

A TEXT BOOK DEALING WITH
ORNAMENTAL DESIGN
FOR
WOVEN FABRICS

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WITH SIXTY-SIX FULL-PAGE PLATES AND NUMEROUS DIAGRAMS
IN THE TEXT

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Note

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PREFACE

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 I

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.

ORNAMENTAL DESIGN

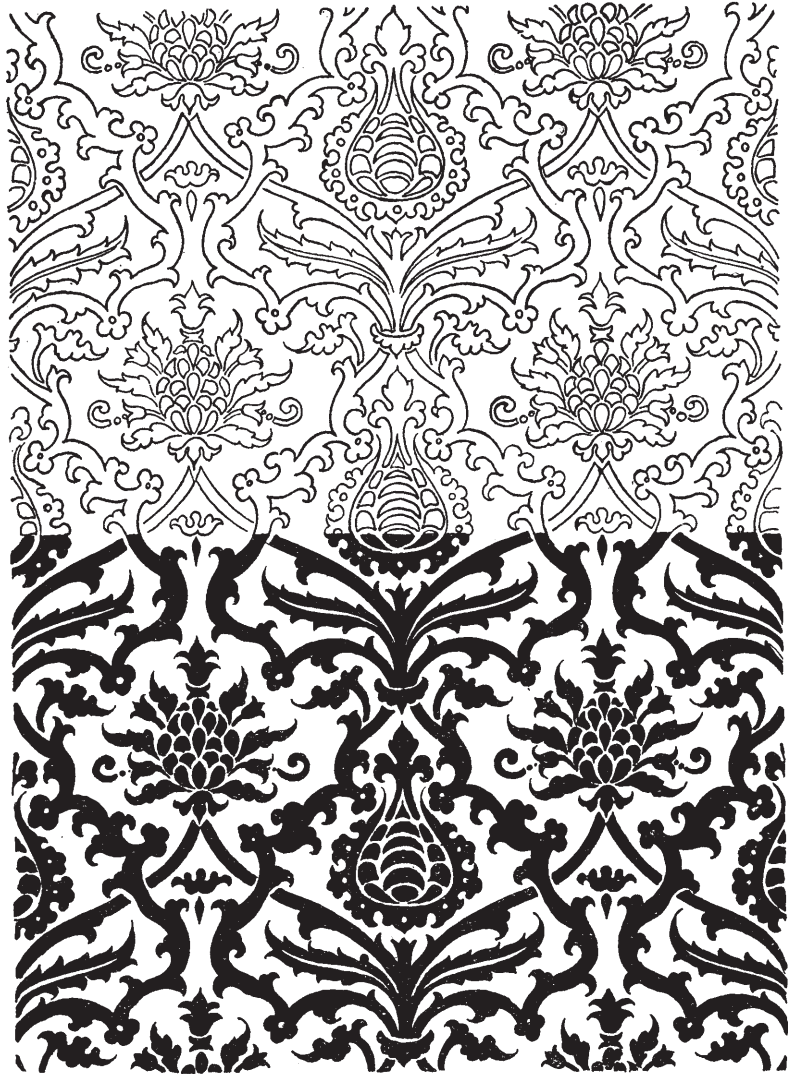
The other purpose which is served by learning to draw is in the development of a feeling for beauty of line and form that it helps to bring about : all design is to a large extent dependent on a refined and sensitive feeling for the beautiful, and although this may be inherent in some people to a much 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

PLATE I.



SPANISH--SIXTEENTH CENTURY-DESIGN, IN OUTLINE AND IN MASS.

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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

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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

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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.

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CHAPTER II

GEOMETRIC DESIGN

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

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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

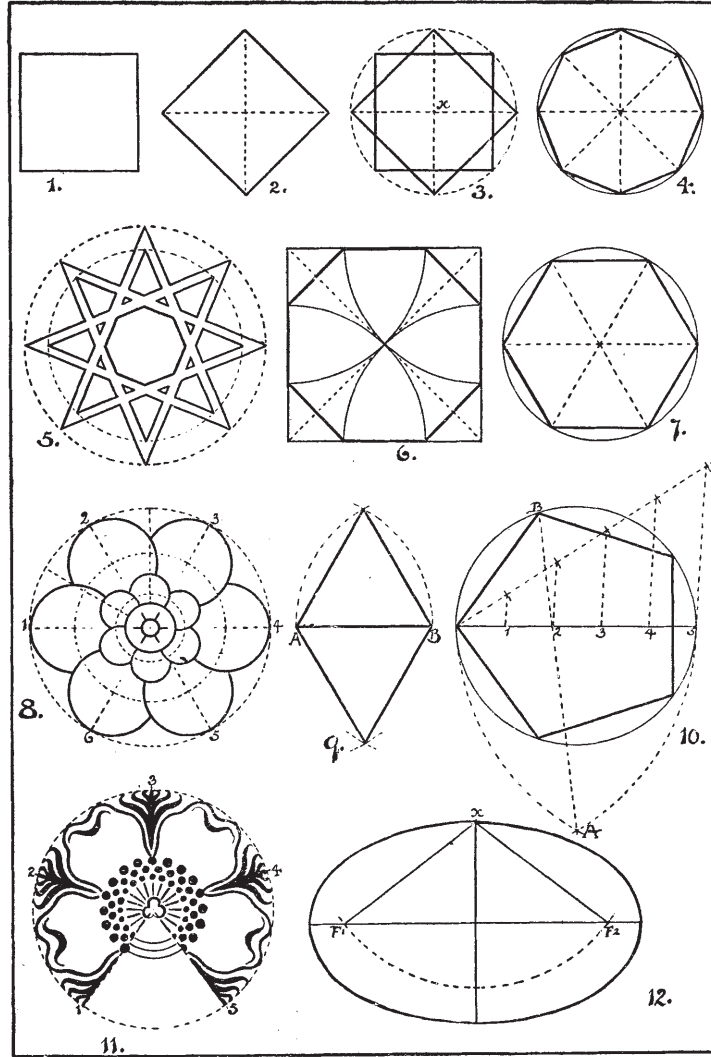
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demands originality of conception and artistic treatment. The simpler forms of geometric pattern, such as stripes, checks, and interlacing bands, are naturally suggested by the process of weaving, just as the plaiting together of bands of straw or 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.

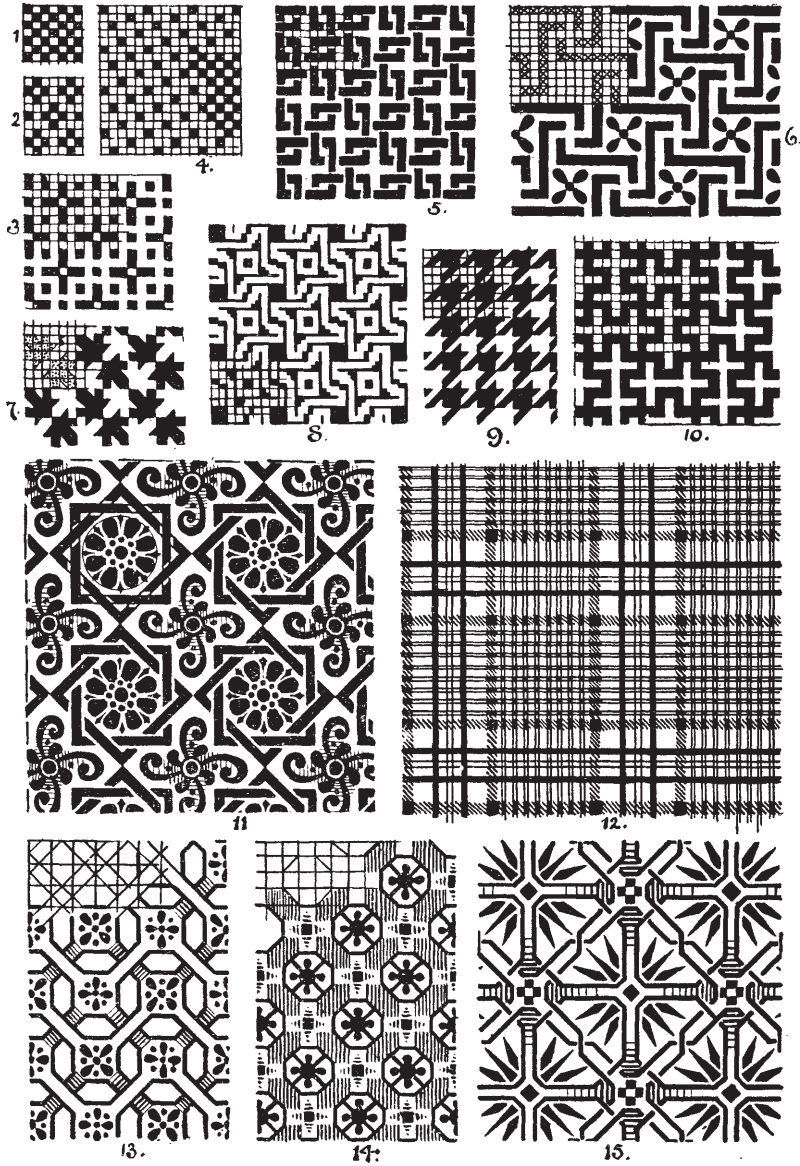
In PLATE II., FIGS. 1 and 2 give the square, first with two sides vertical, and second with one diagonal vertical. In FIG. 3 the squares are combined, and give the interlacing pattern which is developed on PLATE III. FIG. 11. In FIG. 3 the angles of the squares are equidistant from each other and from 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.



