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ORNAMENTAL DESIGN FOR WOVEN FABRICS
THE primary reason why the authors undertook the writing of this work on "Ornamental Design for Woven Fabrics" is, that they felt the want, when teaching, of some book where the subject was systematised and specially dealt with. In planning it out we have been guided by our experience of the difficulties met with by students in local weaving schools, believing that the same may also be felt by others.

It is not intended to cover the whole subject of Ornamental Design, that having been already written upon in many excellent books, and the ground has perhaps been well covered; but for the purpose we have in view, these books may be considered too general for students devoting themselves to one special branch of Technical Design, the information they desire being lost amongst so wide a field of material. It is hoped that our efforts may bring the necessary knowledge within a narrower focus and thereby make it more easily accessible; the consecutive order in which the matter is presented may also be helpful to students, designers, and manufacturers of textiles, in forming clearer ideas on the artistic side of Textile Designing than they would otherwise be able to obtain from the books published on the subject of Ornamental Design in its broader aspect.

It also aims at bringing the artistic side of textile work into practical touch and closer relationship with the technical requirements of manufacture in that particular trade.
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CHAPTER 1

PRELIMINARY SUGGESTIONS

The obvious preliminary to the designing of ornament of any kind is to be able to draw with ease and freedom; a reasonable amount of skill in drawing is the necessary basis of all ornament which aspires to go beyond the purely geometric, and although it may seem absurd to some of our readers to lay much stress on its importance, experience goes to prove that with many there is a tendency to skip too rapidly over the somewhat uninteresting grind which they are called upon to go through in their elementary stages of work: they are impatient to arrive at the more fascinating and attractive branches of design, too eager to produce original work.

There is a twofold object served in the cultivation of good drawing. In the first place, it gives freedom and precision to the hand and trains the eye to judge the relative proportion and position of the parts of a design with accuracy. This must be the first definite aim of the beginner; until he can draw with some amount of dexterity, any talent for design that he may possess will be seriously handicapped, and he will be unable—from lack of skill in drawing—to put his ornamental conceptions on paper in anything like an agreeable or satisfactory form.
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The other purpose which is served by learning to draw is in the development of a feeling for beauty of line and form that it helps to bring about: all design is to a large extent dependent on a refined and sensitive feeling for the beautiful, and although this may be inherent in some people to a much greater degree than in others, it is at the same time mainly the result of cultivation and practice, which even the most gifted individual cannot afford to dispense with.

An excellent method of developing the feeling for beauty of line and form while at the same time obtaining useful practice in drawing, is to copy good examples of ornament, including, of course, Textile Ornament; the latter may be either from the fabric itself (and this is always the most satisfactory where good examples are available), or from good reproductions. Such exercises form a very useful introductory course to the study of Ornamental Design, and though their purpose at this stage is mainly that of teaching freedom of drawing, they also assist in making the conditions of repeated pattern familiar, and—if from the fabric—in promoting a feeling for harmony of colour.

Another useful way of gaining facility in drawing, and at the same time preparing for the work of original design, is to draw as much as possible from such forms in nature as lend themselves to decorative treatment: for textile ornament freely growing plants are essentially important, forming as they do the basis of much of the best work that has ever been produced; other natural elements may be used in the same way, and while serving as useful models from which the would-be designer may profitably copy, they also point the way to the use of natural forms as the basis of ornamental design.

It will be advisable, perhaps, to supplement whatever has been said with reference to the importance of a good and solid preparation in drawing by a few words on the necessity
SPANISH—SIXTEENTH CENTURY-DESIGN, IN OUTLINE AND IN MASS.
PRELIMINARY SUGGESTIONS

of looking at ornament not as outline merely, but rather as form; and students are strongly advised, after gaining a moderate amount of facility in drawing with the lead pencil, to allow the brush to take its place to a considerable extent. It is now generally admitted that the brush lends itself to decorative drawing more readily than the lead pencil. The Japanese know the value of it, and so did the ancient Greeks; if one examines the painted pottery of classic times, or the more modern examples of Japanese decoration, we may see what excellent results have come from a free use of the brush, and how it lends itself to producing solid forms of varying thickness: how with one stroke of the brush a form graduating in thickness from the finest point may be readily obtained. Such designs as the key or fret pattern on Plate IV., or the Anthemion Borders on Plate XXX., Figs. 3, 4, and 5, are the outcome of the use of the brush; in these illustrations the forms are, for the purposes of a repeated woven design, reduced to a regular and symmetrical pattern; the irregularities which may be seen in the old Greek pottery from which these are taken are charming in their place, and are just as natural to hand work as for a mechanically repeated pattern they are unnatural; and so these accidental irregularities are done away with where a woven design is contemplated, but the value of such brush work to the textile designer is not diminished thereby, and granting that this free use of the brush may not always produce accurate forms, it nevertheless produces solid forms which are far more akin to textile pattern than any outline is likely to be.

In nearly all textile designs, the masses of the ornament have to be considered, and their weight and distribution over the surface of the cloth. An outline is liable to be deceptive, tending to make a design look fuller than is really the case. Take, for instance, the illustration given on Plate I., in which the same design is shown in outline
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and in mass; the difference is at once evident, the outline design looking fuller and more complex than it appears when washed in with the brush. This comparison is sufficient to show clearly the importance of considering Textile Ornament as solid form, not as outline; it rarely happens that woven patterns are brought out in the finished fabric in outline only, and it would only be in such rare cases that an outline drawing would be satisfactory.

In getting out a sketch design there are many different ways adopted; but in all cases it is important to let the first blocking-out be such as will indicate the masses of ornament, and so avoid being misled by the false impression which an outline gives. The use of a blackboard and ordinary white blackboard chalk is advocated by some as a good method of getting out the first rough idea; the white chalk lends itself very well for roughly indicating the masses, and for large patterns it is a very useful implement to work with; coloured blackboard chalks may also be used effectively in the same way.

Another method is to use a piece of toned paper—dark toned brown paper does very well—and sketch out the design in white chalk or a piece of soft charcoal, or where two colours are to be introduced, both may be used very effectively and readily. This may very well be done as a preliminary to a more definite drawing-out of the pattern with the brush. In using the brush the whole range of the palette is available, but where the designer merely aims at evolving good shapes and well-distributed forms, and where the question of colour does not enter, the use of a good solid black, such as Indian ink or (which for the purpose does equally well and is much cheaper) ebony stain, is preferable; ordinary writing ink also does tolerably well, but does not produce such a solid black as the ebony stain.

Another method which is found to be very rapid and convenient is, to sketch in the design roughly in pencil, then paint
it over with a brush in the colours that might be suitable for
the completed design, or if only one colour is required,
in black or any quiet colour. If the design then appears
satisfactory, wash it down with water and a sponge, let it
dry, and redraw carefully with a pencil, and finally paint
it over in the required colours as a complete study. The
great advantage of this method is that the first colour stage
is an experimental one on the same lines as the finished
drawing, and is therefore helpful in estimating the final
result.

A very useful and almost necessary part of the work of
a designer, if he wishes to be progressive, is to study as
much as possible the work of others, and much may be
learnt from the designs that are to be met with in our
museums, exhibitions, and shop windows: to mentally note
such ideas is in itself highly profitable, but if one wishes
to retain whatever may be worth retaining, something more
than a "mental note" should be made, and a pocket sketch-
book will prove itself invaluable for the purpose of jotting
down any specially beautiful or novel combinations of form
or colour. Such drawings need not be elaborately worked
out: a few lines may be sufficient to record the salient
points in a design (Plate XXV. is an example), and they will serve at any rate to inspire new ideas when they
are required.

It must not be inferred that such sketches or notes are
to be only from textile fabrics; many useful suggestions
may be gleaned from other objects of decorative art, such
as pottery, tiles, wall-papers, &c., from all of which it is
possible to learn something that may be turned to good
account by the designer for woven fabrics, though, of course,
it must be remembered that sketches from such objects can
only be used as suggestions, and not for the purpose of
imitation: the aim of any such studies as these must be, not
to imitate the work of others, but to store the mind with all
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the good material that is accessible from every source: the shop window gives abundant field for the study of present-day ornament, while our museums afford opportunities of becoming familiar with the best work of historic styles, and it is to a very great extent by learning from such sources that the designer is able to create designs marked by his own individuality, and having a distinctive character of their own.

Studies or notes of the kind suggested, whether pencil drawings or colour sketches, may be supplemented by pieces of the actual woven fabric when the latter are obtainable; if selected with definite purpose, and not indiscriminately, a collection of very useful and instructive material will be gradually gathered together, and when classified and pasted in pattern books so as to be available for easy reference, its value will be still further increased: there is perhaps a danger in making such collections of producing a copyist rather than an originator of ornament; but, on the other hand, if one affects to ignore the work of others there is a tendency to become stereotyped and to constantly repeat one's self. We are all of us necessarily influenced, whether we like it or not, by the productions both of our contemporaries and predecessors, and if the designer wishes to work on progressive lines he will be glad to learn all he can from such sources, and use the knowledge gained as a stimulus to the production of original work.

A word may be said as to the modern demand for novelty in design which is so characteristic at the present day of nearly all industries to which art is applied: there is, of course, no need to discourage in the slightest degree the production of ornament which is marked by some special novelty or originality of idea, but it should always be borne in mind that these qualities must be combined with sound artistic excellence, and must conform to the laws of fitness. This demand for what is novel often tends, however, to the
neglect of the more artistic side of design, and frequently leads to the degradation of good decorative art: when this is the case novelty can only be condemned, and although it is in itself a refreshing feature of all art work, and an important factor in ornament looked at from its commercial standpoint, it must be remembered that the design which has nothing but novelty to recommend it, cannot have any lasting value either commercially or artistically.
ORNAMENT may be composed entirely of geometric forms, or may merely have a geometrical foundation for its structural basis. In textile ornament the question of geometric arrangement is a very essential one; the same may be said of all design which is repeated or multiplied indefinitely by such mechanical means as weaving or printing, for, however elaborate a design may be, it must be capable of exact repetition; for woven fabrics the repeat must be contained within a rectangular shape, the length and width of the rectangle limiting the length and width of the repeat. It follows, therefore, from the repeat of a woven design being containable in a rectangle—and the rectangle being itself a geometrical shape—that there is always a geometrical arrangement present, however free a design may be from shapes of a formal character in the ornament itself.

The lines of the rectangle, although limiting the repeat, do not necessarily supply the most suitable lines upon which to build up a repeated pattern: other geometric forms may be brought into play, and the most useful of all is the diamond.

But it is not intended in this chapter to deal with the
planning of designs—that will be dealt with in another chapter—but rather to deal with the use of geometric elements in repeated pattern. Incidentally, of course, the question of arrangement will be touched upon, but our object now is to deal with the varied effects in design that can be evolved from such simple forms as the square, oblong, hexagon, triangles, polygons, circle, and ellipse, rather than the geometrical planning which underlies the use of these and all other elements in repeated pattern.

It must here be stated that the elements in ornament which are capable of direct geometrical construction, that is, which can be drawn with ruler and compasses, have less claim to be considered artistic than those forms which possess greater freedom and which are more directly the outcome of the artistic feeling and sense of beauty on the part of the designer.

In the development of ornament the geometric comes first in historical sequence: it is the most primitive and elementary type, and the earliest historic styles point to the fact that simple geometric forms were those which first suggested themselves to the ornamentist. They require the smallest amount of intellectual or artistic capacity in their production, and therefore naturally supply the first step in the ladder both of the development of historic styles, and in the progress of the student of design in the present day. Among the uncivilised peoples of the world the geometric type of art gives the limit of their achievement and the extent to which their capacities for design are capable of going; to emulate the uncultured peoples of the world and limit one's ambitions in ornament to the geometric is therefore very undesirable; for while the value of such set forms as will be dealt with in this chapter may be fully and frankly admitted, it must not be forgotten that they can only take very humble rank when looked at from the artistic standpoint, and when compared with design which
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demands originality of conception and artistic treatment. The simpler forms of geometric pattern, such as stripes, checks, and interlacing bands, are naturally suggested by the process of weaving, just as the plaiting together of bands of straw or grass in basket work and coarse matting has suggested the simple patterns with which we are familiar in such productions.

To the student of textile design a knowledge of plane geometry is very helpful if not absolutely essential; and as it will be undesirable here to deal with the science of geometry, the reader's knowledge of it will have to be assumed: it may be useful, however, to refer briefly to the construction of a few of the more useful geometric forms, not as dealing exhaustively with them, but rather as a necessary introduction to their use in design.

In Plate II., Figs. 1 and 2 give the square, first with two sides vertical, and second with one diagonal vertical. In Fig. 3 the squares are combined, and give the interlacing pattern which is developed on Plate III. Fig. 11. In Fig. 3 the angles of the squares are equidistant from each other and from the centre X, so that the points would be contained in a circle of which X is the centre, and they would divide the circle into eight equal parts, thereby producing a regular octagon as in Fig. 4. The same division of the circle may be utilised in producing such ornamental shapes as the eight-pointed star shape in Fig. 5. The octagon may be produced in a square by the method indicated in Fig. 6, the radius of the curves being the distance from the angles of the square to the centre.

The division of the circumference of a circle into six parts may be very readily obtained, the radius of the circle measuring round the circumference exactly six times, thereby producing the hexagon, Fig. 7, and all the ornamental devices which have the hexagon as a basis, such as Fig. 8.
PLATE II.

CONSTRUCTION OF USEFUL GEOMETRIC FIGURES.
GEOMETRIC PATTERNS BASED ON THE SQUARE.
GEOMETRIC DESIGN

Fig. 9 gives, on each side of the line A B, an equilateral triangle, the two triangles together making a diamond shape.

Fig. 10 gives the method of dividing the circumference of a circle into any number of equal parts—in this case five. The diameter of the circle is divided into the same number of parts as it is required to divide the circumference into, and point A is found by the intersection of arcs sprung from each end of the diameter, and with the length of the diameter as radius. The line drawn from A through point 2 to B cuts off one-fifth of the circumference. The second division of the diameter is the one always required, whatever may be the number of divisions, and to ensure accuracy, great care should be taken to divide the line with absolute correctness. Fig. 11 gives a five-lobed ornamental pattern evolved from the division of the circle into five parts, and suggested by the wild-rose flower; generally speaking the number of lobes or petals of such ornamental figures will correspond with the number of divisions of the circle.

Fig. 12 gives the ellipse. The foci of the ellipse are obtained by taking half the major axis as radius, with x as centre, and describing an arc to intersect the major axis in F₁ and F₂. The most generally useful method of drawing the curve—and if carefully done the most accurate—is to fix three pins at F₁, F₂, and x respectively; then tie a piece of thread tightly round these three points, so that the string forms a triangle F₁ x F₂. Substitute the pin at x by the point of the pencil, and taking care to keep the thread tight and the pencil vertical, proceed to draw the curve of the ellipse.

Horizontal and Vertical Lines.—The process of weaving, which is a system of interlacing threads—called the warp and weft—at right angles to each other, must naturally have first suggested designs of a square or rectangular character, and in Plate III, we have numerous instances of the way in which the square may have suggested ornamental pattern.
ORNAMENTAL DESIGN

Such a pattern as Fig. 1, which may be best compared to a draught board, must have grown almost involuntarily out of the weaving process, and no effort of the imagination can have been demanded for such a simple device. In Figs. 2 and 3 a further development is shown in which there is some attempt to arrange the threads so as to produce an ornamental effect. Fig. 5 shows an arrangement of inter-lacing squares, and each of the Figs. 6, 8, and 10 has distinct evidence of being suggested by the crossing of horizontal and vertical lines. The Scotch tartan, Fig. 12, is also very clearly the outcome of a square basis, and all tartan plaids and check patterns are unmistakably built up on this same foundation.

Diagonal Lines.—In Figs. 7 and 9 diagonal lines at 45° are combined with the vertical and horizontal lines. Fig. 11 consists of an arrangement of interlacing squares, each repeat containing a square with vertical sides interlaced by a similar and equal square that has its sides inclined at 45°, and conventional rosettes are added to fill in the vacant spaces. Figs. 13, 14, and 15 are, as will be seen by reference to the construction, based on the lines of the square, and are given merely to show some possible developments of the square as the basis of geometric pattern.

Counterchange.—Figs. 7 and 9 give simple examples of what is known as counterchange; which means that the shape of the pattern is so designed as to leave an exactly similar and equal shape in the ground. The draught-board pattern is the simplest form of counterchange, and if Fig. 7 be examined it will be found to be based on the draught-board pattern, the figure being produced by cutting out wedges from one square and adding to the adjoining squares. The principle of counterchange is a very useful one in design, especially where it is desired to let the ground have the same amount of space allotted to it as the pattern, and numerous instances of it will be pointed out in this chapter.
GEOMETRIC STRIPES AND BORDERS.
Plate IV. consists of a series of geometrical stripe patterns and borders.

Stripes.—In Fig. 1 the most elementary form of stripe is given, the stripes being of equal thickness and at equal distances from each other; in Fig. 2 they are at equal distances but alternating in thickness. Fig. 3 gives stripe lines of equal thickness but arranged at unequal distances, while Fig. 4 gives a striped effect in which both the thickness of the stripes and the size of the intervening spaces vary. Fig. 5 gives an effect in which the thickness of the stripes is so graduated as to suggest a shaded result, a gradual change from light to dark. Figs. 6, 7, 8, and 9 give instances in which a little conventional ornament is added. The further consideration of designs for striped effects will be dealt with in Chapter VIII.

Geometric Borders.—Figs. 10 to 20 give examples of fret patterns, beginning with the simplest possible form and gradually developing to more elaborate treatments. In Figs. 10 to 15 the lines used are all either vertical or horizontal, and the width of the ground space is the same as the pattern, the ground itself forming a device which is generally as good as the pattern itself: for instance, in Fig. 13, which is frequently called the key pattern, the white ground is almost as pleasing in shape as the part printed in black. This is distinctly a valuable feature in fret designs; they are very readily drawn out on the squared point paper—as may be easily judged by reference to Fig. 15. Where simple border designs are required they are very useful, and their severe rectangular character makes a very good contrast when used as secondary to larger borders in which freely growing ornament is introduced. Their construction will be evident from the small portion which is squared out in each, in the manner of Fig. 15 just referred to. Figs. 16, 17, 18, and 19 are sloping frets in which the horizontal lines of the ordinary fret are retained, but the vertical lines are
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substituted by others inclined at an angle. Fig. 20 is a flattened or elongated fret, and nearly all ordinary frets can be similarly elongated to any extent that may be desired.

Fig. 21 is a zig-zag pattern, and Figs. 22 and 23 are ribband designs that take a zig-zag direction. The remaining patterns on Plate IV. are examples of interlacing strap work, based in most instances on vertical, horizontal, and 45° lines. Such designs as these are met with very frequently in Moresque and Arabic ornament, and although possessing no high artistic value, they are very effective when woven; the principle of interlacing which such designs as these illustrate may be carried to an almost indefinite extent by the combination of straight and curved lines, and they are within the reach of any student possessing a reasonable amount of ingenuity.

Hexagonal Construction.—Plate V. gives examples of designs based upon the hexagon. This geometrical figure is one of the most useful shapes that the designer has to deal with; it is composed of six equal equilateral triangles, or of three diamond shapes, and, as will be seen by reference to Fig. 1, the six points of the hexagon and the centre of the hexagon are at equal distances from each other, thus producing the equal distribution which is such an important feature in repeated patterns. Fig. 2 gives a simple counter-change design of equilateral triangles, and Fig. 4 of diamond shapes, but in each of these instances it will not be difficult to see that they have also definite relation to the hexagon. Fig. 3 shows how the hexagons will fit together without leaving any intervening spaces, in the same way that equal squares, oblongs, or diamonds will fit together. It is the only regular polygon in which this is possible, the pentagon, heptagon, octagon, &c., all being so constituted as to inevitably leave spaces when grouped together. It will be evident, therefore, that the hexagon forms a very useful basis for all-over patterns, and such a design as Fig. 10
PLATE V.

1. Geometric patterns based on the diamond or hexagon.
GEOMETRIC PATTERNS BASED ON THE CIRCLE.
GEOMETRIC DESIGN

gives an instance of the good distribution which it effects: in this example it will be seen that each of the conventional six-petalled flowers is equidistant from its adjacent ones, and besides producing good distribution there is no tendency on the part of the pattern to stripe unpleasantly in any way, the vertical and horizontal lines being neutralised by the sloping lines in each direction. In Fig. 5 we have a twelve-pointed star shape, and in Fig. 6 another pattern which follows the hexagon very closely, as seen in the structural lines indicated in one corner of the pattern. Fig. 7 is a design in which the hexagonal construction is not at first sight very evident, but which a slight analysis of the pattern will disclose. The design is a very good counterchange, and as simple in arrangement as the result is effective. Figs. 8 and 9 also possess an element of counterchange in so far as the shapes evolved out of the hexagonal lines are concerned, each form being exactly the same and fitting together. In Fig. 8 the shapes are composed of three and Fig. 9 of four adjacent hexagons. Fig. 10 consists of six-pointed stars surrounded by hexagonal shapes, while Figs. 11 and 12 are ornamental designs that have unmistakably grown out of the hexagon, and which further serve to point out the possibilities which this geometrical shape holds out to the designer for textile fabrics in which an all-over effect is desired.

In the last three plates the geometric shapes which have been dealt with are composed of straight lines: in the next three plates geometrical patterns composed of curved lines, or a combination of curved with straight lines, will be dealt with.

Curved Lines, Plate VI.—The circle and the ellipse are the two curved forms which are most useful, more particularly the former, nearly all curved line patterns of a geometrical character being the product of circles or parts of circles.
ORNAMENTAL DESIGN

Fig. 1 gives the Guilloche pattern, composed of interlacing circular curves. Fig. 3 is very similar to the Guilloche in character and construction. Fig. 2 consists simply of interlacing rings, and is so simple as to require no explanation. Figs. 4 and 5 are "meanders," a term which adequately expresses the peculiar character of this type of ornament; a running fret is also a meander, built up of straight lines, and there is very close relation between the Figs. 4 and 5 and the two fret meanders on Plate IV., Figs. 10 and 11. The construction of the two meanders on Plate VI. is clearly shown, the points indicated being the centres of the circular parts of the meandering curves. Fig. 6 is similar in principle to the Guilloche, Fig. 1, the only difference being that the large circle in the latter is replaced by an ellipse. Fig. 8 consists of conventional flowers or rosettes constructed on a geometric basis, the foundation of such rosettes being the division of a circle into any number of equal parts. The scope for designs of this formal character is practically unlimited, nearly every natural flower being capable of suggesting simple ornamental patterns of the type shown in Fig. 8. Figs. 7 and 9 are the Greek wave scroll, single and double, and although not geometrical in the sense of being capable of construction by means of mathematical instruments, they are so formal as to be not out of place in this chapter. Fig. 11 is clearly derived from the intersection of circles, Fig. 10 being just as obviously derived from semicircles. The skeleton of this pattern gives what is termed in ornament "imbrication," suggestive in its construction of fish-scales, semicircular tiles, or the scales on the fir-cone. Figs. 12, 13, and 14 are in their main lines dependent on the semicircle in combination with the quadrant, and in each case the construction as shown by the dotted lines will be sufficient to explain the method of drawing these patterns. They are all counterchange constructions, as
PLATE VII.