CONSTRUCTION OF USEFUL GEOMETRIC FIGURES.

PLATE III.



GEOMETRIC PATTERNS BASED ON THE SQUARE.

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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 F_1 and F_2 . The most generally useful method of drawing the curve—and if carefully done the most accurate—is to fix three pins at F_1 , F_2 , and X respectively: then tie a piece of thread tightly round these three points, so that the string forms a triangle $F_1 X F_2$. 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.

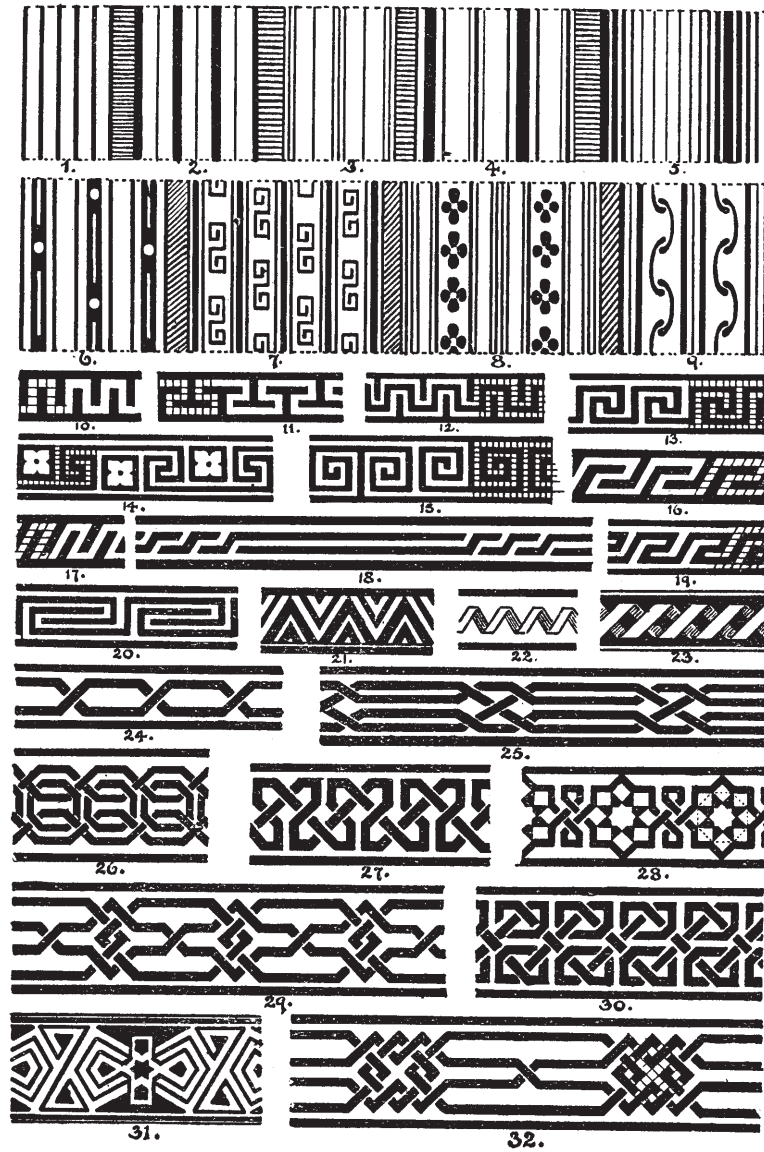
Horizontal and Vertical Lines.—The process of weaving, which is a system of interlacing threads—called the warp and weft—at right angles to each other, must naturally have first suggested designs of a square or rectangular character, and in PLATE III. we have numerous instances of the way in which the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

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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 interlacing 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.

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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.

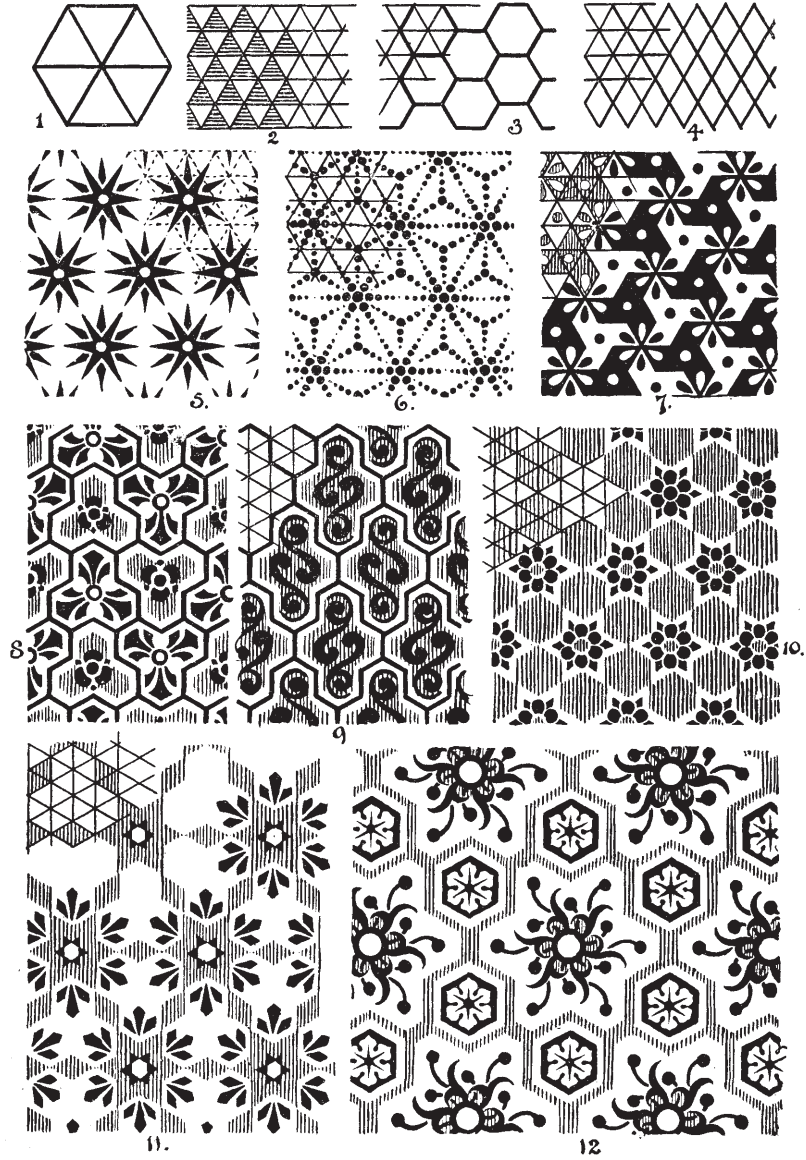
Geometric Borders.—FIGS. 10 to 20 give examples of fret patterns, beginning with the simplest possible form and gradually developing to more elaborate treatments. In FIGS. 10 to 15 the lines used are all either vertical or horizontal, and the width of the ground space is the same as the pattern, the 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

ORNAMENTAL DESIGN

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.