CURVED LINE ALL-OVER PATTERNS,
also is Fig. 10. Fig. 14 is an instance of the ogee shape when composed of semicircular curves; it also serves as another example of counterchange construction, the ornament in each of the ogee shapes retaining the same form, but being alternately black on white or white on black.

The full repeat for weaving purposes of the patterns in Figs. 10, 11, 12, 13, and 14 is in each case a square.

Plate VII.—In Fig. 1 the Guilloche pattern is turned into an all-over repeating design; the construction is exactly the same as that of the Guilloche border (Fig. 1, Plate VI.), the vertical direction of the repeat corresponding exactly to the horizontal. It will be seen that the repeat of the pattern, counting from the centre of each large circle, is a square, as also is the repeat of Fig. 4, taken from the centre of each quatrefoil. The construction of Fig. 4 will not be difficult to understand if reference be made to that part of the design in which the structural lines are shown.

Fig. 6 is another instance of the use of the semicircle as the basis of an all-over design; in this case it gives a swag or festoon of conventional flowers, producing a repeating design of a simple but effective character, while in Fig. 14 a somewhat similar use is made of the semicircular curve for a border of festoons: in both these designs it will be evident, from the fact that the festoons are suspended vertically from fixed points, that they are best adapted for a fabric which is destined to hang in a vertical position; the border (Fig. 14), for instance, would be suitable for the border of a table-cover, which normally hangs in vertical direction over the edge of a table, but it would not be so well adapted to the border of a carpet, the position of which, when in use, is always horizontal. In Fig. 7 the principal lines of the design are catenary curves, a catenary curve being generally understood in ornament to be the curve produced when a chain is suspended from two fixed points, one placed higher than the other.
In Fig. 5 the backbone of the design (the wave line) is composed of semicircles and parts of circles, as may be readily seen by the diagram of construction included in the design. Fig. 8 is so obviously made up of circles as to need little explanation, and it will also be very evident that the centres of the circular rosettes fall into the lines of a square, as is also the case in Fig. 9, which is a further development of Fig. 8; both these designs are suggested by Egyptian ornament, Fig. 8 being distinctly Egyptian in character.

The ornamental devices shown in Figs. 2, 3, 10, 11, 12, and 13 are all constructed, in so far as their main lines are concerned, geometrically, and are inscribed within a circle in each case. Figs. 2, 10, 11, and 12 are from Japanese ornament, and they indicate how a circular spot design may be made more interesting by the breaking up of the circle with ornament without destroying the circle itself.

In all the designs for all-over effects given in Plates VI. and VII., the underlying basis upon which the arcs are developed is the square: in Plate VIII. we have in Figs. 1, 2, and 3 the lines of the hexagon or equilateral triangle as the foundation; in Fig. 1 the hexagonal basis is plainly traceable, while in Fig. 2 the equilateral triangle is easily seen to be the figure on which the design is founded; Fig. 3 is also built up on the equilateral triangle or the hexagon (they are, as has been shown on Plate V., practically the same, the hexagon being a multiple of the equilateral triangle), and produces a figure which is very effective as a counterchange; the curves, not including the leaves which form the conventional rosette, are all semicircles, the diameter of each semicircle corresponding to one side of the equilateral triangular construction.

Figs. 4 and 6 are each based on the ellipse, the intersecting curves of the elliptical forms giving the principal lines of the design in each figure.
VARIOUS GEOMETRIC PATTERNS.
Fig. 7 is a design in which only the main lines are geometrically constructed, being included to show how it is possible to use geometrical forms as a framework for more ornate treatments.

Figs. 5 and 8 are examples showing the combination of curved lines with straight ones in the production of geometrical pattern.
CHAPTER III

HOW TO PLAN AN ALL-OVER REPEATING DESIGN

BEFORE beginning to arrange a design it is well to have some clear idea as to what its main characteristics should be, and then to work upon some definite plan.

The character of a design is very largely governed by the kind of material it is intended for, and also by the prevailing fashions.

If it is for a tapestry tablecloth say, or a hanging, then the design may be made full and rich, and of a bold character; this boldness may be emphasised by a strong arrangement of contrasting colours. But if it is intended for a dress fabric, then it must be made to a much smaller scale and the colours be more subdued. In designing a dress fabric, it must always be born in mind that some one is going to wear it, therefore the design should be kept to the scale of the person. The size of the repeat for dress fabrics is usually about four and a half inches; in most cases this is quite big enough. In a repeating pattern more than one repeat should be visible from one point of view, and if we take a back view of the wearer, the value of the repeat will be lost if the pattern is much larger than four and a half inches, especially if we take into account how the repeat is cut up by the seams of the dress.
Having decided what material or purpose the design is for, the next point to settle is the general plan and arrangement of the leading lines. One should really have the whole of the scheme of the design in mind before beginning; this, of course, requires much practice, but if the student has not some idea to work upon he is liable to produce a design without character or backbone.

This central idea or principal feature of a design is the mark of originality; by it the design is judged, therefore too much stress cannot be laid upon the importance of giving the most careful consideration as to what this fundamental idea shall be; the whole design hangs upon it, and the rest of the detail should be subordinated to it. How important this assertion is cannot be better illustrated than by picturing to one's mind a would-be purchaser engaged in selecting a fabric out of the multitudinous variety offered by the salesman. He will select the fabric in which the design appeals to him by some decided originality or beauty of the leading idea. It may be that a well-arranged spray of flowers will appeal to him, or it may be merely some graceful line or figure which possesses the distinctive character to lift it above the level of mediocrity.

It will be obvious to any student who has carefully studied the chapter on "Geometric Design" that it is necessary to plan out a pattern and decide upon what lines it shall be based before the foliage or other detail is added. It is absolutely necessary that the planning shall have a geometric basis if the design is intended to be reproduced as a repeating pattern by machinery, or some mechanical contrivance such as a printing block; the necessities of reproduction demand it. Whatever shape the unit of the design shall be enclosed in (it may be enclosed in a square, oblong, triangle, diamond, hexagon, or even an ogee), some multiple of the unit must eventually be enclosed in a square or oblong if the design has to be reproduced as a woven
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fabric. This will be clearer if we take two examples, Diagrams 1 and 4. In the case of Diagram 1 the unit and the repeat are identical, and the square indicates the part for which the cards would have to be cut; but in Diagram 4 the unit is contained in a diamond, and the complete repeat is composed of one whole diamond and four quarters, which together, as is shown by the black lines, are contained in the oblong A B C D; this oblong would be the repeat, to be drawn out in full on the point paper, and for which the cards would be cut. Diagram 2, the oblong or parallelogram, would be treated in the same way as the square, except that the design would be an oblong shape instead of a square. Diagrams 3, 5, and 6, the triangle, hexagon, and ogee, would be treated the same way as the diamond, Diagram 4; this is shown by the black lines of the repeat and the hatching in of the unit in each diagram.

It is important to keep a clear idea of the distinction between the unit and the repeat, and not confound the two. In carefully observing the Diagrams 1 to 6, it will be
ILLUSTRATING PLANNING AND THE WANT OF IT.
AN ALL-OVER REPEATING DESIGN

apparent that the units are made up of regular geometric figures that fit together without leaving any spaces between them; this arrangement, of course, is very necessary, otherwise the design would be an imperfect one, and the parts would not fit. These geometric forms that are given are very useful—in fact, necessary ones—in the planning out of foliated ornament. The diamond and the square or oblong are the most useful, but the diamond is perhaps the best of all.

The whole of the foregoing remarks refer to machine-made or mechanically contrived fabrics. Hand-made things, such as laces and Oriental carpets, can, of course, be made without repeat—the whole of the pattern may be different from one end to the other; but these come outside the scope of this work.

Plate IX. is an illustration of the necessity of having some definite plan in mind, when beginning a design, upon which to build up the superstructure of foliated forms. Fig. 2 is supposed to be a design for a stripe, if the term "design" is not too much of an anomaly to be used in a case where no planning exists; the very term "design" includes planning. In this figure an irregular wave line is drawn, and growing from this line are a number of leaves and flowers placed without any regard to order except that the design repeats at AB and CD, and is enclosed in the dotted line oblong. The wave line, leaves, and flowers have no relation to one another, nor have they any relation to the side of the border. The three flowers at x accidentally come together and fall in a straight line across the length of the stripe, which, of course, would be very awkward, and in practice accentuate and define the limit of each repeat, which, as a rule, the designer endeavours to conceal.

Fig. 1 shows how by a little arrangement the same details can be put together to make a satisfactory repeating stripe pattern. Referring first to the main stem, which runs
through the design in the form of a wave line, the repeating portion is drawn inside the limits of the oblong, EFGH (which is dotted), and which indicates the length and width of the repeat. Care is taken that this main stem shall at each side, at the points K and L, be the same distance from the edge of the border, the equidistance of these two points giving a steadiness to the design which it would otherwise lack. In the second place the scroll line is drawn in such a way that it twice cuts the wave line, thus breaking the continuity of the latter, as at L. The flowers are placed at alternate sides, and grouped into threes. Similar grouping, but in a different degree, takes place with respect to the arrangement of the leaves. On observing the design closely it will be seen that the majority of the features, i.e., the leaves and flowers at each side, terminate at about the same distance from the outside border. This, like the placing of the central wave line, helps towards the steadiness of the design, and in a sense one has the feeling that the floral ornament could neither be easily moved from side to side, nor the details stray too far from the main groups; to put it into the language of the ornamentist, the stripe recognises its confining borders.

In this question of how to plan a design a stripe has been used as the first example because of its greater simplicity, it being necessary to make it repeat only in one direction, that is, in the direction of its length. But in an all-over figure, as in the next plate, it is necessary to make it repeat both in the length and the breadth.

Plate X. shows the planning of such a design. The oblong shown by dotted lines indicates the repeat. Begin the same way as in the stripe by drawing the principal line, or parent stem. The next point to decide is whether this parent stem shall be an important part of the finished design. In some cases the parent stem is only put into a design to give it some logical growth or coherence, to provide some-
PLANNING OF A DESIGN
thing for the flowers and leaves to spring from, but does not otherwise form an important part of the design, and, as far as the appearance of the design is concerned, it might as well never be there. But in the example before us the parent stem is intended to be an important factor, and must therefore be well drawn and of good shape.

In all designs, or nearly all, some feature should be more apparent than the others, and should be placed so that it will attract the eye either by its shape, size, colour, or texture. How this feature is going to be made to attract must be decided beforehand. A design without a leading feature is monotonous and uninteresting, and of course it follows naturally that if this feature is so important it becomes necessary to make it the most interesting and the most beautiful part of the design. This note of warning is sounded because we find from experience that students are usually too anxious to tone down all the details to one monotonous level. They seem to think that if there is nothing in a design that strikes the eye it must be a good one. A greater mistake can hardly be made, for the little value that such a design can have is only negative; at the best it is merely harmless.

To return to the design before us, the repeat is first decided upon. The wave line is carefully studied with a view to its becoming a feature of the design. It is not enough to make a good curve as it is seen within the limits to the repeat, but the curve must be satisfactory in its relation to the same curve as it is seen in the adjoining repeats. It must not in any way conflict in an unpleasant manner with its adjacent repeating curves.

The four large leaves at the corners of the repeats are also intended to become features, therefore it is advisable that their shapes should also be carefully drawn, and then placed in position. In practice it is advisable to sketch the design in very simply, with as little detail as possible, as at Fig. 1,
ORNAMENTAL DESIGN

because it is almost certain that it will have to be modified in parts when it is repeated. It is seldom that a design in any degree intricate can be put straight in without alterations and modifications; as a designer would say, it requires "pulling about."

The next important item is the conventional flower in the centre of the repeat; that should go in next. It would seem advisable to place this flower on some point which shall be central between the four large leaves. The reason why this flower should go into the central position will be apparent if we refer to Diagram 7. In this example we have the same design in which the flower under discussion is not in the central position, but is placed nearer one set of leaves. To emphasise the change of effect the proportions of the repeat are also altered from an oblong to a square. The result of this alteration is, that instead of the design being an all-over repeating one, it has transformed itself into a vertical stripe. It does not necessarily spoil the design; it is all right as a striped one if a stripe is wanted, but if an all-over design is required, then it is all wrong.

After this flower is satisfactorily placed the remaining details are drawn in as in Plate X., Fig. 2.

Do not be satisfied with your design in outline, but fill it in with a brush solidly, as you intend it to be when carried out. It is very deceptive when only in outline, not only because it looks fuller, but also because many of the faults do not show themselves until it is either made solid or the design is woven into a fabric.

In all cases it is advisable when making a design to draw out rather more than just one repeat; it enables the student to judge better how it will appear when multiplied in the loom. Unless the designer is experienced in his work it is very difficult to judge the probable effect of the design and know how to avoid the faults which are likely to happen. Diagram 7 is an illustration of how easily a design can fall
inadvertently into the lines of a stripe when the repeat is multiplied.

Diagram 8 is another illustration showing how by only drawing one repeat the fault of lining is apt to occur. In this case when the single repeat was drawn the design appeared to be a satisfactory one, but after tracing out parts of the adjoining repeats the faulty line as shown by the darts became apparent. The remedy for this is not a question of pushing the repeats a little closer together, for by doing so some parts of the ornament would overlap. The only way to avoid such lining is to take care that some of the leaves and flowers of each repeat shall extend into the other repeats so that the pattern will dovetail. It is necessary at all times to remember that we are not designing for one repeat only, but that we are making a design to cover the whole surface of a fabric, and that the
fact of its repeating is due more to the necessities of manufacture than to any ornamental value that mechanical repetition possesses; therefore the ideal design is the one that successfully conceals the repeat.

Faults do not always show themselves by lines or bare spaces. Sometimes it is two or more flowers of some peculiar shape, colour, or size, that single themselves out in a repeat. These flowers, &c., may be in such a position that they run into line with the same flowers, &c., in the adjacent repeats, thus causing a chain or line of flowers running the whole length or width of the piece.
CHAPTER IV

THE DROP PATTERN

BEFORE proceeding to explain the advantages and the methods of construction of the Drop pattern, it is desirable that some definite understanding should be arrived at as to the meaning of the term "drop." Fig. 1, Plate XI., is a drop pattern, which, when seen with its accompanying diagrams, will perhaps assist in making the matter clear.

It will be seen that the design (Fig. 1) consists of a number of diamond shapes, within each of which is placed a symmetrical pattern of conventional bird forms, the diamond shapes being arranged together in such a way that if we take any one diamond it will be found to fit midway between the adjacent diamonds. This may be more clearly seen at Fig. 2, where the diamond shape A fits midway between the diamond shapes marked B; it "drops" half-way between the side diamonds B B.

This placing or "dropping" of one diamond below another, as in Fig. 2, gives the essence of the drop pattern, the term "drop" being the outcome of the custom which has been adopted by wall-paper and cotton printers of using printing blocks of a diamond shape, and printing the units of the repeat in juxtaposition. It must of course be under-
stood that the ornament placed in diamond A must be identically the same as that placed in the diamonds B. Fig. 1, for instance, has exactly the same ornamental pattern repeated in each of the diamond shapes, and the fact of the ornament being identical in each diamond is an essential factor; if the design contained a different pattern in alternate diamonds it would at once cease to be a "drop," though at the same time it must be borne in mind that the pattern need not be a symmetrical one, as will be seen later in this chapter.

So far the drop has been treated as being based on a diamond, but it may be just as accurately treated on a rectangular basis, as may be seen in Fig. 3, Plate XI., in which each of the rectangles contains one-half the diamond shape plus the quarter-diamonds, amounting of course to exactly the same as one whole diamond. Perhaps this may be more completely understood by referring to Fig. 4, in which C D E F is the repeat contained in a rectangle, and G H K L the same dropped half its height. If the corner portion of the bird at C be compared with that at G, they will be found to be exactly similar, and the corner piece at F would also, if the repeats were multiplied, fit in at the angle D G H, and so make one complete repeat within the diamond; the rectangle contains, therefore, exactly the same form—only transposed—as is contained in the diamond.

The diamond shape is the most frequently used and most useful basis for all repeated diaper patterns, but in drop patterns it is an almost indispensable factor in their construction; it provides the essential element of the typical drop, the side points of the diamond dropping midway between the top and bottom points. Every true drop pattern if dissected will be found to have the diamond as its fundamental plan. In the example on Plate XI. it is strongly in evidence, and forms a dis-
PLATE XI.

CONSTRUCTION OF THE "DROP" PATTERN.
THE DROP PATTERN

tinctly characteristic feature of the design; as a rule, however, unless for some special reason it is desired that the diamond shape should be strongly marked, it is preferable to subdue such construction lines—to get rid of the scaffolding of the structure. If we examine any of the drop patterns on Plates XII., XIII., and XV. we shall see that the diamond basis of these designs is by no means prominent; on the contrary, it is only possible to trace it by close analysis, and its presence to the lay mind is not felt in the slightest degree.

That it is there, however, may be ascertained by joining four repeating points, as for instance in Plate XII.; if we join the central points of the four large seven-lobed leaves in this design, the result will be an unmistakable diamond shape, and the same figure would be produced by joining any other four similar repeating points in the design (see Diagram 9).

It is impossible to lay too much stress on the importance of this underlying foundation of Drop pattern design; it must, however, not be forgotten that for the practical working out of the pattern in the loom the repeat of the design must be enclosed in a rectangle, the amount which has to
be put on the point paper being one complete diamond with four quarter-diamonds to make up the rectangle, except in the case of "centre-ties" and roll carpets, which will be subsequently referred to; for instance, on Plate XII., of which there is a rough analysis given in the accompanying Diagram 9, the repeat will be seen to include one complete diamond (containing the unit of the pattern), plus the four corners which make up the dotted rectangular shape, A B C D, and all within this shape would require to be worked out on the point paper.

In a symmetrical design, however, such as those given on Plates XI. and XIII., it would only be necessary to put half the full width of the diamond on the point paper, as it is possible to so arrange the mechanism of the loom as to produce the two symmetrical halves of the repeat from the one set of cards, this method of arranging the harness of the loom being known as the "centre-tie." For instance, in Design 2, Plate XIII., the amount actually worked out on the design paper and for which cards would be cut would be the oblong A B C D (see Diagram 10), the repeating half being produced automatically from the same strings in the harness of the loom by a system of tying up each individual part of the harness on one side to the similar parts of the harness of the other side. This device is of special value in the production of symmetrical designs of an elaborate character, as by this method of arrangement, a design will have the effect of being twice the width of the amount actually worked out for the loom, without any addition to the expense of production.

This same economy in production applies also to designs which, although not drop patterns, are symmetrical in character. Plate XIV. is an instance of a symmetrical
SYMMETRICAL PATTERN WHICH DOES NOT "DROP." SIXTEENTH CENTURY GOTHIC (FROM LYONS MUSEUM).
THE DROP PATTERN

design which does not drop, and the portion hatched in represents the symmetrical half of the repeat which would have to be drafted.

One of the most advantageous uses of the drop pattern in textile fabrics is in its application to roll carpets. The usual width of carpet with which we in England are familiar is 27 inches, and by using the drop it is possible to make the full width of the repeat equal to twice that amount, namely 54 inches.

In Plate XV. a carpet design is given in which the drop pattern has been used. A B at the top of the plate represents 27 inches, or one width of the roll, and A B C D (in which the ground is filled with vertical lines) is one complete repeat, representing the amount which would have to be worked out on the point paper. In the centre of the line B C we find this same repeat dropped at E F G H, the width of the rectangle representing another width of carpet roll, which fits to the first width so as to make a perfectly connected design. If the illustration is further examined, it will be seen that, when this drop pattern is used, the same forms in the pattern do not repeat at a less distance across than two widths of the roll (54 inches), as, for instance, point D in the large flower which repeats at K.

If a side to side repeat were adopted, the forms would recur horizontally every 27 inches, but the drop pattern can, without any additional expense or labour in production, produce an apparently wider design. An exactly analogous case is to be met with in wall-paper designing, in which, by means of the drop, the repeat horizontally is made equal to two widths of the paper, 42 inches instead of 21 inches.

In the use of the drop pattern for carpets there is another advantage which is distinctly in its favour, namely, that there is less chance of waste during the process of cutting the roll and fitting the widths together to suit the
size of the room; the diagrams (11 and 12) which are here shown will illustrate the economy that may be effected by the use of a drop pattern over one which repeats from side to side. Two equal rectangular shapes are taken, which are presumably floor spaces, and which require covering with carpet. The dimensions are 13' 6" × 15': the narrower direction of the room just taking six widths of 27" roll. Diagram 11 is carpeted with a pattern in which the drop is used, the oblong spaces representing the repeat. It will be seen that beginning at A, and cutting off what is

![Diagram 11](image1)

![Diagram 12](image2)

required for the long direction of the room, A B will be the first length, and a little waste will occur at B'—the portion which falls outside the rectangular floor space; similarly a certain amount of waste occurs at C, D', E, and F' in the process of cutting off the lengths in the order of the letters appended, and in fitting the drops together, amounting altogether to about one yard. In Diagram 12 the same space is carpeted with a pattern which does not drop, but which fits from side to side, and it will be at once seen that the waste as indicated at B, C, D, E, and F is considerably more than in Diagram 11, amounting altogether to nearly
DESIGN FOR CARPET, "DROP PATTERN."
THE DROP PATTERN

four yards. It may be said that this is an extreme case, but, at the same time it stands to reason that there is less likelihood of waste in a drop pattern because the repeats fit at half the height; and, whereas in the latter the greatest possible waste in one room length of roll would be half the length of a repeat nearly, it is possible in the other case to have very nearly the whole of a repeat waste.

In order to minimise as much as possible the chance of this waste in cutting, it is advisable to keep the length of repeat within moderate bounds, whether the design be a drop or no. The design in Plate XV. errs in this respect, the length of the repeat being too great; a squat diamond in preference to a tall one would have been a better basis to build the design upon, looked at from the economical standpoint.