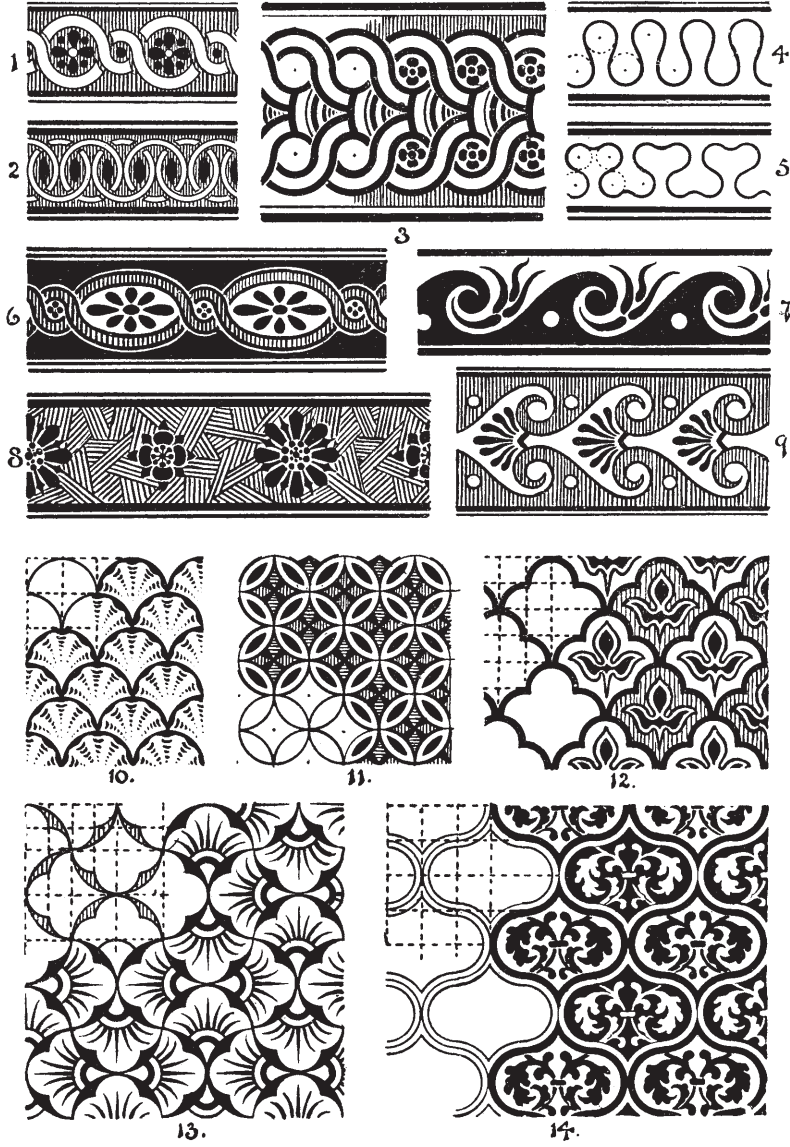
FIG. 21 is a zig-zag pattern, and FIGS. 22 and 23 are ribband designs that take a zig-zag direction. The remaining patterns on PLATE IV. are examples of interlacing strap work, based in most instances on vertical, horizontal, and 45° lines. Such designs as these are met with very frequently in Moresque 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



GEOMETRIC PATTERNS BASED ON THE DIAMOND OR HEXAGON

PLATE VI.



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.

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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.

GEOMETRIC DESIGN

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.

ORNAMENTAL DESIGN

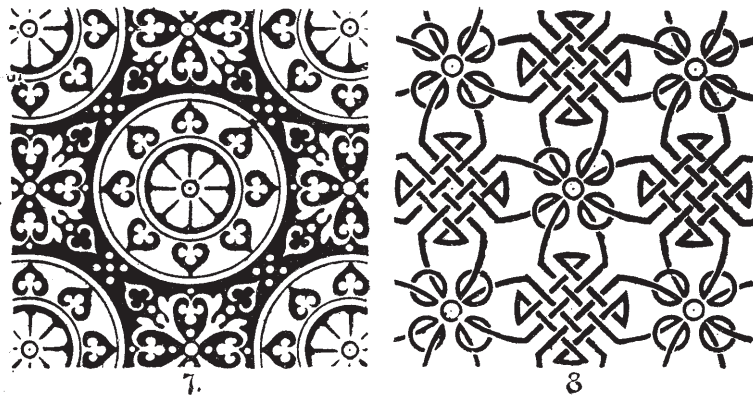
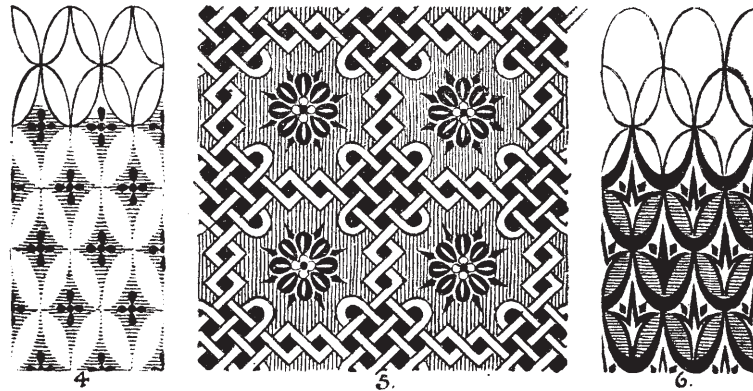
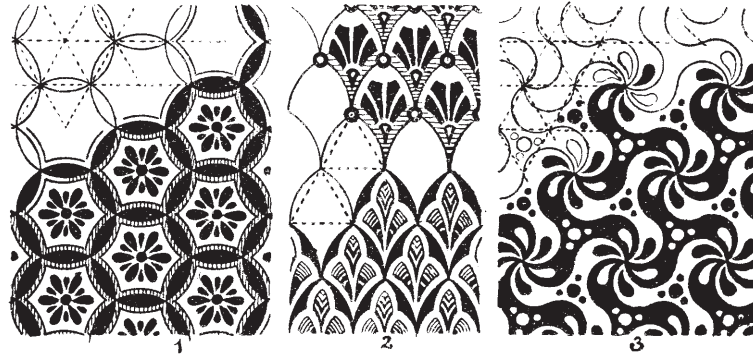
In FIG. 5 the backbone of the design (the wave line) is composed of semicircles and parts of circles, as may be readily seen by the diagram of construction included in the design. FIG. 8 is so obviously made up of circles as to need little explanation, and it will also be very evident that the centres 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.

PLATE VIII.



VARIOUS GEOMETRIC PATTERNS.

GEOMETRIC DESIGN

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.

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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.

AN ALL-OVER REPEATING DESIGN

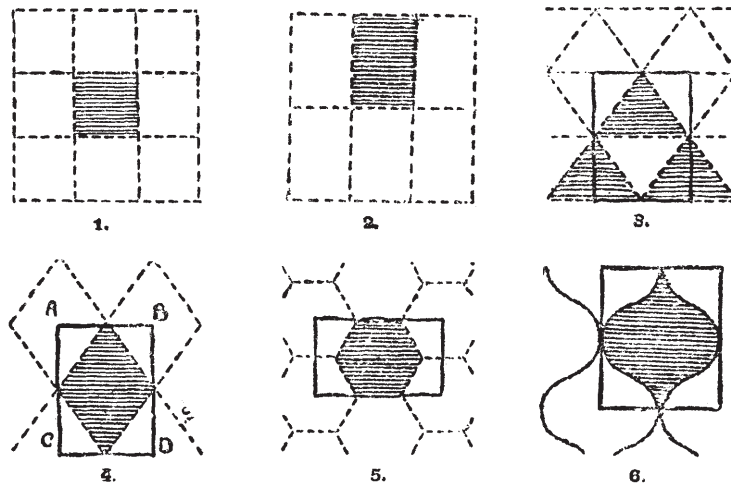
Having decided what material or purpose the design is for, the next point to settle is the general plan and arrangement of the leading lines. One should really have the whole of the scheme of the design in mind before beginning; this, of course, requires much practice, but if the student has not some 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



DIAGRAMS ILLUSTRATING UNIT AND REPEAT, ETC.

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.

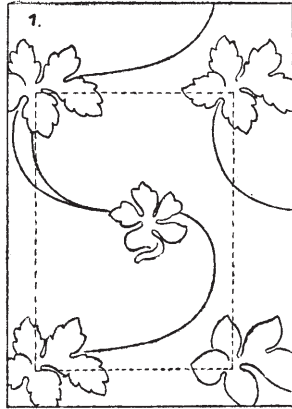
FIG. 1 shows how by a little arrangement the same details can be put together to make a satisfactory repeating stripe pattern. Referring first to the main stem, which runs

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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-



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AN ALL-OVER REPEATING 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,

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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

AN ALL-OVER REPEATING DESIGN

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



DIAGRAM 7.

DIAGRAM 8.

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

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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-

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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.

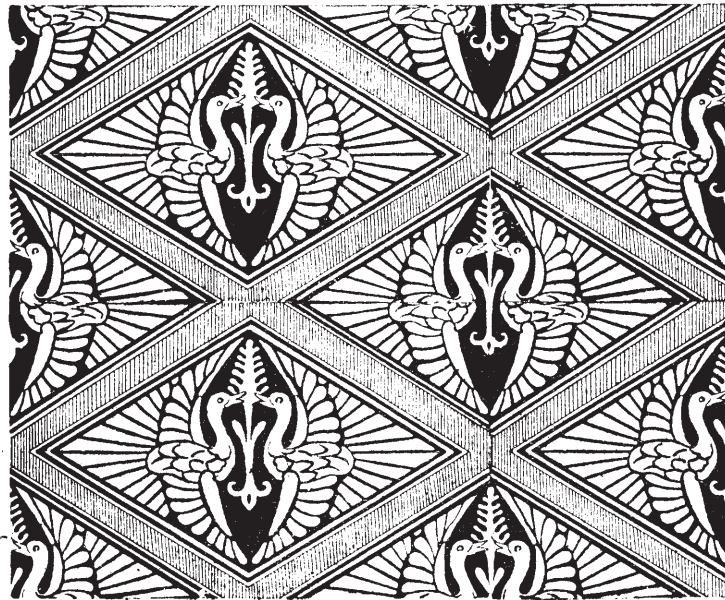
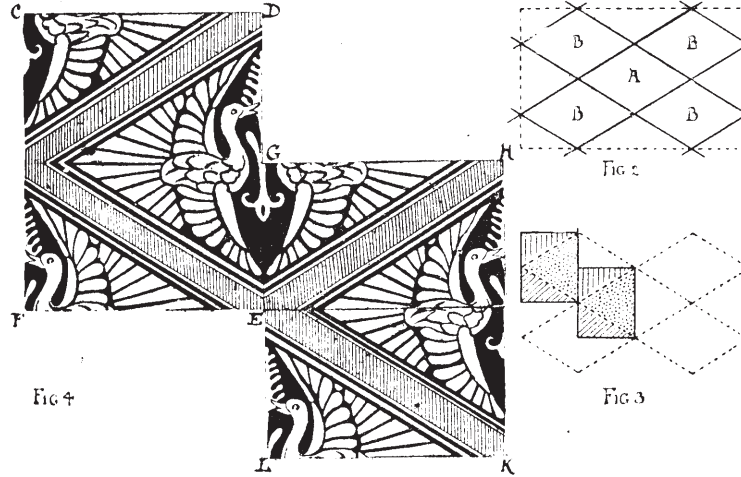


Fig 1

CONSTRUCTION OF THE "DROP" PATTERN.



UNSYMMETRICAL DESIGN, BASED ON 360° LINES, IN WHICH THE "DROP" IS CONCEALED.

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

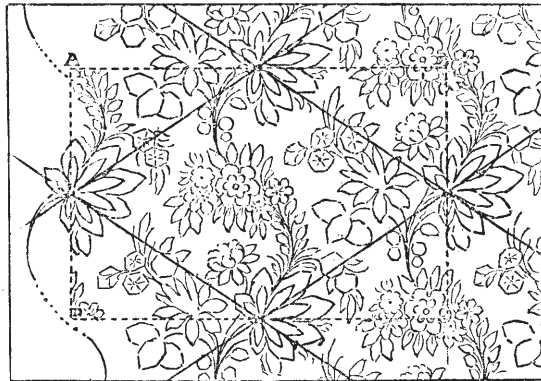


DIAGRAM 9.

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

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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



DIAGRAM 10.

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

PLATE XIII.



SYMMETRICAL "DROP" PATTERNS—NO. 1 FLEMISH, NOS. 2 AND 3 ITALIAN.



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

ORNAMENTAL DESIGN

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" \times 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

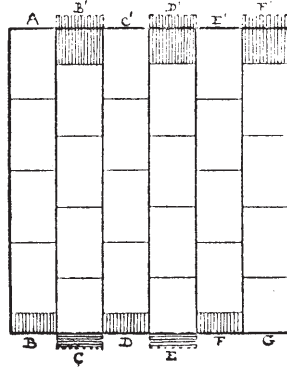


DIAGRAM 11

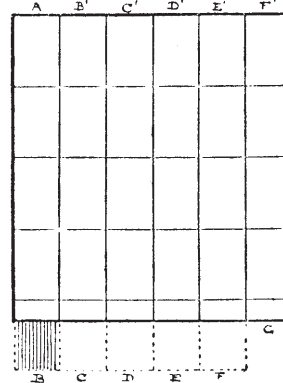
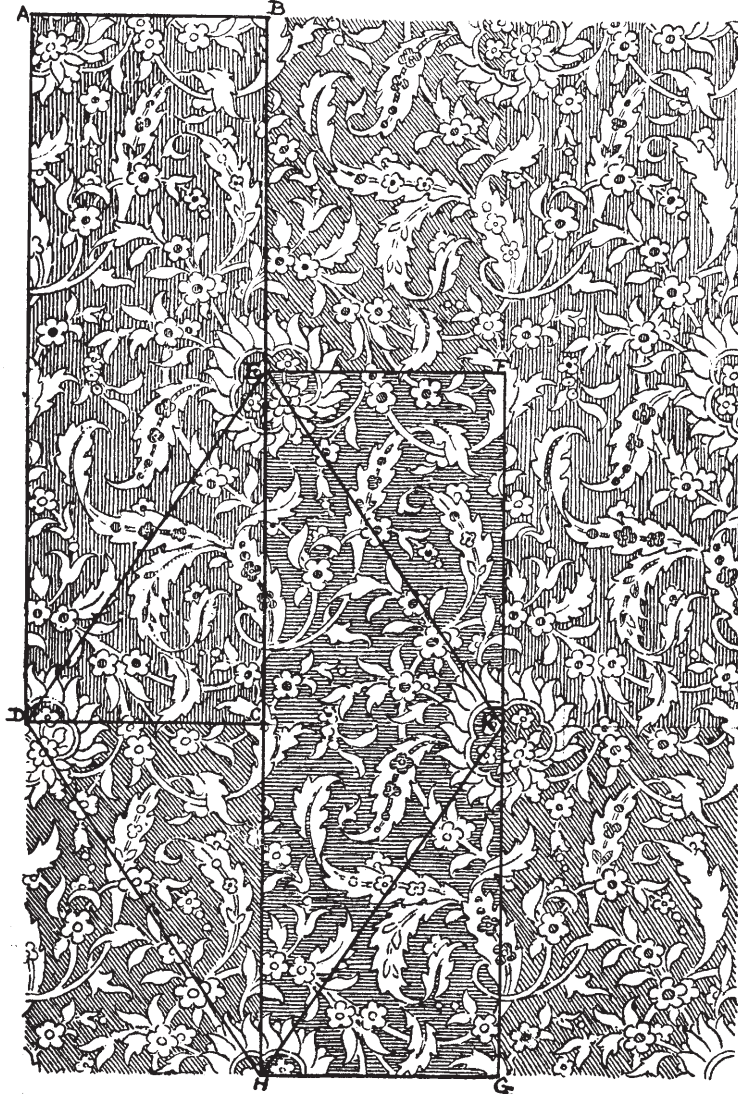


DIAGRAM 12.