With regard to the method of making a drop pattern design, it is undoubtedly best to begin by constructing a diamond shape, making the width and height equal respectively to the width and height of the full repeat; then sketch in the dominant forms and leading lines, such, for instance, as the principal flower and stem lines in the carpet design on Plate XV.; then block out the principal leaf forms of the pattern, taking care that the line EK of the diamond be cut by the lines of the design exactly in the same points as in DH, and similarly ED must correspond to KH. The diamond EDHK contains one complete unit, but it is necessary, in order to get a satisfactory distribution, to extend the first sketch freely in each direction beyond the limits of the diamond; and when the forms so multiplied seem to be well arranged and agreeably distributed, a more exact drawing of the ornament contained within the unit may be made with the aid of tracing paper in order to make sure that everything fits accurately together and takes its proper place.

In speaking of the drop pattern, the drop has always
been taken as half the height of the repeat, and this is generally accepted as the true drop; it is possible, however, to have a drop, say of one-third the height, as in Diagram 13, or of one-quarter the height, as in Diagram 14, but regarded as a repeating pattern in which a good even distribution is desired, the result is not so satisfactory, while the width of the repeat is greater. There is a decided tendency for a "bar" to assert itself, as seen at A B, Diagram 13, or at C D, Diagram 14, whereas in Diagram 15, which drops one-half the height of the repeat (the generally accepted type of drop pattern), there is no tendency for

either the horizontal, vertical, or diagonal stripes to assert themselves unduly. The shorter the drop, the worse the result is, producing a more pronounced stripe and making the width of the repeat greater and more expensive to work out, without any compensating value regarded as ornament.

As a general rule, therefore, drop patterns of the character of Diagrams 13 and 14 are not satisfactory, being both more costly on account of the increased width of the repeat, and less adapted to the ordinary requirements of repeated all-over pattern on account of the diagonal stripe which persists in asserting itself.
The Construction of a Turn-over Pattern.
THE "TURN-OVER" DESIGN AND HOW TO PLAN IT

THE "turn-over" method of planning out a design is one that for many reasons is very frequently used. With this method of planning "faults" can be avoided with more certainty, and the design has a greater appearance of complexity, because the repeats, by being alternately turned first one way and then the other, are less evident to the eye than when they all run in the same direction.

Although it is a most useful planning and, in competent hands, a design can be made on this basis in which "faults" are least likely to occur, yet it is the most difficult one for the student to master, because when the unit of one repeat comes to be turned over the two units are liable to overlap one another in some of the details.

The method of constructing a "turn-over" pattern will be seen by referring to Plate XVI., where is given the design, together with the main lines and the geometrical construction upon which the whole is based.

The first part to arrange is the proportion of the repeat: this is given in the oblong hatched in with horizontal lines. It will be noticed that the repeat, that is, the whole oblong required for weaving purposes, contains one unit—which is the white diamond in the centre—and four quarter units which surround it.
ORNAMENTAL DESIGN

After the proportions of the oblong $ABCD$ are decided upon it is well to draw in a diamond which shall join the centre of each side of the repeat as in the example given. So far we have the necessary geometrical construction. The next point to decide is, what shall be the character of the design. The one given is based upon the lines of the ogee. It is not necessary to base the design on the ogee; a wave line, as in Plate XVII., or any other line could be used; or, if desirable, no definite line need be adopted, but in any case the character of design should be decided beforehand.

To draw the ogee accurately, divide the top corner of the repeat into four equal parts, as $E$, $F$, $G$, $H$, then draw in the ogee line. It will be sufficient if the line is drawn from $F$ to $I$, and the other half traced from it, as the two parts are exactly the same. When this portion is drawn, trace from it the other four portions of the ogee.

The large flower in the centre of each repeat may now be placed in position. Care must be taken that each alternate horizontal series is turned over in a different direction, one whole series towards the right and the other towards the left, as shown in the plate. No other placing will produce the required effect, as the student can see by experimenting with other arrangements.

In blocking out the design it saves much waste of time if the principal features only are sketched in with a single line, such as the heart shapes which are intended to stand for the group of flowers in the centre of each unit at the lower completed portion of the Plate.

When these heart shapes have been repeated a sufficient number of times, break up the ogee lines with lines $K$, $K$, $K$. This is the line upon which the small flowers are to be drawn. Repeat this line in each unit; it is not repeated in the diagram to avoid confusion.

Now that the design has advanced so far it is well to look it over and see if any parts are likely to overlap or go wrong
THE "TURN-OVER" DESIGN

in any other way. It is almost certain that some part will overlap another when the ornament which is drawn in the first diamond is transferred off, when turned over, on to the adjacent diamond. This advice must be specially borne in mind when making an original design, and not copying a given example.

If at this stage it is thought that the design will come satisfactorily, the detail of the principal part in the centre may be repeated at once at the four corners, A, B, C, D. The reason for completing and repeating one part at a time in this fashion is that one can tell better where to put the subordinate parts, which in this case will be the flowers on the line K K K.

When the design is all traced in to the last detail it is very probable that it will still want overlooking again; it is sure to want some slight alterations here and there, the turned over portion will be likely to come into conflict with the first portion, the lines where the first diamond joins the four adjacent diamonds may be too thickly filled with ornament or it may be too sparse in the filling. It is the parts where the units join together that are always the most difficult to manage.

The student who has studied carefully the chapter on the "drop" pattern will probably have noticed that the "turn-over" pattern is in some ways like the "drop." In the first place it requires one unit and four quarter units to make up a whole repeat; this will be seen by referring to the top of diagram, where the four quarters are hatched with horizontal lines, and the diamond-shaped unit in the centre is left white. It is like the "drop" pattern in another sense: the unit contained in the whole diamond is both turned over and dropped, and in making the design it is necessary to trace off the first diamond, turn over the tracing paper and drop it down to the adjacent lower diamond. This class of design might quite well be termed a "turn-over and drop pattern."
"Turn-over" designs are liable to "faults" much the same as designs that go in only one direction, but not in so marked a degree. This partial immunity from "faulty" lining is one of its advantages; any "faulty lining" that may happen will probably run in a zigzag direction because of the turning over of the unit.

Plate XVII., Fig. 1, shows a "turn-over" pattern based on a wave line; the diamond-shaped unit is indicated by being left white, the remainder of the repeat is hatched. Looking at this single repeat only, it would be difficult to predict that the whole design when many times repeated would appear "faulty," but this "faulty lining" becomes more evident when traced out and filled in as in Fig. 3 below. If the design is held away at arm's length or the eyes are half closed, a white zigzag line will be perceived running up the design; this line is marked A, A, A, on the right-hand side of the design. The fault could be easily remedied by the addition of another leaf in the middle of each blank, or by twisting round the little spray of conventional buds at the top of each so that they would fill up the gaps.

Similar faults can also happen in the arrangement of a simple sprig design. Fig. 2 shows how, when a sprig is turned over, the upper part and the lower part of each figure turn towards one another in such a way, that one flower comes nearly over the flower below it and the two leaves of one spray are liable to come over the two leaves of the spray below, though in the particular case illustrated the leaves fall satisfactorily. To accentuate the fault the flowers are filled in black. On looking closely at the design it will be found that these black flowers form a zigzag line by coming too closely together. There are various expedients adopted to avoid this faulty lining, though they are all to some extent matters of experiment. A good plan to adopt is to put the sprig in its complete form on the four corners of the repeat. It will be noticed that these four sprigs will all slope in the
same direction. When the four are drawn, take the tracing of the sprig, turn it over and move it about within the space left by the sprigs at the four adjacent corners until it is in the position that will best avoid the "fault," and then trace it through with a pencil point. Other ways of avoiding the "faults" are, to take care that the sprig is not too long in any direction, but that the general mass shall form into a round or oval shape; also keep the largest masses, darkest tones, and brightest colours at a central part of the sprig, and the danger of lining will be minimised.

A "turn-over" design can also be arranged on vertical and horizontal lines instead of on a diamond; the points of contact will indicate where the tracing will have to be placed. In some cases this method may be quite as convenient, especially if the design is composed of a sprig. Fig. 2, Plate XVII., gives such an example, where both the diamond and the horizontal and vertical line constructions are used. It is generally found when an all-over pattern is desired that the diamond construction will make the most convenient basis to work upon. It may be well to point out here that a deviation of this "turn-over" arrangement can easily be made by making the sprigs alternate; that is, making the series of sprigs that lean to the right different to those that lean towards the left; an example of this is given in Plate XXII., Fig. 1.
CHAPTER VI

SOME DIFFERENT PLANNINGS

To be acquainted with a number of different ways of planning out patterns is to have at hand a ready means of giving to one's designs the variety that is so essential. Every designer should aim at variety, and whenever a new design is met with he should study it; to do this intelligently he should analyse its construction. He should know first the geometric basis upon which the design is constructed, then the principal lines running through the design, and, lastly, the spotting out of the chief features. By examining a pattern in this order he will be greatly assisted in remembering it.

The number of geometric constructions upon which a design can be based and from which the designer has to make his choice is very limited. As before stated, it must be either a square or rectangle, or some other figure which, when multiplied, will exactly fit within the required square or rectangle. In this way it is possible to arrange a design on an apparently irregular plan, providing that a whole repeat is contained within the rectangle as before. If this apparently irregular plan is adopted, care must be taken to avoid the design having an unsteady appearance.
Designs A & B the distribution of the ornament is based upon the square and rectangle.

Designs C & D the distribution is based upon the diamond.
SOME DIFFERENT PLANNINGS

The square, rectangle, and diamond are the bases most generally used, and although one is so limited in the possibilities of geometrical construction, yet on these bases endless varieties of designs can be constructed by varying the kind of ornament used and the disposition of it.

The method of construction should not be left to haphazard, but should be decided upon according to the necessities of the design required. For example, the square produces a repeat which is the same proportion in length and breadth. The rectangle results in a repeat of greater length than breadth or *vice versa*, according to which way it is turned, the length horizontally or vertically. The diamond can be made to produce repeats of the same proportion as the square or rectangle, by making it of the same length and breadth, or by extending it vertically or horizontally.

The difference of effect produced by the rectangle and square as compared with the diamond may be seen by referring to the figures on Plate XVIII. Each has some quality of its own that the other does not possess. The two designs on the rectangular plan are more severe than those on the diamond, and they have also the effect of marking the limits of the repeat more definitely; they have also a tendency to suggest horizontal and vertical lines, caused by the eye joining together the large flowers which are the principal spots in each repeat. The diamond plan has less tendency to line in any direction, and it is also useful in concealing the limits of the repeat.

On these geometric bases an endless variety of designs can be developed, from the simple disconnected sprig or spray to the most elaborate combination of interlacing wave lines and ogee forms. They may be roughly divided into spots, powderings, sprigs or sprays, connected forms, in which the repeats are joined together by means of continuous structural lines and patterns which are made up entirely of geometrical forms.
ORNAMENTAL DESIGN

Diagram 16 is a spot design arranged diamond-wise. The construction of it is, no doubt, sufficiently evident without further explanation. It is a very useful figure where much ornament is not required. It is not always necessary to cover every available space on the fabric with ornament; the young designer, especially, is cautioned to bear in mind that his design is intended to beautify the material, and if the material will look better with very little ornament upon it and plenty of ground or bare space, he must be content with only just so much ornament as the fabric appears to demand. Then, again, the purpose to which the material has to be applied must be considered; for some purposes an elaborate design is unsuitable, so it will be seen that too much ornament, instead of beautifying a fabric, will vulgarise and spoil it. It is in such cases that these spot figures come in useful, where the ground of the material requires only just sufficient ornament to break its plainness, and also in cases where the material is used in small quantities, such as gentlemen's ties. Of course fashion rules this question to a great extent, especially in regard to wearing apparel. Sometimes the demand is all for spots, and sometimes for elaborately figured goods.

Powdering, such as Diagram 17, is an elaboration of the spot. It has a number of different figures or spots in one repeat, and is more effective in concealing the repetition. It may be composed of any number of different details that can be conveniently arranged within the limits of the repeat,
SOME DIFFERENT PLANNINGS

as in the example. This system is derived from Japanese powderings, which have, as a rule, no repeat, the details being put in by hand with a brush, just wherever the designer fancies to put them, throughout the whole length of the piece.

Sprig patterns may be arranged vertically, with both sides of the sprig equally balanced, as at B and D, Plate XVIII., or they may slope all in one direction, or "turn over" and alternate as in A and C on the same plate. A sprig or spray pattern is one in which the forms are disconnected, without a continuous stem running from one to the other. Diagrams 18 and 20 are two very useful examples.

Diagram 18 is one that is very commonly used in dress fabrics; it is a simple treatment that is very suitable, and one in which the danger of "faulty lining" is reduced to a minimum. As a design it is very effective and easy to construct.
It is arranged on a diamond plan, as in Diagram 19: the larger spray is first drawn within any of the diamonds; in this diagram it is filled in in black. Afterwards it is turned over and traced into the other diamonds, or it would be sufficient to trace whatever comes within the four corners of the repeat. (The repeat in this and the following diagrams is indicated by the parallelogram in solid lines.) The small sprig is then drawn in and made to fill any intervening space there may be to let. It is well at this stage to turn the tracing paper back and add this small sprig to the larger one on the tracing paper; then turn over the tracing again and put in the small sprig in the other repeats just as the large spray was put at the four corners.

The spray design, Diagram 20, is a very effective one where it is desirous to keep much of the ground unbroken with ornament. The construction of it is shown in the accompanying Diagram 21.
The next plate (XIX.) is an example of how connected forms can be used. A design in which the forms are connected at once becomes more pretentious than a simple sprig pattern, and is usually more intricate; it is generally used for materials where a higher class of ornament and greater enrichment of design is required.

The constructional basis of this design is an irregular diamond (see Diagram 22), though the easiest way of constructing it is upon vertical and horizontal lines. The horizontal lines are drawn at equal distances apart, but the vertical lines are drawn alternately at greater and lesser distances. The most direct method is to place the large flowers at the four corners of the repeat, then place the other large flower at the point where the vertical and horizontal lines cross one another, a little to the left of the centre of the repeat. The principal lines should be treated the same way, drawn in one direction, then immediately drawn in the other. This design is a "turn-over" one, and though it is slightly irregular, it is constructed...
similarly to the example given in the chapter on that subject. The principal line in the design is an irregular wave line running vertically.

The following design has a different motive to the one just described. In the latter the principal flower is spotted out and made into a distinct feature of the design, and being so much larger than the other details gives the character to the pattern. The motive of Fig. 1, Plate XX., is an entirely opposite one. The impression it gives is an all-over effect. The ornament is quiet and subdued, evenly distributed, leaving very little of the ground. No part is allowed to proclaim itself much more than another. The design is constructed on a diamond basis, and is a "drop" pattern, the explanation of which is found in a preceding chapter. In constructing a design so closely filled with detail, the greatest difficulty that has to be contended with is the dovetailing of the ornament along the lines where the diamond-shaped units fit together. There is a diamond drawn on the design given; it will be seen that no important feature is allowed to stop at that line, but it is so contrived that they shall all cross over into one or other adjacent diamond; in this way any "faulty lining" that might occur on these lines is avoided. The method of constructing the design is shown in the Diagram 23, the continuous run of the wave line in a diagonal direction being here more evident.
ITALIAN SEVENTEENTH CENTURY PATTERN IN WHICH THE REPEATING FORMS ARE CONNECTED.
SOME DIFFERENT PLANNINGS

The second design on the same plate has another and different motive; the last design was an all-over effect, all the parts were evenly balanced, whilst in this design the different features effect a contrast one with another. The dark sprays of flowers which are picked out in black, turning alternately from the left and from the right, are the most conspicuous features. The principal stem or main line is of white, bordered with black; this forms a secondary feature. There is still a third item in the design, namely, the grey spray which fills in the otherwise blank spaces. There is no effort to fill in the whole of the ground, a great part of it is intentionally left empty. This subordinating of one part to another in a design is a matter of great importance, and one that is more fully dwelt upon elsewhere. The design is a turn-over one, and by referring to the construction given in the last chapter, and to the small special diagram for this design, Diagram 24, it will, no doubt, be easily understood. In the diagram the single unit of the design is filled in with black. Probably the most difficult part to draw is the irregular wave line. The easiest way to understand its construction is to take the part of it which extends from the solid line that bounds the top of the repeat and passes through the letter A to the horizontal dotted line at B. It will be found that this line can be traced on to tracing paper along with the diamond basis; the tracing can then be turned over and "dropped" so that the diamond trace will fit over the adjacent diamond below. When this is done, it will be found that the top of the curve last traced
ORNAMENTAL DESIGN

will exactly fit the bottom of the black line that was supposed to be first drawn. The piece drawn first and the other traced afterwards will thus fit accurately together and be one continuous curve. The next stage would be to draw in the spray that is shown as black in the diagram. There is a difficulty that may often occur here, in the way of "faulty lining," which will happen if the heaviest and largest group of flowers falls too nearly in a vertical line with the same group when turned over in the repeats above and below on one side. Care must be taken that the heaviest group shall come at a point under and midway between the same groups repeated above. In the diagram there is such a group at the four corners of the repeat. The same group is repeated at the centre. It is not always necessary to place the heavier masses at such central points, but whatever the arrangement may be, some similar system of balancing must be employed. Similar care must be taken in placing the grey details. These are not shown in the diagram, to avoid complication.

The first design on Plate XXI., Fig. 1, might be described as a ball pattern; the ball-shaped flower becomes one of the most important features. The design is apparently complicated in effect, much more so than it really is. It is a regular "turn-over" pattern, and on referring to the analysis which is given at one part of the figure it will be seen that it contains besides the ball flower a continuous, irregular wave line, with a branch placed alternately to right and to left; this branch is clothed with five shamrock leaves. The real difficulty in constructing such a design is in making it sit so well together. Simple designs often give the impression of having been easily made, though, as a matter of fact, they have often cost much trouble and effort.

The second figure on Plate XXI. is also a "turn-over" design on a diamond basis; it apparently evades its simple origin by putting in three almost equally prominent features. Take the circular flowers as an example, and it will soon be
SOME DIFFERENT PLANNINGS

seen that they are arranged on a diamond plan; the other two features are interspersed in a regular order. The main stem, as shown in the diagrammatical portion, waves from side to side, sending off a scroll alternately from right and left.

The third figure is an exceedingly interesting design that is based upon the parallelogram, though at first sight the five large figures are so much the same that the design might be mistaken as one based on a diamond. In constructing it the four large flowers are placed at each corner of the parallelogram. The fifth flower, which is a different one, is placed at the centre. The peculiarity of the design is the arrangement of the wave line, which runs diagonally across, making lines of an ogee form from corner to corner. If the example is examined closely it will be found that there is only one simple curve in each repeat.

PLATE XXII. contains two designs; the first is a sprig design, arranged alternately right and left on a diamond plan, but it is not a "turn-over"; the alternate sprig is not like the first one, though in general proportions it is very similar.

The second figure is a very pleasing arrangement, in which there are two strongly contrasting features, the profile leaves containing much plain ground, and the spray of flowers. The design can be constructed on a diamond plan, as it is a "turn-over" one, but probably it would be the easiest way to plan it on horizontal and vertical lines, as illustrated in the accompanying Diagram 25. Place the leaves which run in the same direction at the four corners of the repeat, then trace it and turn

DIAGRAM 25.
it over at the centre, where the leaf is filled in black in the diagram.

Plate XXIII. is a combination of foliated forms and interlacing strapwork. The construction is on the diamond basis and is adapted as a centre-tie. This class of design is useful for continuous all-over figures, because it is possible to make an interesting contrast between foliated centres and the lighter strapwork. This particular example is also interesting in showing what is meant by contrast of line. That subject is dealt with in the chapter on the "principles," but it is instructive to refer to it here, as it is so very important a factor in the design. On the left-hand side is a line analysis of the design in which the principle of contrast of direction is well illustrated. It will be noticed that when one line crosses another it cuts it at, or nearly at, a right angle; this cutting rectangularly of one line with another gives to the design the sharpness and crispness that it possesses.

Another interesting variety of design is given on Plate XXIV., in which one design is superposed upon another. It is known as superposed ornament. The ground is a sort of plaid, composed of gradually diminishing vertical bars, which are crossed by a similar series of horizontal bars. The superposed ornament is made of dock leaves conventionally rendered and placed at different angles. There is no particular order in the arrangement of the leaves, but care must be taken that they fall at different angles and that no two in the repeat shall fall the same way. The way to begin such a design is, after drawing the bars geometrically, to place the leaves at the four corners of the repeat and then fill in the centre with other leaves. A word of warning may be given here as to the arrangement of the ground, that is, the amount of space in the ground compared to the amount of space occupied by the figure, and the shape of the spaces left in the ground between the figures. This is
PLATE XXIV.

DOCK LEAVES SUPERPOSED ON CHECK GROUND.
very important, especially where the design has no apparent order of arrangement. The amount of space occupied by the ornament must have some tangible proportion to the ground; if there is too much equality the two are liable to be confounded; it will be difficult to see at a glance which is one and which the other. Again, the spaces left between the ornament should be pleasing in shape and not too decided in form; any forms that are too continuous are liable to catch the eye and be more attractive than the ornament. The designing of the ground is in reality as important as the designing of the ornament.

**Plate XXV.** is a design suitable for a very rich material; it is arranged as a centre-tie, and is based on the diamond; the principal lines running through it are two ogee lines that cross one another. A very pleasing feature is the contrast that is obtained by introducing the underlying ogee of decorated ribbon work. The construction will be sufficiently evident by referring to the diagram that accompanies it.
CHAPTER VII

THE "SATEEN" ARRANGEMENTS

This method of planning out designs, known as "Sateen" arrangements, has been purposely left out of the chapters "How to Plan a Design" and "Some Different Plannings," because it was felt that if this part of the subject were treated by itself there would be less liability of confusion.

Although the planning out of these sateen arrangements is in reality on the square or oblong basis, the effects produced are so peculiarly different, and in certain classes of design for textile fabrics are so much used, as to warrant a separate explanation.

The term "Sateen" is derived from the arrangement of warp and weft peculiar to what is known in textile manufacturing as a satin weave, which is a construction of cloth where the weft comes to the surface in greater proportion than the warp, or vice versa, in a certain definite order. In these sateen arrangements we have nothing to do with the construction in regard to the building up of the cloth, but we make use of the peculiarity of distribution they give when applied to design purposes in the way of spacing out the units of the repeat. A series of arrangements up to sixteen places is given on Plate XXVI., though it is not often that more than the eight-ends is used.
ARRANGEMENTS BASED ON THE SATEEN ORDERS.