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 KI. 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

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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

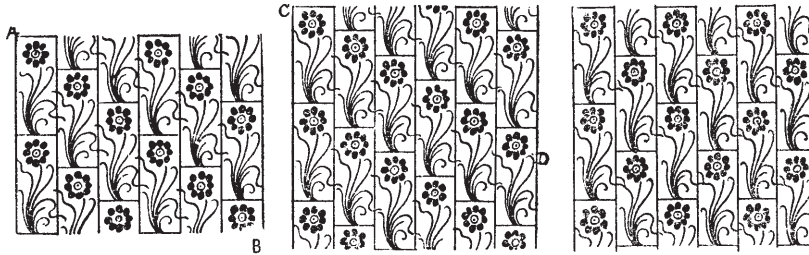


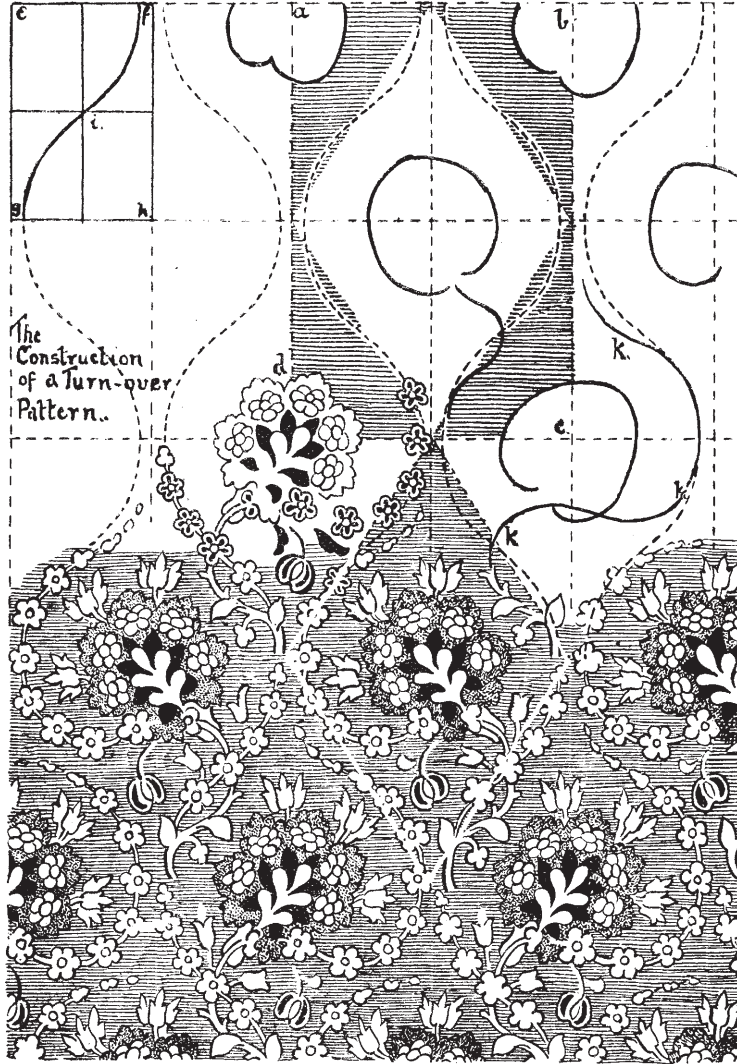
DIAGRAM 13.

DIAGRAM 14.

DIAGRAM 15.

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.



CHAPTER V

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.

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After the proportions of the oblong A B C D 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 $\kappa \kappa \kappa$.

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."

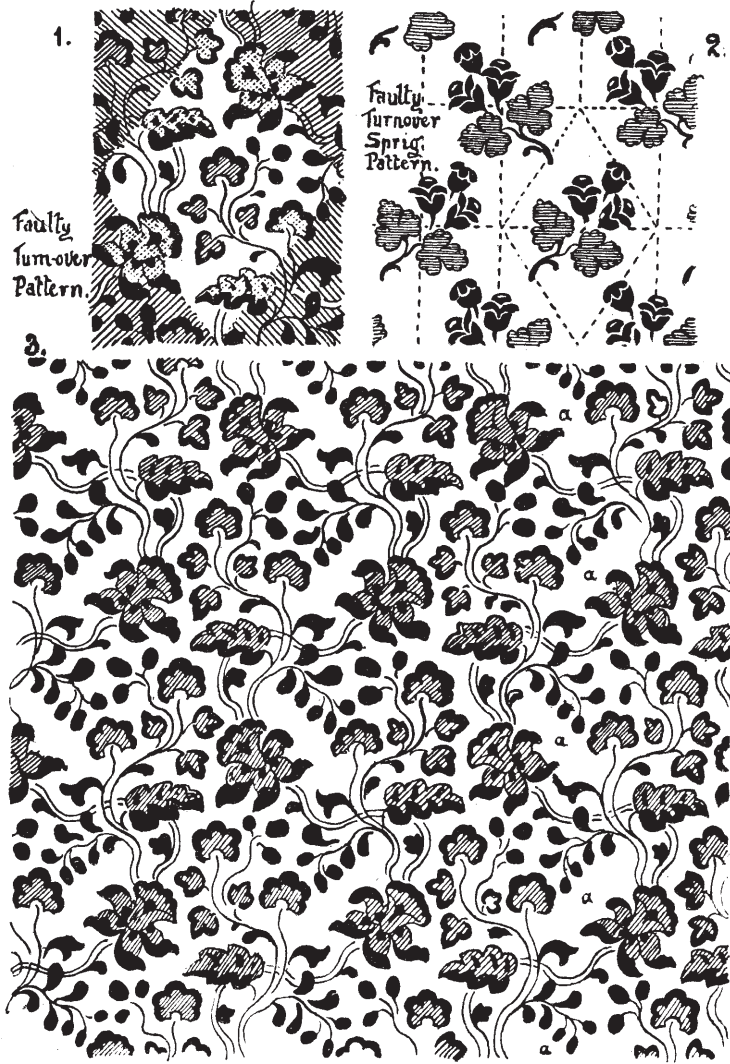
ORNAMENTAL DESIGN

“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, 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

PLATE XVII.



THE "TURN-OVER" DESIGN

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.

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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.



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.

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DIAGRAM 16 is a spot design arranged diamond-wise. The construction of it is, no doubt, sufficiently evident



DIAGRAM 16.

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.

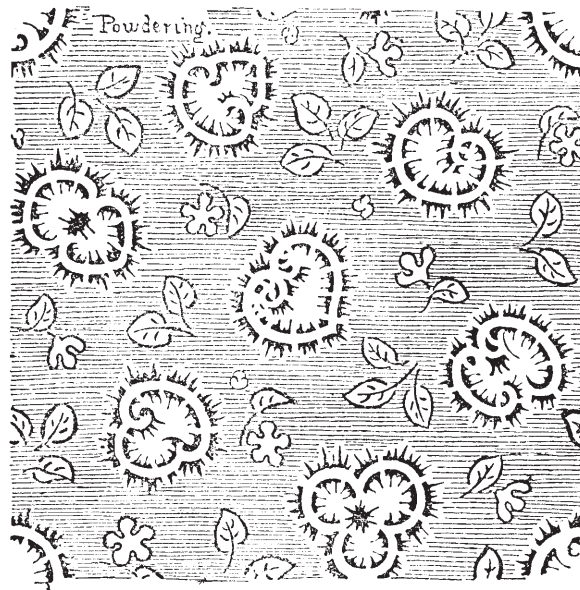


DIAGRAM 17.

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.

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It is arranged on a diamond plan, as in **DIAGRAM 19** : the larger spray is first



DIAGRAM 18.

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.



DIAGRAM 19.

The spray design, **DIAGRAM 20**, is a very effective one where it is desirable to keep much of the ground unbroken with ornament. The construction of it is shown in the accompanying **DIAGRAM 21**.