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The "Sateen" Arrangements

The value of the sateen arrangements is most apparent in patterns with small repeats, where it is desirable that the repetition should not be evident. They are of great service, too, when a simple spot figure is used as the feature of a design, each spot making a unit in the repeat, which unit may be placed in different ways as in the example of an eight-end spot figure given on Plate XXIX. In all such cases the use of the sateen arrangements is advantageous because it enables one, by a very ready method, to place the spots in such positions that the danger of faulty lining is reduced to a minimum; as an instance of this, if reference be made to the second diagram on Plate XXVI. (the five-ends) it will be evident that if the eye were run up the squares from any of the numbers, 1, 2, 3, 4, 5 at the bottom, or across, from any of the numbers at the side, it will be stopped by one of the black squares, and in no case will there be a series of five white squares without a black square intervening; thus it will be seen that if the spot figures are placed upon these black squares there will be no danger of faulty lining. The first figure on Plate XXVIII. is an example of a design where the large flowers are arranged on the basis of a five-end sateen. The same test applies equally to all the other sateen arrangements.

Turning again to Plate XXVI. it will be easily seen which of the numbers are the most useful ones, viz., those that give an even distribution of the black squares. The numbers in which the black squares form into a diagonal line or twill should be avoided unless the diagonal is required for some special reason.

The method of finding out the disposition of the true sateen orders is as follows:—Take a number that is less than half the whole number and yet will not divide exactly into the whole. Taking the five-ends as example, two is less than half the five, and also will not divide into five without leaving a remainder. Then two is the number to be used in counting
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out the squares. Referring again to the second figure on Plate XXVI. (the five-end), we begin to count from the left-hand corner and mark the first square as number 1. Then count 1, 2, and place the next black above the 2 and on the second row; again count 1, 2, which takes us to the third place, and above the 3 on the third row mark the third black; beginning again at the left-hand corner, and this time counting the corner square, count 1, 2, we have the place for the fourth black above the 4 and on the fourth row upwards. Again counting 1, 2, we arrive at the figure 5; above it and on the top row mark the place for the fifth black. Each black square is the place for the spot figure, or the most important figure of the design.

The four-ends and six-ends that are given on Plates XXVII., Figs. A, B, C, and D, and XXVIII., Fig. B, respectively, are exceptions to this rule for finding the places of the figures. They are really not true sateens. The arrangement of the four-ends is too obvious to require explaining. There is no particular way of learning the order for the six-ends except by remembering it as here given—1, 4, 2, 6, 3, 5, and shown on the third diagram, Plate XXVI.

It is as well to state here that in the higher counts it may often happen that there will be several numbers that will produce the same results; for example, arrangements of the thirteen-ends sateen order can be made with the numbers three, nine, five, and eight; one will generally be more satisfactory than the others for design purposes. In all cases there are at least two numbers that will find the order; for instance, in the five-ends, two or three will work, the first is the number used in the figure, the second is the arrangement that we should find if we counted the points as they occur from the left-hand side of the repeat. In a few cases where the count is a high one there will occasionally be a number that will not apply by the rule given; a little experimenting will soon show what numbers will be satis-
FIGS. A, B, C, D. ARRANGED ON FOUR-ENDS SATEEN ORDER.
FIGS. E, F. ON FIVE-ENDS.
DESIGN BASED ON FIVE-ENDS SATÉEN ORDER

DESIGNS BASED ON SIX-ENDS SATÉEN ORDER.
factory, those given in the figures being probably the most convenient ones.

The figures at the bottom of Plate XXVI. are given to illustrate another method of arranging the same sateen orders. The system is based on the principle of dividing the square or oblong repeat into the same number of equal parts as there are ends required. As an example, take the first figure, the five-ends. The square repeat is divided into five parts of equal area, or more strictly speaking there are nine unequal parts, but these unequal parts can be added together in such a way that they will make five parts of exactly equal area as before stated. How the different parts can be joined together is shown in the last figure on the Plate; for instance, the black triangle D, inside the square repeat, can be placed against the incompletely square 2, and make it into a figure equal in area to the central figure 5. In the same way it can be shown that all the other incomplete figures can be added together. The different ways that the triangles are hatched or dotted in the figure will assist the student in adding together the different parts.

Plate XXVII. contains several applications of sateen orders. The first four figures, A, B, C, D, are arranged on the four-ends plan. Fig. A is a connected pattern with prominent features placed in the four-ends order. B is a sketch of the same showing the effect of the pattern when further repeated. C is a sprig pattern arranged after the same manner. D is a spot pattern, which is also on the same arrangement.

Fig. E is a spot pattern arranged on the five-ends order. The usual way of arranging the spots in this order is to place the figures at an angle of 45°, i.e., across the diagonals of the squares, pointing first to the left, another spot pointing to the right, then other two spots pointing right and left but upside down. In this way four different positions can be
obtained. The fifth position must then necessarily be a repetition of one of the others.

Fig. F illustrates a geometrical method of placing the five spots each at different angles. First find the centre of each square by drawing the two diagonals. From the centre of the middle square draw a circle. Divide the circle into five equal parts by means of the lines drawn from \( u, v, w, x, \) and \( y \) to \( z \). Then draw the black lines through the centres of each required square parallel to the lines \( uz, vz, wz, xz, \) and \( yz \), and on these lines place the spot figures of the design. These figures will each have a different direction. It is necessary to be careful that none of the figures are placed in a horizontal position. A figure so placed always has an unsatisfactory appearance.

Plate XXVIII., Fig. A, is another example of a five-ends sateen order, where instead of using disconnected spot figures, the design is composed of two sprays, the flowers of which are placed in the order of a five-ends sateen. Note that rather more than one repeat is given in the figure.

On the same plate, Fig. B is a six-ends sateen. This arrangement has a peculiarity entirely its own, i.e., three of the spots come closer together and have a tendency to run in a line; these lines work in alternate directions, thus producing a perfectly steady design. In the example the three spots are joined together, though it is not necessary that they should be attached; they are so joined to emphasise the peculiarity of the arrangement, but if a number of circular spots were made and repeated as many times as the spot is repeated in the diagram given, they would tend to run together in lines of three. It will be found in practice that this six-ends order will be a useful variety on the others. The small design below the other one is another application of the same arrangement.

The seven-ends is very similar in effect to the five-ends, its value as compared to the latter being that there are a
THE "SATEEN" ARRANGEMENTS

greater number of units in the repeat. It can also be arranged at seven different angles, as shown in Fig. B, Plate XXIX. Referring to Fig. A above, it will be noticed that the spots have a tendency to stripe diagonally, or twill. This effect, which is generally deterrent to its usefulness, can be avoided by elongating the square into an oblong as in Fig. B.

Fig. C on the same plate is an arrangement peculiar to the eight-ends order. No two spots that come together are alike in direction and angle of placing. The arrangement is as follows: taking the line of spots from G to F they are placed at an angle of 45° pointing upwards first to the right and then to the left. Taking the parallel line above E to D, the spots point also first right and then left, but downwards. These two arrangements are repeated throughout the design.

Patterns based on higher counts of the sateen orders are designed on similar lines as explained in the lower counts, and students who wish to experiment further can easily do so on the information already given.
BORDERS.—In woven fabrics it is impossible to consider the design for a border by itself and apart from the “filling” which the border encloses; in most fabrics which possess a border in addition to a filling, both the border and filling are woven together simultaneously in one piece and on the same loom, and it is essential that, for practical reasons, the repeat of the border should keep in line with that of the filling. To take a simple illustration, say a stairs carpet, which has a border on each side; supposing the length of the repeat of the inner part or filling of the stairs carpet to be 18 inches, the repeat of the borders must also be 18 inches, or a divisor of 18: if the border repeats twice for every repeat of the inner part it would be 9 inches, or if three times, the length of the border repeat would be 6 inches; a 7 inch repeat in the border would be impracticable, as it would fail to work with the 18 inch repeat of the filling.

In cases where the border is woven separately and afterwards stitched to the filling, there is not the same absolute necessity for this uniform repetition, as in roll carpets for instance, in which the separate widths of roll, and the border, are, after leaving their separate looms, stitched together to fit the size of the room for which the carpet is intended.
BORDERS, CORNERS, ANGLES, ETC.

Even in such an instance as this, however, there is something gained—assuming that the border and filling are specially designed for each other—in keeping the repeats in relation the one to the other, by reason of the harmony and unity which will thereby be secured between the two, and so long as the design of the filling has to repeat as a condition of its existence, it is better that the repeat of the border should keep in step with it.

The principal fabrics to which ornamental borders are commonly applied are: damask table linen, tapestry and velvet-pile table-covers, cotton quiltings and toilet-covers, silk handkerchiefs, curtains—either lace, muslin, damask, or tapestry—travelling rugs, and carpets woven in one piece, such as Brussels and Kidderminster squares.

The possession of a border in a fabric generally implies—except in a few instances—that the article of which the border is a part is woven in one complete whole in the loom, and that the fabric (as in a table-cover for instance) has the border not only at the two sides but also at the two ends—or in other words on all four sides of the whole; it will be advisable, therefore, before dealing with the ornamental arrangements which may be adopted for borders, to set forth as clearly as possible the practical basis which must underlie their use if they are to conform to the requirements of weaving.

The size of the complete article must in the first place be decided upon, and in most of the fabrics mentioned above it is found convenient in practice to adopt sizes which are multiples of a \( \frac{1}{4} \) yard. Such fabrics as carpets, table-covers, and table linen will nearly always be found to be a multiple of quarter yards both in width and length, as, for example, 10 quarters \( \times \) 7 quarters, or 7 ft. 6 in. \( \times \) 5 ft. 3 in. Take an instance of a table-cover of these dimensions, see Diagram 26, in which the setting out of the arrangement of repeats is illustrated. A very simple ornamental treatment
is given. The size of the repeat is made \( \frac{1}{4} \) yard in each direction, that is, both in width and height, and this has the advantage of fitting to any size cover that is a multiple of quarter yards by simply increasing or decreasing the number of repeats in the filling either in width or length. The border is the same, both in design and dimensions, at the sides and the ends, and it will be easily seen that the square repeats of the filling are made to fall in line with the repeats of the border, as indicated by the dotted lines. The corner also occupies a square of the same size, as seen at \( C \).

This 9-inch square repeat is given as one of the simplest and least expensive ways of dealing with such a fabric, but it must not be supposed that the designer is limited to the square shape. Diagram 27 gives an instance of design for a table-cover of similar dimensions to Diagram 26, in which the repeat of the filling is longer in one direction than the other, as seen by the oblong shapes, each of which represents a repeat. The proportion of the oblong repeat is relatively similar to the proportion of the whole rectangular space occupied by the filling, and there is a certain amount of gain.
in having such a relation between the shape of the repeat and the shape of the filling on account of the sense of fitness which is thereby secured.

It will be noticed that the repeat of the side borders is longer than the repeat of those at the top and bottom; it fits at the sides to the length, and at the top and bottom to the width, of the repeat of the filling, as indicated by the dotted lines carried through the borders from the filling. The corners are in each case the same, and are so designed as to connect with the adjoining repeats without destroying the necessary relation and sequence.

The corner of a border is generally a part which requires some skill in dealing with, the difficulty being to make the corner join on correctly to the adjoining border repeat in each direction, while retaining exactly the same form and design in each of the four corners. The simplest treatment is to panel off each corner into a square and introduce within it an isolated piece of ornament having no connection with the borders. Another very elementary way of dealing with the corner is by introducing a conventional rosette, as Fig. 6, Plate XXXI.
When it is desired to make the border run without any distinct break round the corner, neither of these two methods is available, and the problem becomes a more troublesome one. In those borders which are termed "vertical" or "link" borders, such as are illustrated in Diagram 26 and also on Plate XXX., the difficulty is not great, as the vertical repetition makes it a comparatively simple matter to design a corner which will join to the adjacent borders without destroying the sense of connection. In "vertebrate" or running borders, such as are shown in Diagrams 27 and 28 and also on Plate XXXI., the ornament has a distinct growth in one direction, and runs round the border continuously. For some forms of applied art this is not a difficulty at all, but for a woven fabric which must have the two side borders symmetrically equal, the top and bottom borders also equal, and the corners each the same, it is a difficulty which requires considerable ingenuity to deal with satisfactorily. Diagram 27 is an illustration of a vertebrate border which is made to connect with the corners without any break.
BORDERS, CORNERS, ANGLES, ETC

Vertebrate or running borders can, however, be most readily used by adopting another and not uncommon method in decorative fabrics, viz., by letting the design start from or run round the corners, and introducing a stop in the middle of each border, as in Diagram 28 at A or B. By using this arrangement, however, the repeat of the border together with its adjacent filling amounts to one-quarter of the whole fabric, as at B C D X, and whatever comes in the quarter must reverse and repeat above and at the side upon point X as centre. This method of treatment allows of absolute freedom in the filling of the angles with separate ornament, or with the panelling of the space enclosed by the border as at E, Diagram 28.

In square-shaped fabrics the design is often made symmetrical on the diagonal line of the square, as in Diagram 29; it will be seen that the whole square is divided into eight equal triangular pieces, as F H G, which is symmetrical on F H with F H K.

In curtains which are woven in one piece many decorative schemes are used, but one of the most usual is to have a dado treatment at the bottom and a border on each of the sides; the latter may be the same in width, or they may vary according to the fancy of the designer; very frequently the dado border is made much wider than
the side borders, and in the latter the outer one is generally made the wider of the two, so that when the curtains are hung the large outside borders may have the effect of binding together the pair.

The design for the dado portion is, from a practical point of view, independent of the side borders and filling. Occasionally one sees the border brought round into the dado, though more frequently it is a separate piece of ornament out of which the side borders grow, but there should be harmony of treatment between the borders and the dado if the former grow out of the latter. In Diagram 30, A B C D is the dado portion, and D C represents the beginning of the upper part; D C E F is the repeat of the upper part and contains the wide outer border, the filling, and the inner border, all of which recur simultaneously and as frequently as the length of the curtain demands.

A considerable economy is effected in curtain designs by adopting throughout the whole length a symmetrical arrangement; or, to put it more clearly, if the curtain were to be folded in the centre line of its length, the two halves would be symmetrically equal and opposite. This plan may perhaps be somewhat severe in style, but it is quite capable of producing very pleasing results. Diagram 31 shows a symmetrical arrangement, the design being
exactly balanced on \(xy\). Only half the full width of the curtain would need to be prepared for on the design paper, \(GHKL\) being the amount required for the dado, and \(KLMN\) (which includes the border and filling) for the upper part of the curtain, instead of the full width which is required in Diagram 30.

The severity which this plan tends to bring about may be reduced by the use of a free centre, as in Diagram 32. It will be seen that the design on each side of the free centre is exactly balanced, \(ABCD\) in the dado and \(CDEF\) in the upper part giving the amount which would need to be shown on the working drawing for the symmetrical parts; in addition to this, the free centre \(BGHC\) in the dado and
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CHKF for the repeat of the upper part of the curtain would require to be drawn out on the design paper.

This chapter has so far been devoted to the application of border designs to the classes of textile fabrics for which they are most generally used, and it will be desirable now to deal with some of the more typical lines on which repeating borders may be built up. A number of geometrical treatments have been already given in Chapter II., and no further reference to them is necessary. Next to the geometric, the simplest type of arrangement is seen in what are termed—for purposes of classification—"link" or "vertical" borders, in which the repeats are joined together by a more or less conventional link. Plate XXX. gives numerous instances of this class, and it will be noticed that in nearly all of them there is a decided vertical or rectangular character evident—that is, the ornament grows at right angles to, or appears to be standing on, one of the edges of the border. Fig. 1, for example, is distinctly arranged so that the ornamental pattern appears to grow vertically from the inner edge, and so also is Fig. 7; Fig. 6 gives an example of a design which grows vertically from the outer edge, while Fig. 5 is a combination of the two effects.

The position of a border must always be taken into account when the design is being made. Some have to assume a vertical position, as the border of a table-cover; for such a purpose a design on the principle of Fig. 6 is well adapted to its position. Others have to lie in a horizontal plane, as rugs and carpet squares; and in such cases, if link borders were adopted, it would generally be best to let them be vertical to the inner edge of the border, as in Figs. 1 and 6, in order to obtain a fitting connection with the central portion, and so that they will be seen the right way up when viewed from the centre of the room. In a rug or carpet square the border and filling are seen together on one flat plane, but in a table-cover the border is the right
way up when seen hanging vertically. But whatever the position may be which a border has ultimately to take, it is essential that it should be designed consistently with this end in view.

In Fig. 1 the link is parallel to the side of the border, and merely turns up to meet the ornament growing at the repeats. Fig. 2 gives a further development, the link—while being parallel to the sides of the border—turning up in a scroll form to carry the ornament. In Fig. 3 it bends over in the shape of an S placed horizontally, and in Fig. 4 another variation is produced by letting the link travel from one side of the border to the other, as also in Fig. 5, in which the S shapes are made so as to reverse. Figs. 3, 4, and 5 are Greek Anthemion borders, and another old Greek pattern is shown in Fig. 6, in which the links are semi-circular in form and interlace with each other. Fig. 7 is an Arabian border showing the same link principle underlying a more elaborate design. Figs. 8 and 9 are double link borders, the former having them symmetrically opposite on each side, the latter having them arranged alternately.

It must be clearly understood that the examples here given are selected because of their simplicity, and as illustrating this class of border design; the principle may be modified in many ways and with endless variety, and it lends itself very well to the borders of most classes of woven fabrics.

Plate XXXI. gives a series of borders classified under the term "vertebrate"—that is, borders which have a backbone running through the design, and throwing off the ornament in successive repeats. Fig. 1 is the simplest, containing nothing more than a series of leaves growing symmetrically opposite on each side of the central or vertebral line; Fig. 2 is not symmetrical, the repeats alternately growing above and below the central line at regular intervals. In Fig. 3 one of the boundary edges of
the border acts as the vertebra from which the ornament grows, while Fig. 4 has the pattern growing alternately from each side. Fig. 6 is another border having the same simple method of arrangement as Fig. 1, but in this case the ornament is more varied in its forms. Fig. 7 is an example of a vertebrate border in which the vertebra is much nearer to one side than the other; the horizontal portion of this design will indicate the plan which is adopted of carrying the border into the corner. Fig. 8 gives an example of the wave line border, with the corner symmetrical on the mitre line; this wave line design is another application of the vertebral principle, a curved vertebra taking the place of a straight one. Fig. 5 is an example of scroll ornament clothed with conventional foliage, the scroll line having grown from the wave line. Fig. 10 is a Persian design, and consists of two wave lines, each carrying its own share of the ornament; in this case their growth is in the same direction, though there is no absolute necessity for this where two separate stems are used; one might grow from right to left, and the other from left to right. Fig. 9 is an interesting example of a vertebrate border in which the figure interlaces, remaining the same in form, but alternating in colour or tone. This design is specially adapted for use in the upright position for which it was originally intended; some of the examples on this plate are more suitable for a horizontal than a vertical position, though a few of them would be equally satisfactory whether used in one way or the other.

Most vertebrate borders are easily adapted to striped effects, the growth forward which is so characteristic of them lending itself very well to stripes, in which there are no corners to deal with, and which run continuously with the length of the fabric.

In Plate XXXII. Fig. 1, an example of more naturalistic ornament is given, but even this, although apparently free
VERTEBRATE OR RUNNING BORDERS.
DESIGN FOR CORNERS AND ANGLES.
from any set lines, is not far removed from a vertebrate border, the stems of the flowers, if carried through from one to the other, forming an irregular wave line. The other designs in Plate XXXII. illustrate different treatments of angles in rectangular fabrics. They are more appropriately introduced into some fabrics than others; for example, they may be more effectively used in hearthrugs or carpet squares than in such fabrics as linen or tapestry tablecloths, because in the former their normal flat position gives due value to any ornament which the angle may have, whereas in a table-cover it would be almost entirely lost by the unavoidable folding of the cloth at the corners of the table.

The main purpose of an angle ornament is to break the rigid rectangle of the corner, but care must always be taken that its general form or contour is good, and also that it leaves a pleasing shape in the field of the fabric. This may be better understood by reference to Figs. 3 and 4, in which the angle ornament of Fig. 3, when repeated in the four quarters of the design, produces an agreeable panel shape, as seen in Fig. 4. The shape of the corner in this instance is only suitable for a fabric that is oblong in shape—a hearthrug, for instance. Fig. 2 is perhaps best adapted to a square shape, though it might be used for an oblong without causing any sense of incongruity. In Fig. 5 the corner is made to break into and interrupt the border; this may be more clearly shown by reference to Diagram 29, p. 123. This design is symmetrical on the mitre line, as also is Fig. 2. In Fig. 6 the angle ornament is free in so far as the field of the design is concerned, being only bound by the shape of the border. It is not enclosed within any definitely shaped panelling, as in Figs. 2 and 3, and it is not symmetrical on the mitre line, as in Figs. 2 and 5.

Stripes.—A few of the more elementary forms of stripe ornament, such as those which consist of little more than parallel straight lines running in the direction of the warp
ORNAMENTAL DESIGN

threads, have been already referred to in the chapter on Geometrical Design, Plate IV. There are certain practical advantages in stripes which probably count for something in explaining their use, such as the added appearance of height which is suggested by a stripe used vertically, and it is a common practice on the part of dressmakers to recommend striped dress fabrics to people who are short in stature in order that a greater sense of height may be given; on the other hand, stripes used horizontally have the opposite effect, and suggest increased width and decreased height.

Fig. 1, Plate XXXIII., gives a simple form of stripe in combination with a powdering of conventional flowers arranged at angles of 45° and pointing in different directions. Fig. 2 is an instance of a curved stripe based on reversed wave lines, while Fig. 3 consists of parallel wave lines broken with conventional ornament growing from the sides. Fig. 4 is an instance of a stripe crossing the fabric in a diagonal direction; the inclination of the stripe follows the diagonal of the rectangle which contains the repeat, and in this case, the repeat being a square, the stripe is at 45°; if the repeat were an oblong, the direction of the stripe would be greater or less than 45°, according to the proportions of the oblong. Fig. 5 gives a more elaborate example of stripe ornament with three distinct contrasting stripes repeated.

Fig. 1, Plate XXXIV., is an example of a straight stripe superposed by an all-over sprig pattern, and is taken from an old Italian velvet; Fig. 2 has a naturalistic stripe contrasting with a very conventional one, while Fig. 3 is a reproduction of an old Spanish fabric showing two stripe effects recurring alternately.
PLATE XXXIII.

DESIGNS FOR STRIPES.
DESIGNS FOR STRIPES.

1.

2.

3.
CHAPTER IX

LAWS OF ORNAMENTAL COMPOSITION

ALTHOUGH this chapter will be devoted entirely to elucidating the principles that should guide a designer in planning out all-over patterns, this does not necessarily mean that it is the only place in which the principles are taught or indicated. On the contrary, every chapter in the book indicates more or less the practical application of the principles which are here specially dealt with. Almost every good design—perhaps one might be safe in saying every good design—is an illustration or an embodiment of the principles. They have already been illustrated in the designs included in the chapters on practical planning, but in too incidental a way to be easily perceptible to a student. In this chapter all the principles will be taken separately, and illustrated by diagrams and designs in which some one principle makes itself particularly evident. The designs will also be pulled to pieces in order to expose the principles upon which they are based.

The principles that are necessarily involved in the production of good repeating patterns are:—Repetition, balance, symmetry, contrast, variety, tangential junction, radiation, growth, stability, subordination, repose, fitness, unity, and proportion.
Repetition is the first principle dealt with and is perhaps the most important one to observe when designing for textile fabrics.

An all-over repeating pattern implies in itself the idea of repetition. It is possible, of course, to have an all-over design that does not repeat, as in the case of some hand-made carpet squares, though such a design might equally well be spoken of as a panel. Besides carpets, there are a few other cases where a large space is covered with all-over ornament without repeat; for instance, in some hand-made embroideries for hangings the ornament is powdered over the whole surface without thought of its repeating. Such a treatment is beyond the scope of this book because of its inadaptability to fabrics produced on the loom; but it is useful in comparing the inherent value of the principle of repetition as compared to a non-repeating all-over design.

There is undoubtedly some value in the principle of repeating details, in addition to the convenience of easy and cheap reproduction. An extended all-over design without a repeat—such as would possibly be used for drapery hangings—might, one could easily imagine, make itself extremely wearisome to the eye for want of some recurring feature to rest upon. The eye cannot wander about incessantly from one part to another over details that are all of equal importance without becoming wearied. True, one could make some of the features more important than others in a non-repeating design, so that the eye would have points on which to rest itself; but these features or "spottings" would presumably take an irregular form, both as to size and position, otherwise, if they had an appearance of regularity without being actually regular, they would to all intents and purpose be repeating designs.

The argument resolves itself, then, to this: that the eye must have some parts of more marked character than the others upon which it may rest. If so, is it better that
those characterising features should be arranged to repeat, or be erratic? Looking at the question entirely from an aesthetic standpoint, without any thought as to cost, perhaps it might be more interesting if the subsidiary detail was not made to repeat exactly, but some slight variations allowed that would not upset the general balance of the repeats. It would undoubtedly be more interesting; but then the advantage would be so slight that custom has seldom sanctioned it except in the most expensive work, such as hand-made tapestries for decorative hangings, &c., which, however clever they may be, are liable to appear wanting in the repose that is desirable in designs used as backgrounds, and it is important to remember that textiles should take this secondary or background position in relation to the human figure or the principal features of room furnishings. Repetition has therefore distinct advantages, ornamentally speaking, in giving restfulness to a pattern.
Diagrams 33, 34, 35 illustrate respectively banded repetition, fourfold repetition, and all-over repetition. Alternation, as in Diagram 36, is really a variation of repetition, and is very useful in effecting a contrast to avoid monotony.

The two following principles, contrast and variety, need to be strongly recommended to the student. A design from which these two principles are absent will be monotonous and uninteresting; it is necessary to have contrast of shapes, of proportion of masses, and direction of lines. Diagram 37 is the simplest possible example of contrasting shapes—a circle and two narrow upright bands. In this instance there is a contrast both of shape and proportion—the curved figure contrasts the straight figure, and also contains a much larger area than the straight bands. The example is a very primitive and simple one, but still the principle is the same in this as in a more intricate design.

Diagram 39 is an example of quite a different kind of contrast—viz., contrast of line. It is important that the student should clearly distinguish between contrast of line, of shape, and of proportion. The diagram is a
simple border composed of horizontal and vertical straight lines, but, simple though it be, it contains the elementary principle of contrasting lines. Of course it is not a pleasing arrangement; the contrast is both too violent and too evident. As has been said before, the construction of a design must not be visible, but must be ingeniously hidden; the same remark applies to the principles, which, to be successful, must be applied without undue assertion. In the next example, Diagram 40, the principle is applied to curved lines. The branches which diverge from the centre wave line turn back and cut this wave line again almost at right angles, and the two small lines at each side of the branch, if produced, would also cut the continuous wave stem at right angles. Diagram 38 illustrates this same principle of cutting one line with another at a right angle or thereabouts.

Diagram 41 is composed mainly of a series of heart-shapes placed at a little distance from one another. Inside the heart-shapes is a series of radiating lines; these lines, in general direction, are about at right angles to the heart-shaped lines. Again, these heart-shapes are joined together by three ball spots that take a curved line which at each end cuts rectangularly to the curve of the heart-shape.

Diagram 42 is an all-over pattern in which the principle of rectangular contrast is well illustrated.
Diagram 43 is not intended as a design, but is a diagram illustrating contrasting lines in all directions. The lines take a horizontal, vertical, and diagonal direction. The circles serve the purpose of fixing the eye on certain points and not allowing the attention to wander in any one direction. To obtain a thoroughly well-balanced all-over design this principle of contrast in all directions must be carefully observed, otherwise there is a danger that too many lines will fall into one direction, and thus cause faulty "lining." To this rule there is an exception: it is legitimate if the fabric is ultimately intended to occupy a vertical position, as many fabrics are, to allow a preponderance of lines pointing upwards, as in the case of most of the lines in Diagram 42.

This principle of contrast does not apply only in such examples of the set and rigid character as just given, but also to designs of the most elaborate foliated description, such as those on Plate XXXV. and elsewhere. The reason why the more rigid designs have been used is because the principles are thus made more evident. In Fig. 1, Plate XXXV., the large turned-back leaf cuts sharply across the stem (A). In Fig. 2 the crown-shaped device cuts rectangularly across the vertical stripe and serves to break the monotony of the straight lines. In Fig. 3 the foliated wave line cuts across the ribbon wave also at right angles, as will be more clearly seen by referring to the
PLATE XXXV.

Contrast by means of one line cutting another at or near a Right Angle, as at (3)

Too much Contrast. Want of Repose. More Repose.

Variety of Direction of Line in one Flower.

Variety of Details.

Variety of Details.
adjacent diagram, Fig. 4, at the points marked A. The same rectangular principle is illustrated at the points A in Figs. 5 and 6.

A word of warning may be put in here. Do not drive any principle too hard; if you do the result will be crude and unpleasing. A writer on ornament has said that "rules make good servants, but bad masters." Rules can only be used for guidance; they serve to indicate what must not be done quite as much what to do and how to do it. A design worked out only on principles, without the guiding hand of taste and ingenuity, will be dry and uninteresting, if not even objectionable.

Fig. 7 illustrates a case in which the principle of contrast is driven too hard, causing a want of repose. The line which passes under the spray and cuts across itself several times is more suggestive of fireworks than ornament. In Fig. 8 the same material is used to much better service. Most of the lines are made to radiate from one point at the base or start of the spray. There is a certain amount of contrast of line between the veins and the serrations. The shading on the leaves also lends a softening quality to the whole design.

There is no principle that should be more insisted upon than the principle of variety. Variety is the very essence of a design, the principle that gives it brightness, interest, and diversity. Fig. 9 is a drawing of a conventional flower, and Fig. 10 is a diagrammatic rendering of the same, showing the variety of direction that can be put into one small detail. Fig. 11 is a small portion of a design which is marvellously rich in its variety of details. Fig. 12 is an example of the introduction of contrasting variety in the treatment of details in one design.

Turning to Diagrams 44 to 47, we have several illustrations arranged on the principles of symmetry and balance. A symmetrical arrangement is one in which the ornament
is exactly repeated on each side of a straight line, as in Diagrams 44 and 45, and also in the details of the two border designs, Diagrams 36 and 41, and the all-over pattern,

Diagram 42. Designs that are symmetrical are usually of a severe and formal character, and in the case of repeating patterns the repeats are easily detected. In cases where the severity of a symmetrical arrangement is undesirable, a design in which the principal masses are balanced instead of being rigidly repeated at both sides may be advantageously used. Diagrams 46 and 47 illustrate the principle of balance; thus, if a straight line be drawn down the centre it will be found that there will be about an equal quantity of ornament on each side of the line without exactly repeating the details. The decision as to how much should go on one side or on the other is a question that is necessarily relegated to the designer's sense of proportion. In the two examples given the details on one side are quite different to those on the other, but yet the quantity is about the same in each. This question of balance enters more or less into every design.

The tangential junction of lines is also an important principle, and to it is due much of the grace of form to be found in the best designs. The term is adapted from the geometrical problem where a circle comes in tangential
contact with a straight line; the straight line is then said to be tangential to the circle. In the first examples given, the two curves A and B are tangential to the straight line in such a way that if the upper portion of the straight line and the curve B (which are dotted in the second diagram) were taken away, the curved line and the portion of the straight line remaining would form a good and unbroken line. The same explanation applies to the joining of curved lines with curved lines. It may be described another way. Suppose the first part of the curved line to be a thick stem which is split at the junction of the two lines at A, DIAG. 48, and both halves bent slightly differently; if the lines are tangential, both halves will be perfect lines without any break at the junction.

Radiation is a principle that also adds much to the grace of a design, and one that can often be made into a very pleasing element; it is useful where neither parallelism on the one hand nor strongly contrasting features on the other are desirable. The diagrams given are probably sufficiently clear without further explanation.
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*Growth* is a principle derived from the observation of plant forms, as in the beautiful firm curves suggested by blades of grass, and particularly the stalks of plants having radical leaves growing direct from the root, such as hyacinths, daffodils, &c. When they are healthy they are full of the suggestion of strength, and the firm and almost straight stem of such plants as the fern and forget-me-not, with the opening leaves or flowers unrolling themselves in spiral form as in **Diagram 53**, and also the spiral tendrils of climbing plants are suggestive of vigorous growth. It is advisable, when possible, never to violate the principles of growth; for instance, leaves and flowers should never be allowed to grow in both directions on the same stem, as in **Diagram 52**. The qualification "when possible" has been put in because sometimes when designing a symmetrical all-over pattern of conventional ornament it is very dif-

**Diagram 49.**

**Diagram 50.**
Difficult to avoid some minor anachronisms, such as putting two stems to one flower, for the sake of joining the design up in the centre. It may be taken as a safe rule that the more naturalistic the design, the closer it should keep to the principles of growth. The lines illustrating growth, Diagram 51, are derived from the lines of stalks, fruit, and seeds.

The principle of stability is illustrated by the strong leading lines of a design, and by the firmness of all lines suggestive of growth. Designs without good and firm leading lines appear limp and lifeless.

Subordination of one part of a design is essentially necessary to ward against monotony. In every good design there should always be some feature of more particular interest, such as a brightly coloured flower or group of flowers, leaves, or some other object of interest upon which the eye can rest, a something from which the design will take its character. The rest of the design must be subdued and act as a kind of background. This suppressing of one part for the enhancement of another is usually very difficult to students, especially beginners; they want to put all they know into every part. It is like a public speaker who begins his speech at the topmost pitch of his voice, and is consequently unable to rise to the occasion at the moments of highest excitement, or give that variety of modulation that is so pleasing in oratory.
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To design well, the same as to speak well, there must always be an appearance of force in reserve. A comparison of Diagram 42 and Fig. 3, Plate XXXV., will show what is meant. The first is almost without subordination; in the second, the ribbon wave line is subdued in comparison with the floral one, and although without any particular subordinate parts, the first design is a useful one for certain purposes, and this brings us to the question of fitness.

DIAGRAMS 53, 54, AND 55.

The principle of fitness demands an appropriateness between a design and the material to which it is applied; for instance, a design that would be suitable for a printed cotton would not do for a carpet, or a design for a velvet would be out of place and clumsy if produced in a fine silk. For some purposes, also, a design that is quiet and retiring in character is more in keeping than one containing strong contrasts and much elaborated details. Then again there is the question of suitability to the pre-
of ornamental composition vailing fashion, a subject that every designer is bound to study, even though he may at times rebel against it. This principle of fitness or suitability is a very important one, and before a design is begun it is necessary to think first for what purpose it is intended, and in what material it is going to be carried out.

The principle of proportion, while being of great importance, is one for which it is difficult to make an illustration that will serve for that purpose alone; every good design is an example embodying the principle. It enters, first, when deciding the proportion between the length and breadth of a design; it may appear too wide or too long for the purpose it is intended for, or for the character of the ornament. Then there is the proportion of scale between the ornament and the size of the repeat, and the proportion of one part of the detail with the others, all of which must be carefully balanced to make the design in perfect harmony.

The last principle, unity, sums up the whole of the others. To make a well-balanced design we must have a combination of many principles, but the taste of the designer must at all times exercise a controlling influence. There must be some association of ideas between the different parts and the whole, contrasts must not be too violent, variety must not run riot, symmetry must not be too stiff or rigid, there should be a gradation between the proportions of the details, and every principle must be used in moderation to produce a united whole.
BROADLY speaking all art, whether pictorial or decorative, is in a greater or less degree a convention; otherwise, if it were not a convention it would cease to be art. The art of representing or imitating objects (like flowers and leaves, having rounded forms, which grow on different stalks at varying distances from one another) on a flat surface, such as for example drawing-paper, is necessarily restricted by a number of conventions. It cannot be an actual imitation, if it were we should expect to be able to take hold of the flowers and leaves and handle them; but by certain methods which become conventions (that is, putting so much paint of the right colour in the right place), a flat version of rounded objects can be given that we accept as an imitation or interpretation of them. This is known as pictorial art, and although in some cases the imitation of nature is intended to be as close as possible, yet, as has been shown, it is in some degree conventional. This being the case, then, in regard to pictures, how much more forcibly will it apply to the art of woven design, where, if a natural object such as a flower is imitated, it must be done by means of interlacing threads on a flat surface, and by mechanical methods which necessitate
a greater degree of conventionality. The nature and future uses of the fabric to be ornamented will also impose upon the designer conventionality in varying degree, and it will not be a question altogether of free choice as to whether the design should be very naturalistic or very conventional, but the character of the material designed for will in many instances decide this for us.

To decorate a textile fabric with fitting ornament there are many things of importance to take into account. First there is the inherent nature of the fabric itself, in the way of its peculiarity of surface, which being very beautiful in texture, and having a lustre or some other quality that is essentially characteristic of it, must be taken into consideration. A plain fabric without any ornament, if good in colour, is pleasing to the eye, though with constant usage this fact is apt to be forgotten; but if compared to a piece of smooth paper the value of the textile surface will be easily seen by contrast. Again, a textile has seldom to be seen as a perfectly flat surface like a wall-paper, but usually hangs in folds, or is used to cover other objects which are rounded in form. Then there are different kinds of fabrics; some are made of fine material like silk; others of coarser materials, as wool and jute; some are woven with an open texture as in gauze cloths, and there is also the peculiar texture of the pile in velvets. Then one has to take into account, when designing for woven goods, the process of weaving, in which the frequent repetition of one repeat is a necessary result.

Such conditions as these are bound to produce conventionality in a design, and limit it in many ways that can only be found out by practice.

Again, a good design should always be influenced by the material used and the method of manufacture. In the case of a textile the design should appear to be woven into the fabric, and not have the effect of being added on to
the surface, like a printed wall-paper, or sewn on like appliqué work. It must give evidence of being woven into the material.

Take an exaggerated example that will illustrate what is meant by weaving the design into the material, and also the futility of attempting to imitate natural forms in woven articles. Imagine a piece of basket-work woven with such coarse material as rushes. Suppose that by means of weaving together these coloured rushes an attempt is made to imitate a rose; it is easy to see that by using such clumsy material what a hopeless failure the result would be. Similar failure is only a matter of degree even in the finest fabrics. Suppose again that a rose, or something in the nature of a rose, but larger; is painted on the basket-work. The imitation of the object might and probably would be more real than if it was woven into the material; but would it be more appropriate? The first would be unsatisfactory because it would be an attempt at the impossible; the second, although it might come nearer the possible, would still be out of place because basket-work is not the proper material to paint upon.

The most appropriate and in every way the most suitable method of decorating the basket-work would be to take together a certain number of strands of one colour and weave them with a like number of another colour, and so produce simple geometrical designs such as the one given in the Diagram 57. Again, by changing the combinations and varying the colours of the strands, a great variety of different designs could be produced. These designs would be legitimate, because they would be the natural outcome of weaving together such material, and they would be sufficiently pleasing because the plainness of the surface would be broken up quite enough by the geometric patterns.
Nothing could be more vulgar than the attempts one sometimes sees at imitating natural objects or flowers on woven fabrics; the copying of natural flowers, &c., in their real colours, with all the effect of relief given by the truthful rendering of the shadows, may be clever as a triumph of mechanical skill, but it is not artistic, and is in every way unworthy of the designer. To attempt such a thing is worse than foolish, for besides being a vulgar degradation of the art of designing, it aims at the impossible and invites failure. The material at the designer's disposal is not a suitable one in which to imitate nature, and even if it were, the imitation would not be decoration in the true sense; it would be more allied to pictorial art, and its standard would have to be taken as that of a picture. As a picture it would be ridiculously out of place on a useful material. Try to fancy a textile decorated with pictures many times repeated and then hung in folds, or cut into small pieces to fit as a furniture covering or dress fabric. No, you would at once say a picture should be hung on a wall where it can be advantageously seen; and further, a picture does not gain any added value by being repeated any number of times, but becomes monotonous and uninteresting. However clever the woven imitation may be, it falls far short in excellence of a picture when painted on canvas or paper with the proper materials; far better therefore is it for the imitation of nature to be left to the picture painter, and for the designer to be content with such an adaptation of nature as is consistent with the conditions of woven ornament.

Having tried to show the inappropriateness of using direct imitations of natural flowers, &c., in the decoration of textile fabrics, it will be desirable now to make clear what is the difference between nature and art. It may help to an understanding of this difference if we use a simple illustration such as is afforded by natural foliage with, on the one hand, all its wildness and luxuriant overgrowth as we find it
in the country lanes and hedges, and contrast it, on the other hand, with a landscape garden. The beauty and character of the one are so different from that of the other that it is impossible to draw any satisfactory comparisons between the two for want of a common basis to judge them upon. They can each only be judged each from its own standpoint. We may be ever such lovers of nature, and may be able to enter into all its moods and changes, appreciate its grandeur, its wild overgrowth and abundance, and its intricacies of detail, and yet be at liberty to admire the more formal combinations of nature's flowers and foliage reduced to order as we find them in our parks and gardens.

There is a wide difference between the way nature grows her flowers and the way the gardener arranges his. In nature the rose, the hawthorn, the blackberry, or the bluebell, the primrose, the anemone, &c., grow chaotically together, and what we admire as beautiful in nature is this wild and uneven distribution of her wealth of flowers and foliage. The gardener proceeds on an entirely opposite plan. He spaces out his ground into geometrically shaped beds, and arranges the different flowers in formal order, each separate kind being placed according to a definite ornamental plan, and avoiding the chaos and confusion which are so pleasingly characteristic of nature.

Nature's method and the gardener's method are so different that the question suggests itself, which is right? Nature of course must be right, because all our ideas are founded upon and derived from it; and in its own way the landscape gardener's arrangement of nature may be considered right when its standard is taken from the ornamentist's point of view. The first is the result of nature's overcrowding abundance, where each plant has to struggle for its existence; the second is the outcome of man's mind, which proceeds in an orderly and logical method. One is
NATURE CONVENTIONALISED

nature, the other is art, the latter being the adaptation of nature to the necessary conditions imposed.

The art of designing has a similar relation to nature as the gardener’s art. The gardener makes use of the materials that nature provides, and by a process of selection arranges them after a plan of his own. So it is in the case of the designer, he should choose from nature’s storehouse only those parts that will be of service to him, and reject the others.

As was stated at the beginning of the chapter, all art is a convention in its very existence, and the art of ornamentation is the most conventional of all forms of art. To ornament a piece of cloth demands a conventional treatment, because the necessities of weaving require that the design shall be indefinitely repeated; this fact alone contravenes any notion of a design being a mere arrangement of naturalistic forms, and that being the case, the question then arises how much must a design be copied from nature, and to what extent should it be only an abstraction.

In the first place, a designer must bear in mind that he has a certain amount of material to decorate: he is not making a design in the sense that an artist makes a picture. The picture is painted as a work of art to stand alone, but a design is made to decorate the cloth, and must therefore be subservient to the purpose that the cloth has to serve. The cloth may be decorated with anything that is suitable, whether based on nature or not, and it must be borne in mind that, artistically speaking, there is no necessity for using natural forms; purely abstract ones, that is, forms that are neither copied nor adapted from nature, can be used with equal advantage, provided these forms are beautiful; but if natural forms are used, the question of how far it is desirable to follow nature, and with what degree of realism, must be carefully considered: the chief service nature does to the art of designing is in suggesting
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the many beautiful shapes and ornamental arrangements in which nature is so prolific.

There is of course an advantage gained by using natural forms, such as the rose or the peony, but it is rather one of association than artistic necessity. One has become so accustomed to admiring flowers, that one is pleased to see and recognise them when applied to a design; but still this is only sentiment, for, artistically speaking, any other forms that are as beautiful would do quite as well.

Then it reduces itself down to this, that we should use the forms of nature just as far as they will serve the purposes of our design, and use them only in such a way that they will fall into the graceful lines and shapes which we require for the particular piece of work in hand. What the designer must seek for is beauty of form and grace of line; these he may evolve from his own sense of the beautiful without reference to nature, or he may abstract them from any suggestions which natural forms offer.

If the designer's ideas are taken from nature, a plant for instance, he should first study the plant until he has made all its forms his own, and he should make himself so far master of it that he has no further need for the actual flower; if he has done this he should be able, with the knowledge he has gained of the flower and its details, to evolve a design of his own, based on the plant, making nature fit itself to his ideas, allowing every petal, sepal, leaf or stem to fall into good decorative lines, and idealising the essential beauties of the flower while rejecting non-essential and unimportant accidents.

The designer's duty as regards nature is one of abstracting or eliminating; parts that are unnecessary to the design should be left out, those that will add to the beauty of it and will properly serve the required purpose must be retained. If a type is used, such as a rose, he cannot leave out parts that are characteristic of the rose; if he departs so far
MOSS-ROSE AND HEATHER WITH ADAPTATIONS.
from it, it is obvious that it would be better not to use the rose at all, but to invent something of his own.