SOME DIFFERENT PLANNINGS

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



DIAGRAM 20.

the vertical lines are drawn alternately at greater and lesser distances. The most direct method is to place the large

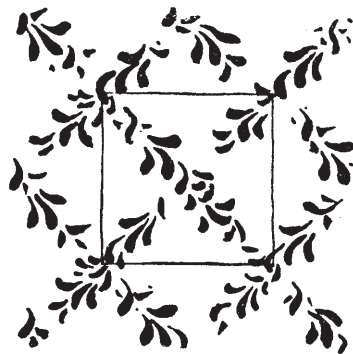


DIAGRAM 21.

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

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similarly to the example given in the chapter on that subject.

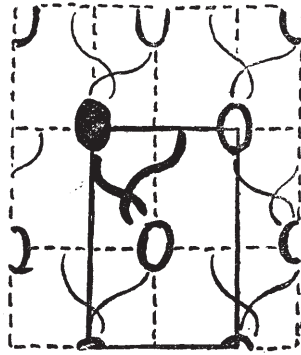


DIAGRAM 22.

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.

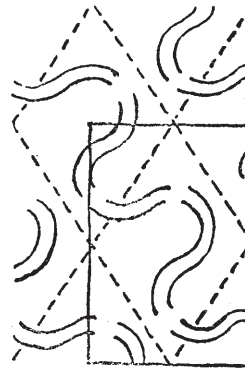
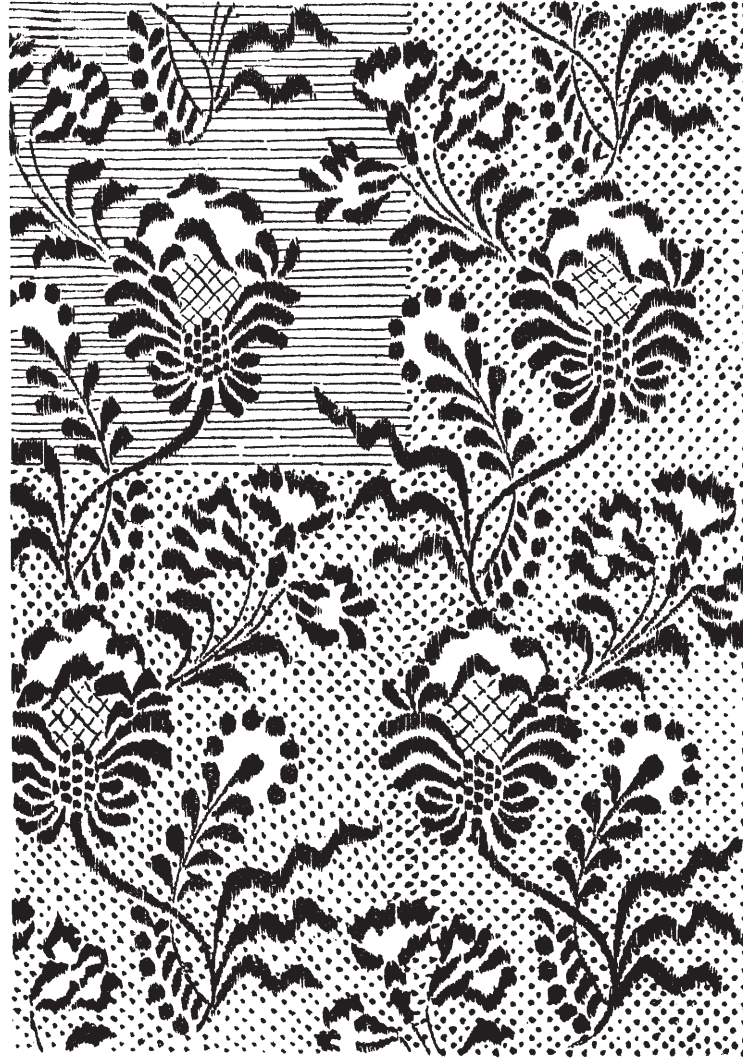


DIAGRAM 23.

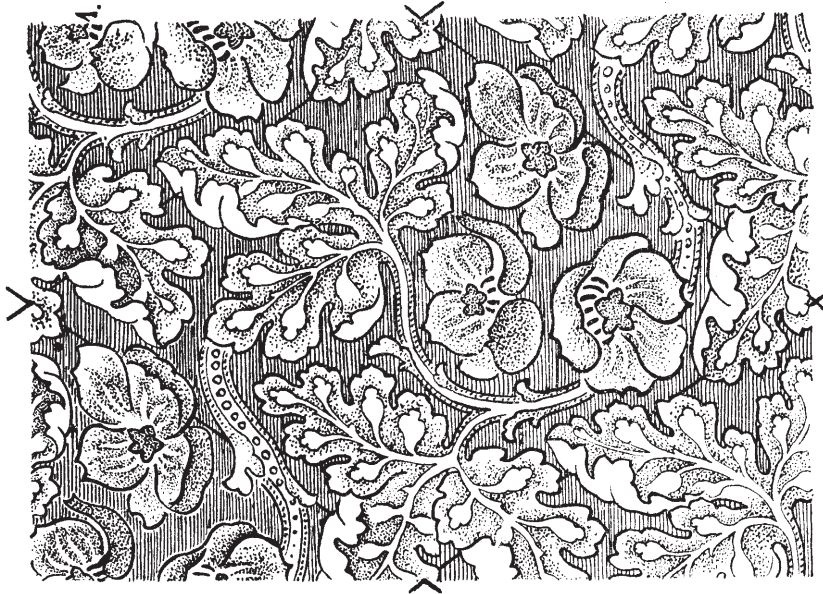


ITALIAN SEVENTEENTH CENTURY PATTERN IN WHICH THE REPEATING FORMS ARE CONNECTED.

PLATE XX.



"TURN-OVER" PATTERN WITH ACCENTUATED FLORAL FORMS.



"DROP" PATTERN WITHOUT STRONGLY MARKED FEATURE.

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



DIAGRAM 24.

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

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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

PART XXI.



ITALIAN SEVENTEENTH CENTURY-VARIOUS-CONNECTED-FORM PATTERNS.

PLATE XXII.



NORTH ITALIAN EIGHTEENTH CENTURY-SPRIG PATTERN AND TURN-OVER DESIGN.

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.



DIAGRAM 25.

Place the leaves which run in the same direction at the four corners of the repeat, then trace it and turn

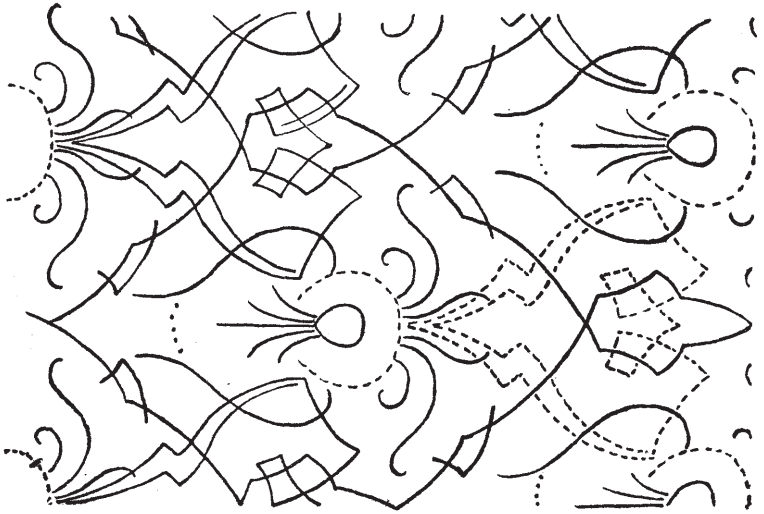
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it over at the centre, where the leaf is filled in black in the diagram.

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 XXIII.