Having discussed these questions of conventionality and abstraction, a few practical illustrations may help to make the points clearer. **Plate XXXVI.** contains a sketch of two half-open roses and a bud, drawn from nature. The petals form comparatively smooth surfaces, with smooth edges. The outlines of the sepals are broken into sharp-pointed divisions, and the surface has spiky thorns from the central veins; the stems are also thorny. These spiky sepals and stems suggest a useful contrast to the smoother petals, and this contrast is shown in the adaptation of the same flower for a simple textile design. It is distinctly an adaptation or an abstraction. There is no attempt to rival nature in realism of effect; realism is avoided, and is substituted by simplicity and flatness. Certain facts in nature are made use of in the ornamental treatment; the petals are made lighter in colour than the sepals and stalks, the petals in nature being smooth, and the sepals and stalks comparatively rough and thorny, and this contrast, in so far as it is possible on a flat surface, without light and shade, is suggested in the ornamental arrangement. The whole adaptation has a peculiar broken effect that might be useful in some designs and is quite characteristic of the natural flower.

There is also a drawing of a sprig of heather on the same plate, and below is a little stripe design based on it. The sprigs are made to twist round in a wave line form, the flowers and leaves being in solid colour, and to avoid too much continuity of the stem, the leaves are not quite joined to it. The arrangement of leaves and flowers, although near enough to nature to be recognisable, is not a copy from the natural type, but is arranged to suit the design.

**Plate XXXVII., Fig. 1,** is an adaptation of another type of rose, with leaves. The treatment in this case is quite different from the last, and is suitable for a design of a
bolder and more marked character. Although the design is entirely in flat tints, a certain amount of relief is hinted at in the drawing of the centre petals and the turned-over parts of the leaves, though there is nothing that suggests realism. Alongside is a drawing of a rose-leaf with another variety of treatment.

Below are two different renderings of a peony, one with a simple flat tint, the other with two tints and black lines. The drawing of the inner series of petals in this latter case is very suggestive of the way in which in nature they appear to turn over towards the centre, though it is by no means naturalistic. A certain license is taken in putting regular serrations on the petals. One half of each leaf is made darker, almost as if it were in shadow, and on the tip of the shadow is the white turn-over piece. This is done to break up the surface and give the design a lighter appearance.

Plate XXXVIII. has several conventional renderings of animate forms. The butterfly, Fig. 1, is arranged as a symmetrical design to fill a circle for a spot figure. Fig. 2 is a prawn by a Japanese designer. Fig. 3 is a lion from a woven coat-of-arms. The last, Fig. 4, is a drawing, also of Japanese origin, of a bird with acorn branch in its mouth; behind it are conventional Japanese clouds.
PLATE XXXVII.

ADAPTATIONS OF THE ROSE AND PEONY.
ADAPTATIONS FROM ANIMATE FORMS.
CHAPTER XI

STRUCTURE OF ORNAMENTAL FLOWERS AND FOLIAGE

This grouping together of ornamental flowers and foliage includes both natural plants treated ornamentally, and also conventional or abstract foliated forms, and it is intended to show how they must both be governed by certain principles of ornamental construction. It has been shown in a previous chapter why nature should be conventionalised; it is proposed now to explain how the principles of ornament should be applied in the construction of ornamental details, whether from nature or of a purely abstract character such as the invented forms in traditional ornament. It is important to state here that the principles are not necessarily derived from nature, but they are, more properly speaking, the outcome of a feeling for what is right in ornament in the desire to produce orderliness and rhythm.

The diagrams given in this chapter are not intended to represent natural leaves, but are given as types that may be found in nature, or of leaves and flowers that are used in conventional ornament; and turning to Plate XXXIX., a series of leaf forms will be found that may be divided into three classes, namely, simple, divided, and compound.

The first series, 1 to 8, are simple leaves all of different
ORNAMENTAL DESIGN

shapes. Fig. 1 is like a grass blade, the two sides are almost parallel. Fig. 2 is the shape of a spear head. Fig. 3 is like a spear head, with the widest part of the blade at the top. Fig. 4, the widest part is at the middle. Fig. 5 is wider at the base and broader than Fig. 2. Fig. 6 is still wider, and turned up like a heart-shape at the base. Fig. 7 is a sagittate leaf, the side of which is a compound curve, and the base of the leaf projects out into two points. Fig. 8 is a further variety, being composed of two compound curves, which eventually glide into the stem.

Figs. 9, 10, 11, 14, 15, 19, and 21 are divided leaves. Figs. 12, 13, 16, 17, 18, and 20 are compound leaves. In the divided leaves the divisions do not go through as far as the central rib or stem; but in the compound leaves each division is a separate leaflet having a short stem, which joins to the central one.

The method upon which a divided leaf should be constructed is given in the accompanying diagram. The names of the different parts are given along with the drawing, and are marked A, B, C, D. The first part to be decided upon is the general shape of the leaf; this shape is drawn in dotted lines on the left-hand side. The leaf is then divided into lobes as at A, and in drawing the lobes great care must be taken to properly construct the parts where they join at the eyes. If the
STRUCTURE OF ORNAMENTAL LEAF FORMS.
drawing of these lobes be looked at carefully in the diagram, it will be noticed that they are so drawn that if they were produced they would be continuous with the pipes, and therefore tangential to the central up-right rib; this is a point in the construction upon which great stress must be laid, because it ensures a firmness in the appearance of the leaf that cannot otherwise be obtained. Afterwards the veins must be drawn from the tip of each lobe and tangentially to the central rib. The pipes, when they are used, should also be drawn tangentially to the central rib, and should be, as stated in the description of the lobe, in a line continuous with the general outline of the lobe. Lastly, the serrations or rafflings should be drawn. Accompanying the same diagram are given illustrations of five different varieties of serrations; number 1 belongs to the class of leaves like the bramble; 2 is somewhat similar, but composed of simple curves; 3 is concave in shape, and reminds one of the holly and thistle leaves; 4 is rounded in the style of the oak leaf; and 5 is a double curve like the geranium. Examples of these serrations are given on Plate XXXIX., and taking them in the same order, number 15 is like number 1, 9 like 2, 10 like 3, 19 like 4, and 11 like 5; number 14 is after the fashion of the dandelion, and is the same serration as Fig. 9, but the point of each lobe is turned downwards. In conventional or abstract ornament any of these serrations can be used that are the most suitable for the purpose in hand, and in naturalistic ornament the serrations will of course be suggested by the plant that may be chosen. Figs. 9, 10, 11, 15, and 19 are examples showing different ways of arranging the veins of the leaves; in number 9 they are tangential to the central rib, in number 10 they diverge from the central rib at an angle, in number 11 the ribs radiate tangentially, and at 15 they radiate at different angles from a point.

On the same plate there are several examples of com-
pound leaves, as in Figs. 12, 13, 16, 17, 18, and 20. Compound leaves are subdivided into leaflets or divisions, which extend down as far as the central rib. Each leaflet may have a short stalk of its own which joins it to the central rib. Like the divided leaf, they should all be constructed on some definite plan—for instance, in Fig. 12 the divisions are arranged in a diminishing order, beginning with the smallest at the bottom and the largest at the top; and also, as will be seen by observing the construction on the right-hand side, there is a certain radiation of the lines of the divisions, the bottom ones being the most horizontal, and the others gradually sloping more and more in an upward direction as they get nearer to the top of the leaf; the same applies to the construction of most of the other compound leaves. Fig. 20 is a compound leaf in which the divisions are in sets of three; on the right-hand side of the leaf is a diagram of construction. There are three subdivisions, a central and two side ones; the two side leaflets are joined by straight lines, one at the top and the other at the base of the leaflets, and they are so arranged that the two lines will cut the central rib of the group at right angles. The rest of the construction is sufficiently evident from the diagram.

In illustrating the principles of construction we have supposed the foliated forms, which are given as examples, to be flattened out and pressed into absolutely symmetrical shapes; and although such a severe treatment may be useful in making it easier to explain the principles underlying the construction of foliated forms, it must not be assumed that in ornament it is advantageous to have two sides of a leaf absolutely symmetrical; it is rather the reverse, such a treatment being only useful where severity of form is desired.

In nature, two sides of a leaf are never the same; nature prefers balance to symmetry. If we take a simple rhododendron leaf, such as Diagram 59, and look at it from a front
PLATE XL.

Construction of Leaf Forms.

The Joinings of Stalks, or Bract Leaves from Nature.

Conventional Renderings of Joints & Bract Leaves.
ORNAMENTAL FLOWERS AND FOLIAGE

view, we shall find that there is a slight difference between one side and the other. But further than this we seldom find in nature that a leaf is even straight; usually it is curved over from the base to the point, or it may have a twist on its central rib, as is shown in the accompanying Diagram 60. A knowledge of the construction of leaves, as illustrated by these symmetrical diagrams on Plate XXXIX., is necessary in drawing them when in the simplest positions; but it is even more necessary when they are drawn in foreshortened or twisted positions, and it is important that when a leaf is represented under the latter conditions it should be consistent with the actual shape as it would be seen if flattened out; there is often a temptation to draw a foreshortened leaf in a design without a thought as to its actual shape if it were pressed out.

These symmetrical leaves have been used because it is easier by means of them to make clear the principles of construction; but they are more a means to an end than the end itself; it remains now to apply these principles to leaves foreshortened in various positions; the principles are the same as in the symmetrical leaves, though the application varies with every different case; on Plate XL. are several examples of such leaves.

In drawing a twisted or foreshortened leaf the central rib must be arranged in such a way that it will not suggest being broken or disjointed, but must be drawn with a firm line from point to base as in Fig. 1; in this case it is very simple, but in Fig. 2 it is not quite so simple. In this figure the part of the rib which goes out of sight under a portion of the leaf is represented by dotted lines, and although this part does not show, yet the two parts that do show are so drawn as to be evidently parts of the same rib.
In Fig. 3 the stem is also in three parts, but suggests possible continuity in one firm curve.

The structure of the leaves and the division of lobes are on the same principles as those of the symmetrical leaves on the previous Plate, only in this case the divisions are balanced rather than made absolutely equal, as may be seen in Figs. 4, 5, 6, 7, and 8. In Fig. 1 a construction is given that is useful in suggesting a principle of proportioning the lobes; the bottom pair of lobes are the larger, and the two upper pairs graduate smaller, being arranged rectangularly with the central rib, as shown by the dotted lines which join the corresponding parts of the lobes and cut the central rib at right angles. This arrangement is necessary when the leaf is curved on the rib, because the lobes on the top side of the rib will become larger, or, the eyes must be made wider, than those on the bottom side, and by placing them as they are placed in Fig. 1 regularity is made certain of. Fig. 4 is an example of a leaf that is even more irregular and partly deviates from this principle of construction, though it acknowledges it in the pair of lobes nearest the top. Fig. 8 is a more complicated leaf, but one that is planned very decidedly on the rectangular principle; the dotted lines that join each pair of eyes are all at right angles to the central rib. The eyes are also on lines that converge to the top point of the leaf, as is shown in the figure by dotted lines.

The remaining figures on Plate XL. illustrate some different joinings of stalks drawn from nature, and also the small bract leaves that so often grow at the junction of a branch stalk with the main stem. In designing, this part of the construction is often made a great deal of, and much ingenuity may be displayed in varying it. A design is apt to appear stalky if too many simple joints are shown, but by careful management these joints can be made an interesting feature of the design. In Fig. 1 the bract leaf is turned up
Structure of Ornamental Flowers.
ORNAMENTAL FLOWERS AND FOLIAGE

and made almost cup-shaped. Fig. 2 has sheath leaves that wrap round the stem instead of bracts. Fig. 3, the stalk is quite detached from the bract. In Fig. 4 the bract is exaggerated to a leaf that is gaily flowing in the wind like a flag of foliated ribbons.

Plate XLII. has a number of examples illustrating the structure of ornamental flowers; some of them are naturalistic, and others are conventional. Flowers, like all other ornamental forms, should be contained within the bounds of good shapes, otherwise they are apt to appear sprawling and irregular, though this does not mean that they should be enclosed within geometrical shapes. Fig. 1 is a full view of a small flower of regular shape, therefore it is best contained within a circle. Fig. 2 is a side view of the same. Fig. 3 is an irregularly formed flower, and in spite of its irregularity it comes well within the elliptical shape that encloses it. Fig. 4 is a side view of a similar flower which comes within a curved shape that is partly elliptical. Fig. 5, the sepals and petals are in regular tiers. Fig. 6, which is drawn from the flower of the monkshood, is made up of a number of very graceful curves; the grace of these curves is due partly to the variety of form, and also to a great extent to the fact that they all radiate from the stem, as shown in the dotted lines of the diagram at the side. In Fig. 7 the petals radiate in curved lines from the centre of the flower; the method of radiation is also shown by a diagram. Fig. 8 is a much more elaborate flower than any of the preceding ones; the sepals and the central tube-like portion are composed of a kind of acanthus-leaf ornament having serrated edges, these two parts being divided from one another by a smooth-edged corolla; the smooth edges and the white inside portion give a useful contrast to the outer and inner serrated parts. Alongside this figure is a diagrammatical analysis of the same showing the principles of construction. The whole figure comes within a more or
ORNAMENTAL DESIGN

less regular shape; the points of the sepals come opposite one another—A is opposite E, B is opposite D, F is opposite G, and C forms a central one. The central rib of each leaf, if continued, as shown by dotted lines, would radiate from one point at the centre of the flower. The tube takes a direction at right angles to the longer axis of the flower, and the two sides of it, if produced, as shown in dotted lines, would converge with the line of the flower stalk. Fig. 9 has a number of flowers on one stem, and as all the flowers diminish towards the end in a regular proportion, all the parts should diminish at the same rate; this is best secured by drawing curved lines, as shown, which converge towards one another. Fig. 10 has four more irregularly shaped flowers which radiate, though somewhat unevenly, from a central point; the flowers are contained within a well-formed curve.

These drawings and diagrams have not been given under the supposition that they illustrate the whole art of constructing foliated forms, they are given rather as suggestions that may point students in the right direction; they can only be used as such, and if used further they will lead astray in the way of stiffness and awkwardness. Every separate piece of ornament has to be studied on its own merits, and every rule has to be modified through the artistic feelings of the designer. This same thought has been well summed up by a writer on ornament in the sentence, "Rules are good things to depart from," and that is about how the case stands; a design that is all rules ceases to be an art production, it becomes more akin to a scientific diagram. Rules are useful in indicating what mistakes to avoid, but they become an abuse if they are too evident in a design.
CHAPTER XII

THE TREATMENT OF PLANT FORMS IN TEXTILE DESIGN

The most casual glance at nearly all figured fabrics of the present time will show the influence which plant forms exercise in the production of design, and as the average taste of to-day runs in the direction of naturalistic rather than abstract ornament, there is very little excuse for plant life being overlooked by the designer. There is a danger, however, that plant forms may be used unsuitably, and, though the preference for natural forms shows a healthy condition of things so long as it is kept within reasonable bounds, it must always be remembered that they need to be modified to meet the requirements of ornament and repeated pattern, and to be made subservient to the limitations of the weaving process.

The popularity of naturalistic ornament and the reason why it is so generally appreciated is often on account of its association with some plant or other object in nature which is familiar, and which can be easily recognised, and not always from any beauty that it possesses as ornament. This surely must be the reason why such a remunerative market exists for those fabrics—and they are not inconsiderable in number—which are resplendent in designs that are hideously natural. They certainly possess little artistic value, being
void of all sense of fitness and beauty of form or colour; presumably therefore the commercial success which they command is due to the fact that their naturalism appeals with strong force to those whose knowledge of the rights and wrongs of ornament is unfortunately very limited.

For textile fabrics *naturalism* must always be made an entirely secondary matter, and must on no account be allowed to usurp the place which belongs to such decorative qualities as graceful arrangement and distribution of form and harmonious combination of lines and colours. Plant forms are not so much ready-made ornament that can be used without any modification on the part of the designer; they provide material from which can be evolved fresh ideas and new shapes for ornamental purposes, but they must be idealised and not imitated, for however rich in beauty nature may be, it is not in itself ornament. For woven fabrics, in which constant repetition of pattern is an essential condition, it is far safer to err on the side of conventionality than of naturalism, and in using plants as the motive of design we must aim at abstracting their more essential beauties and casting aside the accidents and non-essentials.

In advocating design based on plant forms, reference may be profitably made to the authority for their use which the historic aspect of textile ornament provides for us. Their value seems to have been recognised almost simultaneously with the beginnings of ornament, and they have been used for the purposes of design from the earliest periods of art history down to the present day. Old Egyptian fabrics show unmistakable influence of the use of plant forms, so also in Classic art, the lotus in the former and the ivy in the latter being perhaps the most common. In early Christian and Byzantine art the vine plant is very extensively met with, this being, no doubt, partly on account of its symbolic meaning, though at the same time it lends
itself very readily to ornamental treatment, and it is not to
be wondered at that its use continued during the period of
the Renaissance when symbolic meaning was subordinated
to aesthetic effect. In Gothic art the vine was also much
used, and other plants which have been made great use of
in various historic styles are the olive, pomegranate, oak,
the lily, rose, and the acanthus, the latter being the fore-
runner of the various types of conventional foliage which
are embraced by the comprehensive though somewhat
vague term “acanthus-leaf ornament.”

In Oriental art—including Chinese, Japanese, Indian,
and Persian—such flowers as the iris, peony, poppy, rose,
and almond blossom are among those most commonly met
with.

In more recent times the number of plants adapted for
design has not been so limited, the range of selection
having been very much extended; they present an infinite
variety of form, colour, and arrangement, every plant which
one comes across offering its own suggestions for orna-
mental use. Of course some are more prolific in ideas than
others, though there is hardly a plant, however unpreten-
tious, which may not be profitably used in the production
of ornament for woven fabrics. The plants mentioned as
being the principal sources of floral design in the various
periods of history are doubtless still among the most
valuable, but there is no necessity for always ringing the
changes on them; with the great and ever-widening field
of the vegetable kingdom to help ourselves to, there is
absolutely no occasion to go on repeating the old and well-
worn forms (beautiful and worthy of our admiration even
though so many of them are) which have been used by
other countries and at other periods of history.

The mere exercise of studying natural plant forms is
in itself a pleasant and profitable one apart from any use to
which such study may be put in design, and the most
ORNAMENTAL DESIGN

pleasant and profitable way of doing this is to draw them from nature as much as possible; it is the only way of extracting whatever value for ornamental uses they may possess, being much more to the purpose of the ornamentist than the analytical one which the botanist adopts. The designer looks for such artistic qualities as beauty of growth and arrangement, and for any peculiarities or characteristic details which will lend themselves to good ornamental treatment.

It is always desirable when converting the natural plant into the ornamental pattern to retain as much as possible of its character and peculiarities of growth and structure. This is a comparatively easy matter where ornament is not under the necessity of being constantly repeated; in a woven fabric, however, the repeat of the pattern tends to make this more difficult, though much may be retained if we take care that, where a plant form is chosen, it may be chosen with a view to the position and purpose of the particular fabric for which a design is being made. In dress fabrics, for instance, one would naturally choose plants that are light and delicate in character, such as the rose and carnation, while for heavier fabrics, such as curtains and hangings, plants like the peony and the large poppy would be more appropriate for the bolder designs that these fabrics require.

The size of the plant in nature must be taken into consideration, and as a general rule the ornamental treatment should not be far removed from the original, particularly so where the design is naturalistic; where the ornament is very conventional there is no necessity to keep closely to the size of nature, and if any gain is effected in the design of the fabric by a change of scale there is no reason why the change should not be made.

Another feature which must guide the designer in using floral forms is the particular kind of skeleton which he may
NATURAL FORMS WITH CONVENTIONAL TREATMENT.
By the term "skeleton" is meant the structural or main lines which form the backbone of the pattern, and from which the various details of the ornament grow. It may be free and naturalistic in character, or it may be severe and conventional; but according to the skeleton adopted, so must the character of the details growing from the skeleton be regulated. For instance, a geometric skeleton demands ornament of a very conventional and geometric character, and any less formal arrangement of lines involves a correspondingly less formal kind of floral treatment. In the same way a free and naturalistic arrangement of stem lines requires a corresponding treatment in the details, and it would be manifestly absurd to place a geometrical rosette on a naturalistic stem, for the stem and its added growth would not be consistent with each other.

It now remains to be seen how natural plant forms may be treated so as to retain as much of the beauty of nature as possible when combined with the idealised renderings which the designer has to resort to. As has been already explained, nature must be conventionalised when applied to the decoration of woven fabrics; no attempt must be made to imitate nature; the plant form which is being used must be regarded as suggesting ornament, and not as something to be copied as closely as possible. For example, in Plate XLII, we have an instance of a peony sketched from nature, together with an ornamental treatment of the same flower; the latter follows the former very closely, but at the same time there is a decided difference in the effect of the two. One has all the accidental irregularities of nature, the other is simplified and idealised. It is brought out in black, white, and two tones of gray. Each of these is made a definite shape, and as much beauty of form and expression is given to these various parts as is possible. The black vein lines are made to express the direction...
and form of the various petals to which they are applied, and the half-tone in the cup of the flower is shaped so as to indicate the form of that part with clearness. The centre portion of the flower is also reduced to order and ornament. The other drawings adapted from the peony, on the left of the plate, are much more conventional, and depart more from the natural type; in these we see the various petals converted into good and graceful shapes, the various forms radiating together to the centre of the flower as in nature, but with an ornamental effect which has been added by the designer. On the same plate (the upper portion) is given a sketch from nature of a geranium, together with an adapted treatment for a textile fabric in three tones or colours, represented by black, white, and grey, and there is a similar comparison afforded as in the peony: flat tints take the place of gradations, and these flat tints are made (as in the grey parts) as expressive and ornamental in shape as possible. Another flower, the columbine, is also shown sketched from nature, with the same adapted to a textile; in this case the leaf is brought out in solid black with white veins, the veins suggesting, by their shape, the direction of the separate leaflets.

On Plate XLIII. are various renderings of the pink and the chrysanthemum. Figure 1 gives a very flat conventional treatment, the petals of the flower being solid black with a black outline. This addition of an outline is a common device and gives softness to solid masses; there is of course no outline in nature to warrant this, but so long as the ornamental effect is better, it does not matter if nature be somewhat departed from. Similarly in the bud, the addition of spots gives useful contrast, and even though there may be nothing in nature to suggest such spots, one is perfectly justified in adding them if the design gains thereby. Nature may be made use of as much as we wish in suggesting ideas, but, after all, the designer must seek
PLATE XLIII.

Various Renderings of the Pink.

of the Chrysanthemum.
first of all a good ornamental result; this is of primary importance, and must not be allowed to suffer for the sake of keeping closely to the botanical accuracy of detail in the plant which he may be using. Figures 2 and 3 give other renderings of the pink, the latter being a heavier type of treatment and suitable for a coarser material. Figure 5 is the reverse of the latter, and is from a silk fabric. In this case the design approaches more closely to nature, though still an idealised rendering and not an imitation; the flowers, for instance, are entirely suggested by black and white, and their graceful character is due solely to the form given to the outline and solid parts of the various petals. In Fig. 6 also, the flowers are dependent entirely for their effect upon the radiation of the petals and veins from the calyx tube: there is no light and shade or colour to help; it is entirely a question of good design and the production of good silhouette forms. This same silhouette effect is seen in Fig. 7, the chrysanthemum. Such treatments as these are the most simple, and are specially suitable for damasks in effect, but they require a good feeling for beauty of form, as they have nothing else but this on which to depend. Figures 8 and 9 are other treatments of the chrysanthemum, the former being brought out in black, white, and grey; use is here made of contrast, the petals in the near half of the flower being made black against the grey and white of the further parts. In Fig. 9 individuality is given to the flower by the curve of the petals as well as by the contrast of tone. In Fig. 10, which is taken from a Japanese fabric, strong character is given by the dark leaves—with their angular vein markings—being brought against the lighter tone and the soft graceful shape of the flower. The petals of the latter are arranged so as to suggest the interlacing confusion which is so frequently seen in this flower, and all the petals are made to assume good shapes as they radiate from the centre of the calyx.
In Fig. 9, part of the quality is due to the shaded effect. As a rule, however, it is advisable to be very chary of introducing gradations of colour for the purpose of suggesting light and shade. It is quite possible to produce these shaded effects in weaving, and so long as the object of them is simply to give added value to form and not to produce an appearance of relief to the ornament—that is, to make it appear to stand away from the surface of the cloth—there is no objection to them. In textile-fabrics, the ornament must be always a flat surface decoration and must not be apparently applied to or standing away from the surface of the cloth.

Plate XLIV. gives a drawing from nature of a wild geranium, together with separate drawings of the seed vessels, buds, and of the flower, showing treatments that would be suitable for woven ornament. The seed vessels are rendered in grey and black, the patches of black being valuable as a contrast of colour and also in emphasising the form. There are three different methods given of dealing with the flower: the back view is very conventional in treatment, and is almost geometrical in the disposition of the parts, especially in the conventional rendering of the calyx; the front view is more naturalistic, and the form is suggested by the direction and shape of the white markings on the petals, while the solid black treatment of the pistil and stamens is useful as a contrast in the middle of the flower; the side view is an example of a shaded effect, but it is not intended to give an idea of relief, being shaded solely to add interest and quality to the flower.

Plate XLV. is a design for an all-over repeating pattern based on the flower given in the last plate, and it will be readily seen how such a plant may be agreeably used as the basis of a textile design: the leaf is the main feature of the repeat, and the three parallel stems also give a strongly accentuated element. The flowers show a slightly shaded
PLATE XLIV.

Wild Geranium.

Seed.

Bud.

Back View.

Side View.

From Nature.

Front View.
ALL-OVER DESIGN BASED ON THE WILD GERANIUM.
PLATE XLVI.

The Pink Persicaria

Designs for Corner & Circular Border based on the Pink Persicaria
PLANT FORMS IN TEXTILE DESIGN

effect, and the large leaves are cut up by patches of half-tone which indicate their character in an ornamental manner.

Plate XLVI. gives a drawing from nature of the pink persicaria, a common wayside plant having no pretension to rank above the level of a weed, but lending itself not unkindly to ornamental treatment. The drawing of the plant from nature gives a number of instances of a simple leaf in various turned positions, and if drawings of such leaves as these be made, the student will derive great assistance in grasping the almost infinite variety of form which natural foliage suggests, and which is so difficult to invent without constantly repeating oneself.

Plate XLVII. gives a drawing from nature of the garden pea, a plant that is well adapted to use in design. A very useful part of this plant, and one that is not present in the previous examples given in this chapter, is the tendril, which can be made very valuable in binding together the different portions of a design, and thereby preventing any undue looseness or sense of weakness; the flower also assumes very graceful shapes in all its stages from the bud to the full flower, and the leaves, by their variety of size and shape, give ample scope to the designer; the fruit or pod is also quite capable of being brought into use; the fruit is a part of plant-form which is often neglected, though in many cases it is quite as useful as the flower, if not more so. In the design at the corner, based on the garden pea, the central feature is the flower brought against the large leaves in a flat, conventional manner; the design is symmetrical upon the mitre line of the corner, and all the parts of the plant are introduced with advantage, including the pod and also the tendrils, the latter being carried into the field so as to break and round off the angle.

Plate XLVIII. gives an all-over repeated pattern based on the garden pea, the principal features being the flower backed with leaves, and the strongly-marked stem lines.
The leaves behind the flower are divided up by patches of tone so as to suggest the veining, and to bring out the flower; for this purpose the latter is also outlined with black, this black line being repeated in the main stem lines. The smaller leaves which fill up the ground are made flat and simple in shape, no attempt being made to imitate the irregular forms of the same leaves as seen in nature. For the decorative treatment the simple flat shape is preferable, and conforms better with the conventional lines on which the design is built up.

Plate XLIX. gives a drawing of a crocus plant, together with a design based on it for the border of a linen table-cover. A strong feature of the design is the graceful radiation of the leaves and flowers from the bulbous root; it is effected in three groups, a central one and two side ones, these groups of radiating forms being broken by the bent leaves, which serve the double purpose of connecting the repeats together by festoon-shaped curves in the direction of the length of the border, and also of destroying any sense of monotony that might exist if the leaves and flowers springing from the root were uninterrupted. The vertical growth of the design is in this case very well suited to the position which the border of a table-cover generally takes when in use, hanging over the side of the table. The subsidiary border at the bottom of the design is interesting as showing how the bulb and root fibres may be used as the motive of ornamental pattern.
PLATE XLVII.

Garden Pea
from Nature

Conventional Design
based on the
Garden Pea.
ALL-OVER DESIGN BASED ON THE GARDEN PEA.
CHAPTER XIII

TRADITIONAL OR ABSTRACT ORNAMENT

The term "traditional ornament" means ornament which has been handed down from one age to another during the progress of centuries, and all ornament of an abstract character which has no direct relation to any plant or flower in nature is traditional ornament in so far as it is a modification of something of the same character which has been produced in a previous style. The details of this ornament are composed of flowers and leaves of a purely imaginary or ideal kind, which in some cases may be suggested by nature just in so far as they may have corolla and calyx, stalk and leaf, but little else that will recall any individual flower or class of flowers; in some cases it even happens that the conventional flowers are an impossibility so far as the construction of their parts is concerned, and yet at the same time, from an artistic point of view, they may be very beautiful. Traditional ornament may also be composed of imaginary forms and shapes that are not derived from plants or any natural objects, such as scrolls, &c.; they are simply abstract shapes that conform to the laws of what is beautiful in ornament. Traditional ornament has arrived at its present state by a process of growth, each age has added to it and stamped it with its own charac-
characteristics. There is no doubt but that it began with imitations of natural foliage and objects, but these imitations became more and more abstracted and conventional until they have arrived at a state where little or nothing of the naturalistic is left.

To follow the history of traditional ornament would require a book to itself, it is such a wide subject; to do this would be of great use and interest, but it is not within the scope of this work. Its history dates from very early times; the oldest examples of ornamented textile fabrics that can be dated with certainty carry us back to about one thousand years before Christ, but it is not till we come to the period of the Renaissance that we find examples of much artistic value. The art of weaving was held in great esteem during the middle ages, and there are still existing many beautiful examples, some in museums and some in old houses, dating from 1200 to 1700, which show a skill both in design and knowledge of weaving that can bear comparison with the best work of the present day. We cannot do better than recommend students to study these examples, either in museums or from folios of photographs that are published, to aid them in forming a good feeling for correct taste; these early examples are almost invariably worthy of being followed.

Plate L. contains numerous examples of varying dates that will serve to illustrate more practically the characteristics of traditional or abstract ornament. Fig. 1 is a curious combination of shapes; the leaves are oval in form with scalloped edges; the stalk does not join the leaf proper but almost encircles a small three-lobed leaf. The flowers are a kind of conventional pink and have no natural affinity to the leaves. There is also another way of regarding the relationship of the whole design. One may consider that the small thin leaves belong to the pink—they are something like the natural ones; in that case we must consider the
VARIOUS TYPES OF ABSTRACT ORNAMENT IN WOVEN FABRICS
scalloped shape forms not as leaves but as some extraneous fanciful arrangement. Fig. 2 is composed of a series of alternating scalloped and pointed forms radiating from a centre. Fig. 4, Spanish seventeenth-century work, is built up of a number of forms varying in thickness and shape without any idea of copying natural ones or even suggesting a floral origin; it is a design for a continuous border arranged vertically, and serves well to illustrate conventional ornament in which even a suggestion of natural foliage is not permitted. The forms that are used are such as might easily be made with a brush, and they are built up on abstract principles, as symmetry of general arrangement, contrast between the larger masses and the smaller ones, and also contrast of direction in the way many of the lines are made to contradict one another at the points of contact; other principles are illustrated which the student will be able to see for himself. Fig. 5 is a conventional leaf from a piece of cloth of Italian make of the fifteenth century; this example comes a little nearer to having a suggestion of nature about it than the last one, but still it is not like any particular type of natural leaf. It has the general proportions of a leaf, but the serrations are entirely an invention. Fig. 6 is a flower from a design of the same date which is also to a great extent an abstraction; it has a calyx which hangs down over the stalk, and a corolla that is turned upward, and at the centre a projecting part that might correspond to the pistil of a flower. So far it follows nature in the arrangement of its parts, but further than that there is no close resemblance to it. It might just as well be described as a series of radiating lines, and in the complete design it serves the purpose of contrasting with the straighter lines of the conventional leaves.

The horizontal border, Fig. 8, is an illustration of the use of conventional leaves and flowers of no particular type; these are afterwards decorated with other floral forms, as in
the case before us. The leaf is white on a dark ground and is regularly serrated; within it is placed another shape, almost like a piece of seaweed, which is brought out black against the white leaf. It is a treatment that it would be very difficult to find an authority for in nature, but all the same it is very useful in ornament, for in this particular case it is almost the making of the design. If the whole leaf were left white the mass would be too clumsy and heavy, but, as it is, the white is divided into two portions by the black serrated band. The flower is ornamented by a spray of smaller flowers that start from the base; this is a very peculiar treatment that has often been had recourse to, and although it may be very illogical, can be made very effective. The reason why such super-ornamentation is used is to gain greater variety of lines; to put in only the veins and markings that one finds in nature would result in a design of less richness of effect.

**Plate LI.** contains several other examples which are abstractions rather than copies from nature. In **Fig. 9** the flower is arranged with the petals in a fan-like order, which are decorated with small compound leaves after the manner of the last example. **Fig. 10** is a very daring example of the treatment both of fruit and leaves, the fruit being suggested by three forms that cut one another at a point at the top, and although totally impossible, almost to the extent of being absurd, they result in a very beautiful shape. The leaf is also eccentric; instead of coming to a point, it is bifurcated or split at the end and divides out to two points instead of the usual one. It helps to ring the changes in the shaping of leaves, and thus assists in gaining greater variety. The example from a Flemish loom of the eighteenth century is a curious treatment of both leaves and fruit. They seem to have been regarded only as ground-work shapes to break up with other ornaments. In **Fig. 12** the lower leaf is ornamented at the centre and has a border.
PLATE LI.

XVIII Cent.
French

9.

XVIII Cent.
French

10.

Flemish XVIII Cent.

11.

Netherlands XVIII Cent.

12.

French XVIII Cent.

13.

14.

FURTHER EXAMPLES OF TRADITIONAL ORNAMENT.
TRADITIONAL ORNAMENT

which seems to be an imitation of lacework. Fig. 13 is a combination of foliated forms and rigid lines arranged on a definite plan, the principal lines being arranged like the flutings of a shell. The last figure is composed of conventional flowers and leaves. The large leaf is a particularly graceful example of variety of line. Some parts of the contour are composed of long sweeping curves which contrast pleasingly with the shorter curves and the serrated edges. The surface of the leaf is covered with lines and shapes running with the length of the leaf, and others across.

We can best understand why some ornament is naturalistic and other ornament conventional or abstract, and also when one class should be used and when the other, by studying the principles underlying the two.

Ornament that is entirely conventional or abstract is dependent for its interest upon the beauty of its forms only; it has no borrowed interest such as we find in naturalistic ornament. Abstract ornament is not an adaptation from nature, and is therefore without that warm interest that natural objects always create. For example, if one sees a rose or a bit of apple blossom depicted in any design, however conventional it may be, it creates within us a feeling of pleasure much akin to that of meeting an old friend. Conventional ornament is cold and unsympathetic; it is made up of a number of more or less meaningless forms that are brought together with the object of pleasing the eye without going deeper into the sentiments of association of ideas. In conventional ornament the principal lines and each piece of detail should be carefully studied and drawn out in the closest conformity to the principles of what is beautiful in design, and it must always be remembered that they exist for no other purpose than to please the eye. Any line or form that is not aesthetically beautiful has, therefore, no reason for existence. It might
be described as a style that is entirely given over to grammatical construction on correct principles; it contains no meaning and gains nothing from suggestive associations.

Abstract ornament, then, is dependent for all its interest upon the grace and beauty of the forms and the arrangement of the lines in an aesthetic sense; it pleases the eye only, without any appeal to the reason or sentiment. It may often be noticed that much of this class, if regarded from a rational point of view, is altogether an absurdity, having no evidence of a reasonable process of growth such as we see in nature; in fact, it is often purposely made grotesque in character. However grotesque or illogical it may appear, it may still be excellent ornament and in good taste, providing the forms are graceful, but however unnatural it may appear, it must not be without some kind of order; ornament must not be allowed to run mad, there must be some kind of reason in the most grotesque features.

In constructing conventional ornament it is, therefore, of the utmost importance that each line shall receive careful study; it must be beautiful of itself, and must also form into a graceful arrangement with all the other lines and forms of the design. No part of the design can be left to haphazard chance, but every detail must have a clear definition and a refined shape. This will be easily seen on referring to any of the conventional designs given in this work.

The conditions under which conventional ornament can be best applied are for materials where severity of form, and clear, firm, and graceful lines are required. It does not always happen that natural flowers are desirable or appropriate; cases often occur where abstract forms are more suitable than natural ones and in better keeping with the surroundings.

The way for the student to learn this class of ornament
is to make numerous note-book studies of past examples. The more varied the assortment of designs that can be thus gathered together and studied, the greater variety of detail is he likely to get into his own. It is a style where there is little room for originality; the only originality that can be displayed is in evolving new ways of combining the different details. Nearly every conceivable kind of detail has been used over and over again, and all that can be aimed at, therefore, is to produce new variations of them; this can best be done by becoming familiar with as many examples as possible and making use of them when necessary.
CHAPTER XIV

ANIMATE FORMS, PROPERTIES, ETC., IN TEXTILE DESIGN

The value to the designer of that part of nature included by the term “plant forms” has been already shown, and it will be admitted without question that for ordinary design purposes the vegetable kingdom is the most useful of all natural sources in providing material that can be turned to account in the production of ornament; the animal kingdom is, however, another very fruitful source of suggestion, and helps the designer in producing a new series of ornamental forms and design effects which would otherwise—that is, without the help that this branch of nature gives—never be brought into existence; and it is because of this that animal forms are used at all—not so much for the sake of the animal itself as for the hint which it gives in producing a further variety of ornamental form.

The use of animal forms for the purposes of cloth decoration seems perhaps somewhat incongruous, and in some fabrics they would be obviously out of place; they certainly cannot be so generally used as plant forms, which can be brought into service as the motive of design for almost every class of textile; but just as plant forms have to be conventionalised in the process of being turned into ornament, so also must animal forms, only much more so.
EXAMPLES OF ANIMATE FORMS IN TWELFTH CENTURY FABRICS.

1. Sicilo-Saracenic. XII cent.
2. Sicilo-Saracenic. XII cent.
3. Saracenic. XII cent.
The only admissible rendering of animal forms is a very abstract one, and it is impossible to conceive of a realistic treatment of them being agreeable in any class of woven fabric; they must not even approach realism, and the only relation which they can have to design is in suggesting another variety of ornament. The fact of frequent repetition is, apart from anything else, a sufficient reason for this abstract rendering; it is an axiom in ornament that the higher the organic rank of any part of nature which is being used as the motive of ornament, the less capable it is of being constantly repeated, and animal forms, being organically on a higher plane than plant forms, are less adapted, unless very abstract in treatment, to such mechanical repetition as the process of weaving demands.

If reference be made to the illustrations on Plate LII., this conversion of the animal into something that primarily serves the purpose of ornament may be more readily understood. In Fig. 1, for instance, which is from a Sicilo-Saracenic fabric of the twelfth century, animate forms are brought into use in a thoroughly pleasing manner. There is no attempt at the imitation of nature, the animal and bird forms being treated solely with a view to the production of good lines and pleasing shapes, and they make an excellent filling for the space between the large heart-shapes. The sense of movement and action is a quality that may be profitably taken advantage of in using animate forms for decorative purposes, and even in the flat treatments that one has to be content with in a fabric it is possible to suggest this with good effect. In the case of the design under notice the action given to the animals and birds is such as to make the creatures fall into harmonious lines with the rest of the design, and it helps them to fill the space for which they are destined. Fig. 2 on the same plate also illustrates the decorative use of animal forms. The winged lion that fills in the ogee-shapes is an ornamental device.
that has doubtless a symbolic meaning, and a very effective result is obtained by the radiating series of lines which indicate the separate parts of the wings.

Fig. 3 is a very fanciful design composed of many elements, and is very typical of the work of the Saracenic weavers during the twelfth and thirteenth centuries. The chief feature of the design is a nondescript bird standing in what is no doubt meant to suggest water; this again rests upon a conventional rendering of cloud forms, from beneath which issue rays of light; the neck of the bird is interlaced with the folds of a sail—a curious arrangement, and one which has probably a symbolic or emblematic meaning. The chamois is standing on a rock rising above cloud forms, which are only partly shown in the plate; a dog is also included, the legs being seen at the top of the illustration. The design as a whole seems to suggest the sport of game-driving, and it doubtless has a story of its own to tell, which of course gives added interest; but, after all, this is of less importance, when regarded as ornament, than the skilful management of all the parts of the curious combination, which are so conventionalised and blended together as to produce a good decorative arrangement and one that will conform to the requirements of repeating pattern.

Other designs which further illustrate how animate forms may be satisfactorily dealt with in ornament are given on Plate LIII.

In Fig. 1, for instance, the grotesque bird forms are made to fall into the lines of an ogee shape or nearly so, and the bird shapes afford a useful contrast to the floral ornament. In Fig. 2 an eagle seems to be attacking a swan: this design is a good instance of the way in which animal or bird forms should be made to harmonise with the floral or other ornament with which they may be combined. In this case the lines of the eagle and swan are in perfect
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harmony with the other parts of the design; they do not detach themselves at all from the floral ornament, but combine with perfect ease and completeness, while at the same time a certain amount of contrast in form is given by the radiating lines of the wings and the shape of the birds as compared with the shape of the floral details. It is the contrast of form, together with the harmony of line and arrangement, that makes the design so satisfactory as a whole.

Plate LIV. gives another Italian design (Fig. 1) in which bird forms are used with very good effect, and much of the strong character which it possesses is due to their use. Looked at from a naturalistic point of view they are quite grotesque, though perfect when regarded as ornamental features: they contrast most effectively with the floral ornament, the mass of white given by the body of the bird and the shoulder of the wing, together with the sharp radiating lines of the feathers, making an excellent foil to the richly foliated ornament with which the birds are combined. In Fig. 2 a symbolic animal form and heraldic shield are introduced into a repeating pattern; this is a sixteenth-century design, but it is no unusual thing even in modern times to use such elements, and where fabrics are woven specially for the use of large establishments, the embodiment of a shield or crest in the design is often required.

Examples of Japanese ornament with bird forms are given on Plate LV. Fig. 1 is from a Japanese silk fabric, and the same abstract rendering that has been pointed out in the examples given of Italian textile ornament is again present: the birds—depicted in the act of flying—are so far removed from the realistic as to be quite satisfactory when seen multiplied in the woven fabric, and the action of flight gives opportunity of using in the wings and tail a series of graceful waving lines that are in good contrast to the shapes of the floral ornament. Fig. 2 shows a very good decora-
tive treatment of a bird form within a square, and a further example is given in Diagram 61, which is from a Japanese design that seems to suggest birds swimming on water.

The parts of a bird—such as the wings and feathers—have also great beauty both in form and colour, and they are admirably fitted for ornamental purposes. The feather is particularly useful, especially in some instances, the peacock's feather for example, which—from the graceful lines that it falls into and the rich harmonies of colour which it possesses—is capable of supplying many a hint to the designer.

Insects of various kinds are also very well adapted for decorative use, and particularly winged insects such as butterflies, moths, and dragon-flies: an illustration of this may be seen in Diagram 62. Reptiles of various kinds are often of great beauty of form, and though there is perhaps something objectionable in applying reptiles to many forms of cloth decoration, the fact remains that such creatures as the snake and lizard may, when not inconsistent with the use of a fabric, be turned to good account, though, of course, like all other animate forms, they must be treated in an abstract manner.
PLATE LV.

JAPANESE RENDERINGS OF ANIMATE AND CLOUD FORMS.
CONVENTIONAL TURTLES AND WATER, JAPANESE.
ANIMATE FORMS IN TEXTILE DESIGNS

Fishes are also used extensively by designers, and Plate LVI. gives an instance of the way in which a Japanese artist has made them the leading motive of a repeated pattern; the pliable nature of the average fish gives opportunity for turning it into a great variety of graceful flowing curves, which will combine very easily with the conventional representations of water with which fishes are generally associated. In this design the fish is made to follow the general outline of the circle, and the water is suggested by graceful flowing curves that go very successfully with the contrasting circular line of the fish: in this case the designer has evidently intended to indicate rough tumbling water, and the ends of the wave lines provide a very effective feature by the hint which is given of the breaking of the wave into spray and bubbles. There is a very fine sense of rhythmical movement in all the parts, and the design hangs together with perfect ease and completeness.

Diagram 61 gives a suggestion of water in a more peaceful state. Another effective rendering, and one which is quite different from the two previous ones referred to, is seen on Plate LVII. The series of curved and waving lines indicating the water give decided character to the pattern, and especially in contrast to the conventional turtles with which they are combined: in addition to fishes, shells and other water objects, including water plants and seaweed, may be suitably brought into use for decorative purposes.