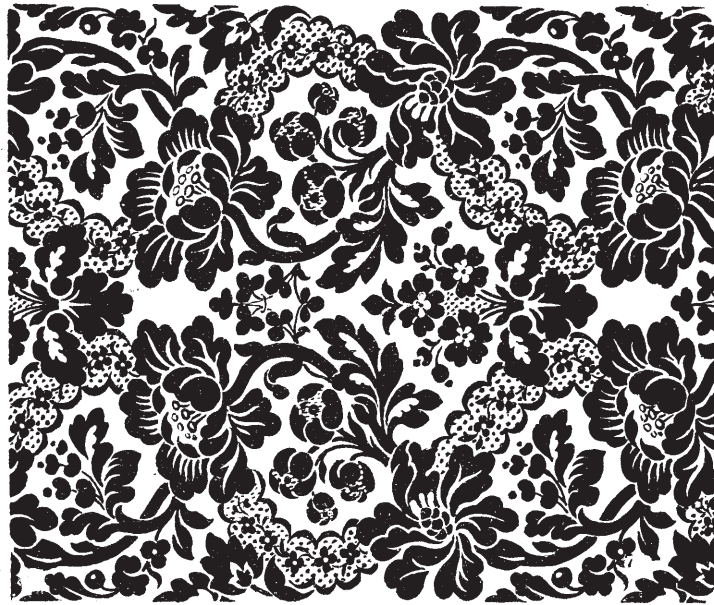
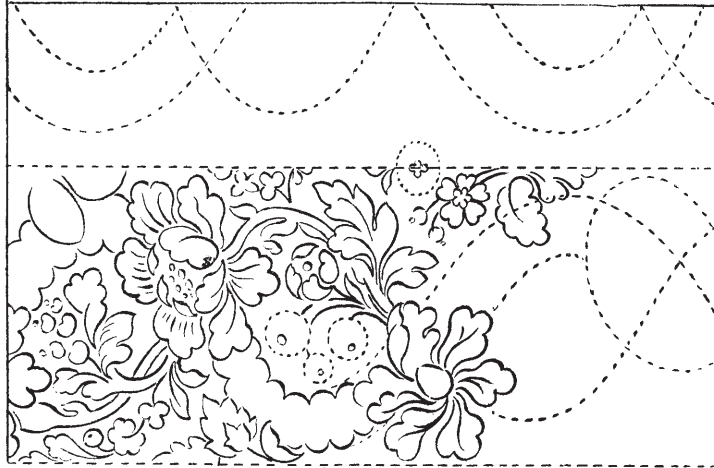
FOLIATED FORMS SUPERPOSED ON INTERLACING STRAP-WORK.

PLATE XXIV.



DOCK LEAVES SUPERPOSED ON CHECK GROUND.

PLATE XXV.



GERMAN EIGHTEENTH CENTURY DESIGN WITH DOUBLE Ogee.

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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.

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CHAPTER VII

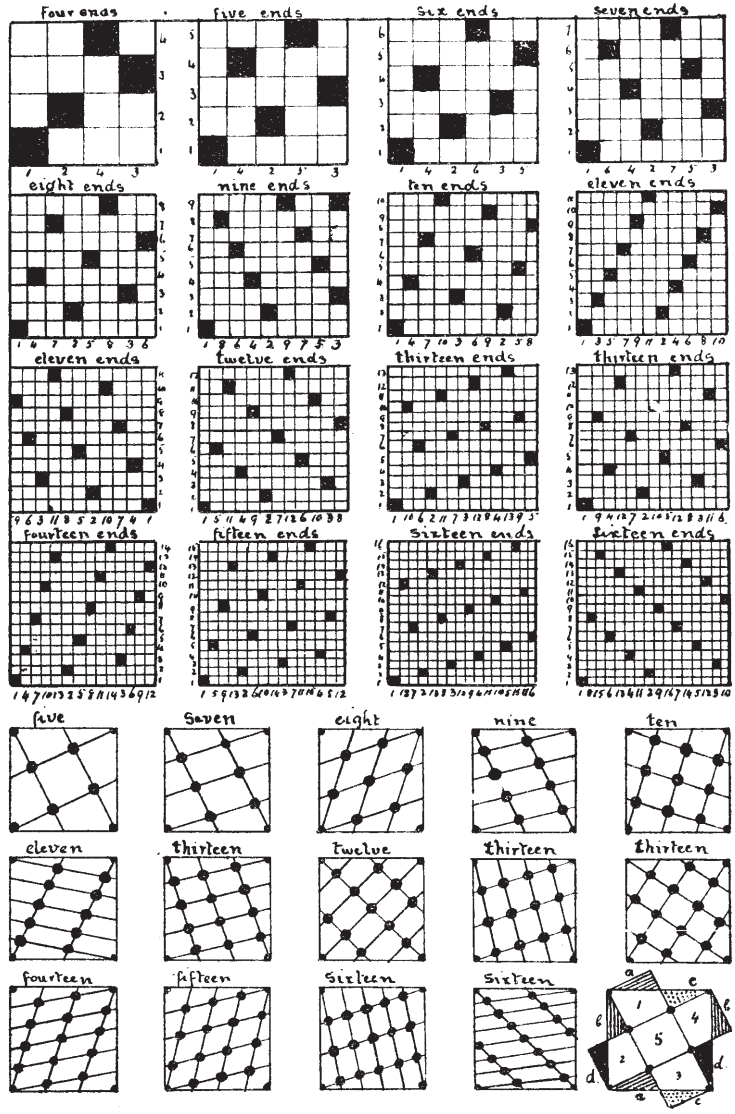
THE "SATEEN" ARRANGEMENTS

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.

PLATE XXVI.



ARRANGEMENTS BASED ON THE SATEEN ORDERS

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.

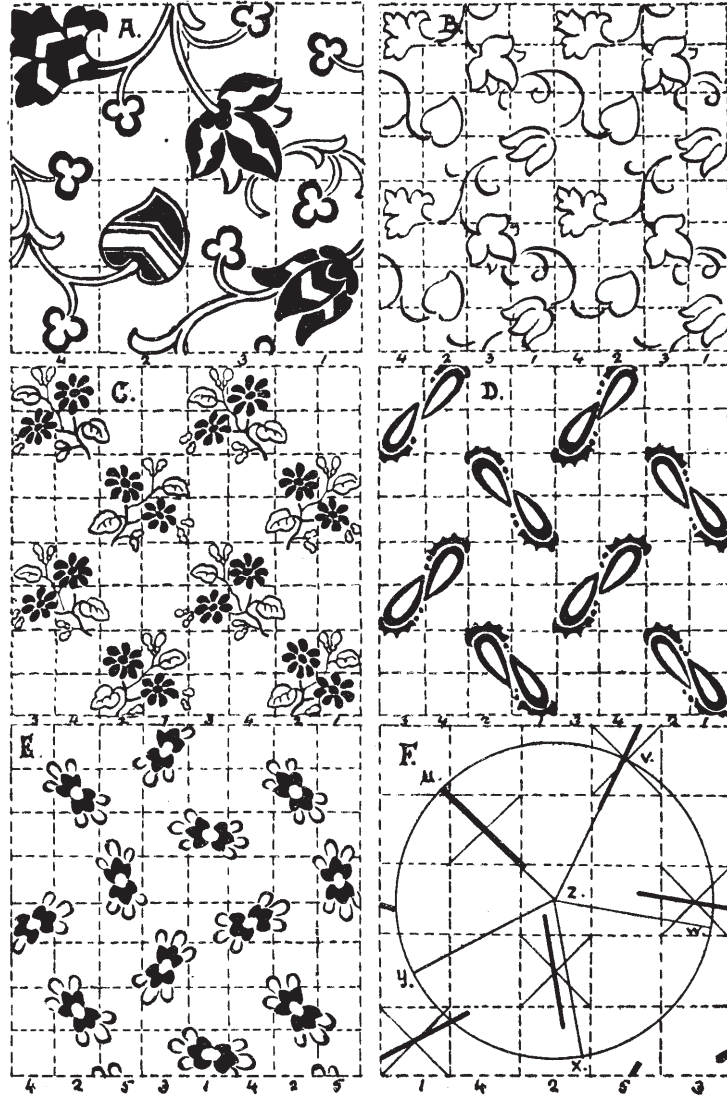
The method of finding out the disposition of the true sateen orders is as follows:—Take a number that is less than half the whole number and yet will not divide exactly into the whole. Taking the five-ends as example, two is less than half the five, and also will not divide into five without leaving 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.