The extent to which nature may inspire the designer is practically limitless: material which will suggest new forms comes from every quarter, and without any great trouble in the finding, providing we go about with open eyes and receptive minds. The vegetable kingdom is doubtless the principal hunting-ground, though there are many less obvious sources that may be looked to, and which, because they are less obvious, are more likely to give birth to designs that are out of the common. The way in which such a
seemingly unpromising element as water may be used has already been shown: then there are the elements of fire and flame, the sun, moon, and stars, the cloud effects in the sky, the effects of frost as pictured on our windows in winter, the natural grain of various classes of wood, the web of a spider, the sectional markings of stones and fossils—all these and many other sources are available. We are disposed sometimes to imagine that in such an old subject as ornament all the parts of nature that have any value to the designer have been explored time after time, but this is far from being the case: as a matter of fact the historic aspect of ornament gives evidence of only a comparatively small number of elements in nature having been used, and it is only in more recent times that designers are taking advantage of the diversity of material which nature provides in every corner of her rich storehouse of beauty.

The three following plates give Dress Fabric designs that are to some extent suggested by nature, though they are very abstract in character. In Plate LVIII. Fig. 1 is a very conventional treatment of lightning, and Fig. 2 is suggested by the curving of a riband, the intervening ground being filled with gradually thickened curves producing a slightly shaded effect. Figs. 3 and 4 are ground effects, the former being a very abstract treatment of water, and the latter suggested by watered silks.

In Plate LIX. ground treatments combined with superposed ornament are given: they have very little connection with anything in nature, and are simply surface decoration that is useful in breaking up the empty spaces with unobtrusive pattern: such ground designs as these are generally brought out by contrast of weave, with warp and weft of the same colour; the effect is in this way so subdued as not to overpower the sprig pattern or spot ornaments that are placed on this ground pattern and which are intended to be of primary importance.
PLATE LVIII.

1. BROKEN GROUND EFFECTS FOR DRESS FABRICS.
SPOT FIGURES WITH SHADED GROUNDS.
NO. 1. PALM-LEAF PATTERN.  NO. 2 AND 3. PROPERTIES.
NO. 4. PINE-CONE PATTERN.
Plate LXI. gives further examples of designs that are well adapted for dress fabrics. They are all very conventional, and have only a very distant relation to any prototype in nature, though they are good for their particular purpose. The main purpose of textile ornament is, after all, to give added beauty to a fabric, and it is not absolutely essential that one's design must be traceable to something that exists in nature. Fig. 4 is a treatment of the pine-cone pattern, the chief feature of which is the contrast between the firm graceful line and shape of the pine-cone with the broken and irregular character of the remaining parts of the design.
CHAPTER XV

LIMITATIONS IMPOSED BY THE STRUCTURE OF A FABRIC

In dealing with this chapter it is assumed that some knowledge of the process of weaving has been previously acquired; but perhaps it may be advisable for the benefit of any who do not possess this technical knowledge to give a brief explanation of the way in which ornamental patterns are produced in the loom.

The design is usually first of all sketched, on ordinary paper, the same size as it would appear when woven; one complete repeat of the design is then drawn upon point paper. This paper, which is specially prepared for the purpose, is ruled over with lines crossing each other at right angles, each small square between these lines corresponding to a warp or weft thread brought to the surface of the fabric. The design, which is necessarily, in many fabrics, very much enlarged when put on to this point paper, is drawn out after the manner of the illustrations on Plate LXI. After being drawn in this way, it is then put into the hands of the card cutter, who takes every horizontal series of squares of the design paper on which the repeat of the pattern is drawn, and cuts or perforates cards according to the way in which the small squares or points in this horizontal line are filled up with the pattern.
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on the point paper, a separate card being thus prepared for every throw of the weft thread by the shuttle. The cards are then stitched or laced together in their proper order. The work which these cards perform is to regulate a series of needles, some of which go through the holes, others being prevented from doing so by the portion of the card which is not perforated: these needles in their turn act upon the harness of the loom in such a way as to cause some of the warp threads to remain stationary and horizontal, while others are raised, and when the shuttle is thrown between the raised and the stationary warp threads, the weft which the shuttle carries will appear on the surface of the cloth where the design requires it to do so, while in other places, where not wanted to produce pattern or to stitch down the warp threads, it will go to the back of the cloth; each throw of the shuttle is regulated by these successive cards in definite order according to the pattern, and the design on the fabric will gradually develop as the cloth is woven.

There are often two, three, or even more shuttles used, according to the number of colours employed in the weft, each shuttle carrying a separate colour. As a rule the pattern is brought out by a combination of warp and weft, but there are some textures figured chiefly by the weft, and others, such as Brussels and tapestry carpets, in which the pattern is entirely the product of the warp yarns, the weft in the latter being solely for the purpose of interlacing the warp and for producing a firmly built and well-tied cloth.

It should be stated that the repeats of a design are produced automatically from the cards which have been prepared, and when more than one repeat comes within one width of the cloth this is effected by carrying branch strings in the harness from each central string, so that the corresponding warp threads in each repeating part are similarly and simultaneously acted upon.
In textiles, as in all forms of applied art, there is of necessity a close relation between the material, the structure of the fabric, and the ornament which decorates it; this relation is of more than ordinary importance in woven designs on account of the technical limitations which have to be considered, and it is absolutely necessary that the designer should give some attention to this side of the subject. On the one hand there is the great diversity of fibre used, while on the other hand we have the great variety of surface effects into which the fibre or fibres may be woven, and in order that the designer may give full value to his ornament when woven, these questions must of necessity be considered; for instance, there is a considerable difference between a woollen and a silk dress fabric, and it will be obvious that a design which might be perfectly satisfactory in the one might be quite out of place in the other, because of the difference of thickness in the fibre producing a difference in surface texture that these fibres present when woven. To take two extreme examples, we have at one end of the scale the primitive weaving which may be seen in the plaiting together of grasses for basket work, mats, and similar purposes, and at the other the rich fabrics that may be produced in such a delicate fibre as silk, and it goes almost without saying that any ornament which might be applied to one or other of these greatly contrasting fibres would be entirely different and would be regulated by very opposite conditions; the former would only lend itself to the production of patterns of a very geometrical character, such as the interlacing of the grass fibre might suggest, whereas in the latter the utmost delicacy of detail and refinements of drawing would be possible.

Between these two extreme cases there are many grades of thickness in fibre—wool, cotton, flax, and jute—all occupying an intermediate position and offering greater or less scope for artistic treatment. It follows, therefore, that the finer the
PLATE LXI.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

DRAWING OF CURVED FORMS FOR DIFFERENT SETTINGS.
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fibre used, the finer and more flexible will be the yarn that can be spun from it. In practice, the thickness of the yarn which has been spun from the fibre and the number of threads which, in a given space, will appear on the surface of the fabric when woven, must have primary consideration, and this may be still further qualified by the fact that the yarn is not always used singly. In such a fabric, for instance, as a Brussels carpet, the yarn is frequently three-fold; that is to say, that three (or even more) separate yarns are folded together so as to make one fuller and thicker thread, this increased thickness giving added richness and softness of effect to the texture of the carpet and also giving greater wearing capacity and softness to the tread, though at the same time it imposes certain limits with regard to the choice of design.

The diagrams on Plate LXI., which are intended to represent different fabrics to actual scale, illustrate the difference in treatment necessitated by varying materials. In Fig. 1 each small square represents the width of one warp-thread or one loop in the pile of a Brussels carpet. This diagram is the actual size of the fabric, allowing ten loops or ends to the inch, and if a curved form such as the one given were to be represented, the outline could only be shown by a series of steps, the steps being made so as to follow as closely as possible the shape of the curve.

This stepping is a necessity in all fabrics on account of the process of weaving, and even where very fine yarns are used it is present, though it follows that the finer the yarn and the greater number of warp and weft threads there are to the inch, the smaller and less evident these steps will be, and the greater will be the possibility of producing well-formed shapes. This may be seen in Fig. 2, in which the same curved form as that indicated in Fig. 1 is used; in this case there are forty ends to the inch appearing on the surface, and it will be readily seen that the leaf is much
more perfectly developed, and allows of more detail being introduced; the same will also be evident when the circular flower in Fig. 2 is compared with the corresponding shape in Fig. 1. It will be obvious from the comparison which these figures (each of which is actual size) afford, that it is impracticable on account of this stepping to produce absolutely perfect curves, and in the thicker or coarser yarns it is only possible to produce curves of very broken character. This is not necessarily a misfortune, however; it is natural to woven fabrics, and gives the ornament which may be applied to them a certain character that is not in the least objectionable, and may be even considered to give added beauty when properly used. Some of the richest of the hand-made Oriental carpets or the Axminster pile carpets have designs worked out in steps varying from one-fifth to one-seventh of an inch in size, suggesting in this way the tesserae of a richly-coloured mosaic.

There is now one point of paramount importance which must be always borne in mind when designing for fabrics that have an open texture, or in which the threads are thick, to avoid curves that run for great lengths in the direction either of the warp or the weft—that is, vertically or horizontally; curves of such a character would lose all their value as curves, and would appear instead as disjointed straight lines placed in steps. In Fig. 3, where there are twenty threads to the inch, such curves as A B or A C, the former running in a vertical and the latter in a horizontal direction, are instances of this unsatisfactory effect, and show the difficulty of suggesting a good curve, when running too parallel with the warp or weft.

The curves that are most typically satisfactory are those that run diagonally across the piece at, as near as possible, an angle of 45°: of course, it is obviously impossible to make all curves in that way; if they were made so, the
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design would be stupidly uninteresting and void of the necessary artistic qualities; but still this important fact must be recognised, and as many as possible should take a diagonal direction. Evenly rounded curves, such as circular ones, work very much in this way, but unfortunately they are not the most beautiful ones. It remains for the designer to decide between the choice of more or less circular curves, with their practical utility, and those of more variety and beauty; the choice must be ruled to a great extent, as before stated, by the coarseness or the fineness of the material.

In all coarse-textured fabrics it is better to let the lines of the pattern be simple and bold in character, aiming at the production of well-rounded and clearly-marked shapes. In fabrics of a finer character this difficulty to some extent ceases to exist, as will be seen in PLATE LXI. by comparing the curves A'B' and A'C' in Fig. 4, with curves of the same size and shape as represented in Fig. 3; in the former case there are sixty-four threads to the inch, and it is possible to get such curves as A'B' and A'C' with a more satisfactory result. A further illustration of the necessity of bold shapes in coarsely-built fabrics is shown by the leaf which is drawn in Fig. 3, as compared with the more delicate and subtle shapes of the pattern drawn in Fig. 4. In the former the curves turn much more quickly; in the latter, long sweeping curves, which deviate very gradually from the straight line, are admissible.

It will now be desirable to refer to the more typical kinds of textile work in order to indicate as far as possible the most appropriate ornamental treatment to be adopted. Referring first to the coarser build of fabrics, it will be seen in PLATE LXII. what the texture of one of the most important classes of carpets is, and in this reproduction of Brussels some idea may be gained of the size of the separate points or squares in the cloth; they number nine to the
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lineal inch, and in such a fabric it would be impossible to produce curves of a very subtle character; the material necessitates that the design be composed of large forms, and even then it is advisable that they should be very bold and decided where curves are introduced, or frankly rectilinear where it is impossible to suggest well-marked curves.

The same also applies in a greater degree to designs for Axminster carpets, in which there are generally from five to seven points to the inch. In all carpet work the question of colour is of greater importance than the question of form. The nature of the fabric limits the designer from the point of view of securing refinement of ornament, but it affords exceptional opportunities for the display of rich combinations of colour, and many designs which are exceedingly commonplace as far as the pattern is concerned, are redeemed by the use of well-chosen colours.

Another class of woollen fabric is illustrated on Plate LXIII.; this is what is generally known as a tapestry, though the term "tapestry" has so many different meanings in the present day as to lead to some difficulty with regard to the exact definition of the term. The hand-made productions of the Gobelins works in Paris are called tapestries, and the same term is also used for that cheap class of carpet in which the colours of the pattern are produced by printing the warp with various dyes in such a way as to produce the design which is required when the printed warps are woven into the carpet. The piece which is given in the plate is from a woollen fabric, such as might be used for curtain-hangings or table-covers, and shows on the surface twenty ends to the inch. This is, as will be readily seen by comparison, finer in texture than the carpets shown in Plate LXII., though it is sufficiently coarse to demand bold and well-defined shapes in preference to small and much-cut-up detail. In this particular fabric four distinct
PLATE LXII.

BRUSSELS CARPET.
PLATE LXIII.

TAPESTRY.
colours are used, a separate shuttle being provided for each colour, and they are woven into a cotton warp which ties the weft threads together so as to produce a firmly-built cloth.

In such a fabric as this, which, being practically all wool on the surface, is capable of withstanding a great amount of wear and tear, it is well worth while to obtain the best possible ornament as well as a sufficient variety of colour to give richness of artistic effect. The woollen fibre derives little advantage from its lustre, but the softness of effect which it possesses makes it specially adapted for giving value to colour combinations.

In Plate LXIV. are given two illustrations of dress fabrics, the lower one being a woollen one, in which a finer yarn is used than in the tapestry just referred to. In this case there are about sixty-four ends to the inch, and it will be seen on examination of the pattern that forms of a lighter and more delicate character are possible both as regards the size of these forms and the more subtle curvature adopted.

This figure also suggests another matter of very great importance, and one that has not as yet been sufficiently explained, namely, what is termed shading. In this design, which is composed of a single weft of light colour and two warps—one of light colour and the other of dark—several different tones are produced by varying the weaves. In the ground, the light warp and the weft are brought to the surface in equal quantities by a plain weave, and the dark warp remains behind. In the darkest parts of the figure the dark warp comes entirely to the surface as a float, and thus forms the solid parts of the pattern. Between that and the lightest tones of the figure there are many intermediate ones, entirely the product of the different weaves. Referring to the figure, and especially to the small oval-shaped leaves, there is a slight gradation of tone from one side to the
other, and some of the long leaves are made darker at one part than another. A few of the long leaves are also made entirely lighter than others by combining the dark warp and light weft in varying proportions. Several of the leaves have so much of the light weft brought to the surface that they appear to be only like reflections of the others, causing them to retire behind and thus giving an appearance of depth and variety to the design. This light shading effect is particularly useful where two leaves meet together, and instead of letting them blend with each other, the lower part of one can be made gradually lighter and more retiring into the ground. In this way it will appear distinct from the darker leaf, and each one will thus be permitted to retain its own form without merging into the other.

This same method of shading is often adopted in designing small spot figures, by varying the weaves from one side of the spot to the other, making a gentle gradation from light to dark. It is not advisable to use this shading with the intention of giving the appearance of relief to the figures; to make anything that would have the appearance of relief would be in decidedly bad taste for a flat woven surface; the shading should only be used to give lightness to the figure and accentuate the forms and shapes.

In the upper half of Plate LXIV. we have a fabric in which the pattern is brought out in mohair weft upon a worsted ground; in this instance the lustrous quality of the mohair is taken full advantage of, and instead of large flat masses (such as we see in Plate LXIII.), the mohair pattern is broken up and we have a number of separate small portions both in the leaves and in the flower. It will be seen that in the flower shown in the lower part of the fabric, the petals are not left plain and unbroken, but are cut up by lines which cross the petals in a diagonal direction; the same device is also adopted in the stem, and the general effect produced in the pattern is such as to give sparkle and
DRESS FABRICS—MOHAIR LUSTRE FIGURE, AND ALL-WOOL TEXTURE.
brightness to the fabric; every separate leaf or every separate division in the petals catches the light by the slight projection above the surface of the cloth which the mohair has, and such fabrics when worn are very effective on account of this sparkling lustrous quality that the pattern gives in contrast to the dull ground upon which it is woven: this cutting up also serves the purpose of tying down the floats of mohair weft, and of avoiding any long floats.

Another large section of woven fabrics is that of Damask; a true damask is one in which the ground and the pattern are worked out in sateen weaves, and the contrast which is necessary in order to bring out the effect of the pattern is obtained by making the long floats in the ground from the warp threads, and in the pattern from the weft threads, or vice versa. In this way the play of light upon the fabric defines the ground from the pattern, and according to the angle from which the fabric is seen, the pattern will be lustrous, or the ground will have the sateen-like effect. Damask being a question of weave effect rather than of any particular fibre, may be produced in various materials, linen, silk, and bright wools being those in which it is most effective.

Damask weaving, as its name implies, originally came from Damascus, and was brought over to Western Europe by the Crusaders, along with the draw loom which was used in its manufacture. The true damask has an 8-shaft sateen weave in both ground and figure, but in modern weaving the term “damask” is used in a much more general sense and is frequently meant to describe fabrics in which the ground only is sateen, while the pattern is brought out by some other weave effect—as a twill, for instance—which, by the comparative dulness that it may have, will contrast with the lustre of the sateen ground. As a rule the charm of a damask is retained most successfully by adopting a large and dignified class of ornament, rather than a light and
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dainty type of pattern, though much depends on the particular use for which it may be intended; for some purposes the lighter class of ornament is more suitable, as, for instance, a linen damask table-cover, but in curtains and furniture fabrics the ornament would more appropriately be of a larger character. Some of the old Italian damasks are exceptionally good as models for the guidance of the student. In cases where the ground only is brought out with a sateen effect, and in which the pattern is dull by contrast, it is desirable to make the most of the rich lustrous sateen ground, so as to let it occupy the largest area, and the design should be arranged with this end in view.

In silk fabrics the delicacy of the fibre, combined with the richness and wearing capacity which it possesses, gives every opportunity for designs of an elaborate and expensive type. Being a costly material in itself, it would be false economy to allow it to suffer in any way by poverty of design; in this material practically anything that can be drawn on paper can be reproduced with almost perfect fidelity of form in the loom. In Plate LXV., which is taken from a silk brocade and is actual size, we have an instance of the almost perfect way in which an elaborate design like this chrysanthemum pattern may be rendered; every leaf or petal is firmly indicated, and the effect is heightened by a suggestion of shading produced by varying the weave, the lighter petals being in solid weft, the half-tones by a mixture of the ground colour with the white weft; the leaves, which are brown, are also enhanced by the addition of a somewhat similar shaded effect. Although in silk it is possible to get extremely small details, it is not advisable to attempt too much in this way; a design is not to be judged by the microscopic detail which may be put into it, but rather by the simplicity with which the desired result is secured.

The silk design just referred to is for dress purposes, and
PLATE LXV.

SILK BROCADE.
LIMITATIONS IMPOSED

its lightness makes it well adapted for use in that way; such a treatment would be out of place if used for purposes like upholstery or hangings, in which a larger and more severe class of design is preferable.

Another important class of silk fabric is Brocatelle, a distinguishing feature of which is its raised figure, which is made to appear puffed out into slight relief above the ground. The facing of this puffed figure is satin, and it is usual to have very little ground in order that full advantage may be taken of the richness of effect which this satin gives. It is necessary in designing for brocatelle to avoid small details and choose forms of a bold and vigorous character, as it is impossible to obtain such details in the raised or puffed effect which is distinctive of this particular class of fabric; if any small parts are introduced they must on no account be allowed to run into or confuse with each other.

In figured velvets the type of design which should be aimed at has much in common with brocatelle; being a raised pile effect it is necessary to adopt clear and strongly marked forms, for small details (as, for instance, the small serrations of a leaf) would be very unsatisfactory in a fabric of this kind. It is always desirable to retain as much as possible of the velvet surface; this is the richest part of the fabric, and it is natural, therefore, that as much of it as possible should be shown, sufficient ground only being used to bring out the ornamental forms that may be adopted. The upper example on Plate LXVI. is a good instance of this, and it also illustrates a type of design which is well fitted for this class of work; in this case the figure is entirely of cut velvet, but it is quite usual to allow some parts of a velvet pattern to remain uncut, that is, to show the uncut loops of the pile in any parts that the designer may think fit. A very usual practice is to let the forms of the pattern be outlined with an edging of this uncut pile,
ORNAMENTAL DESIGN

though it may be introduced in larger masses if the manufacturer is content to sacrifice a corresponding amount of the richer parts of the cut velvet; this is exemplified in the lower half of Plate LXVI.

In Chenille fabrics the design is developed entirely from the weft, and is produced by dyeing the weft to correspond with each successive horizontal strip on the design paper, so that when the weft is thrown from the shuttle it will correspond on the fabric with the successive horizontal lines on the repeat of the design. This gives great scope for variety of colour, and almost any number of shades may be used. The yarn is a wool pile, and there are about eight ends of warp to the inch; it will be therefore evident that only designs of a large character could be satisfactorily worked out in this material.

In open textures such as lace curtains, Madras muslins, and gauze cloths, the light nature of the fabric and the necessity for the fabric being transparent and allowing light to pass through it, suggests design which is light and delicate; on the other hand the size of the net prevents very small details being satisfactorily shown: the ornamental forms used must therefore be bold, but at the same time the general effect of the whole must be as light in character as possible, and one very usual way of securing this lightness is by making good use of the principle of variety—that is, to get the heavier forms plentifully relieved by lighter and more delicate parts. In this way the value of the fabric as a transmitter of light will not be destroyed, and the ornamental treatment will be in harmony with the character and use of the material.

From what has been said in reference to the type of design suitable for various woven fabrics, it will be readily inferred that it is not always possible, and seldom advisable, to transfer a design from one material to another without thought as to the result of such an adaptation. A design
VELVET FIGURES.
LIMITATIONS IMPOSED

that is suitable for one material, however excellent the
design may be in the original material, might become a
very poor one when adapted to another; a design in a fine
material will not work in the case of coarser ones, and
vice versa, a design made for a coarse fabric would look
bald and crude if put on to a fine silk.

Such adaptations can be and are made, but they must be
made judiciously and altered to suit the changed require-
ments. The whole may be summed up in the statement
that a design must be made with a full knowledge of how
it will be executed in the fabric, and what kind of fabric it
is intended for; the designer must think, as it were, not in
pencil and paper, but in warp and weft.

It is, of course, impossible here to deal with every class
of textile that is produced, but the peculiar nature of the
particular fabric for which a design is being made must be
taken into account, and although certain limitations are thus
necessarily imposed in each case, these limitations are not
therefore hindrances to the production of good ornament;
on the contrary, the restrictions imposed will almost invari-
ably act as a stimulant to the faculty of invention, and tend
to develop ornamental forms that are not only beautiful and
artistic, but are also consistent with the practical conditions
which the fabric demands.
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