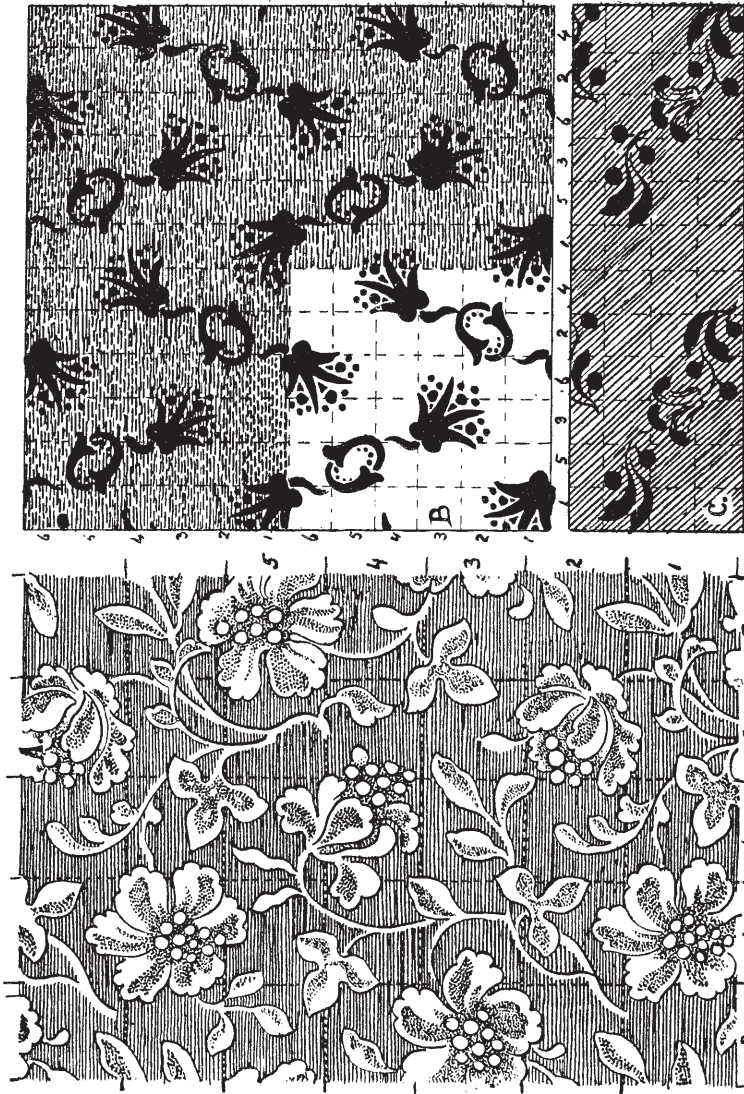
The four-ends and six-ends that are given on PLATES XXVII., FIGS. A, B, C, and D, and XXVIII., FIG. B, respectively, are exceptions to this rule for finding the places of the figures. They are really not true sateens. The arrangement of the four-ends is too obvious to require explaining. There is no 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.

PLATE XXVIII.



DESIGNS BASED ON SIX-ENDS SATEEN ORDER.

DESIGN BASED ON FIVE-ENDS SATEEN ORDER.

THE "SATEEN" ARRANGEMENTS

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 incompleting 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

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obtained. The fifth position must then necessarily be a repetition of one of the others.

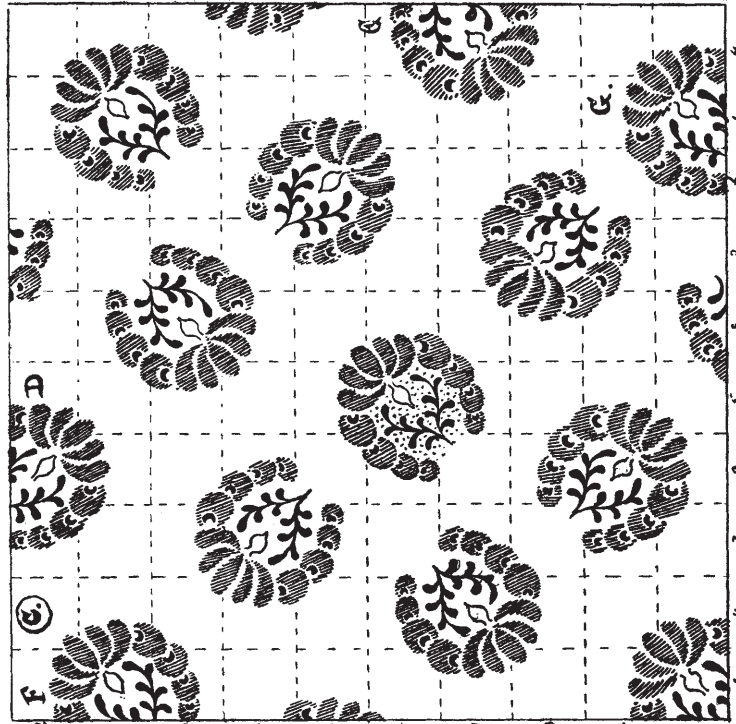
FIG. F illustrates a geometrical method of placing the five spots each at different angles. First find the centre of each square by drawing the two diagonals. From the centre of the middle square draw a circle. Divide the circle into five equal parts by means of the lines drawn from U, v, w, x, and Y to z. Then draw the black lines through the centres of each required square parallel to the lines U z, v z, w z, x z, and Y z, 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.

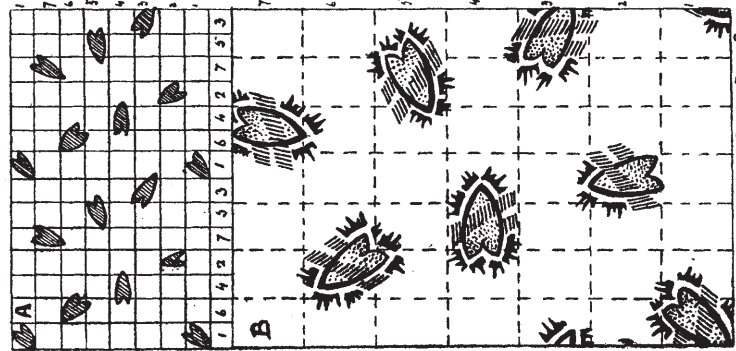
On the same plate, FIG. B is a six-ends sateen. This arrangement has a peculiarity entirely its own, *i.e.*, three of the spots come closer together and have a tendency to run in a line; these lines work in alternate directions, thus producing a perfectly steady design. In the example the three spots 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

PLATE XXIX.



SPOT FIGURE DESIGN BASED ON EIGHT-ENDS SATEEN.



BASED ON SEVEN-ENDS SATEEN.

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.

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CHAPTER VIII

BORDERS, CORNERS, ANGLES, AND STRIPES

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

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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

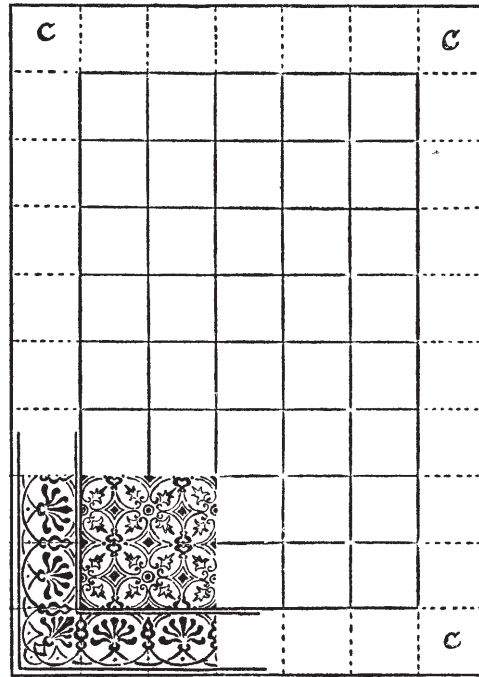


DIAGRAM 26.

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

BORDERS, CORNERS, ANGLES, ETC

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.

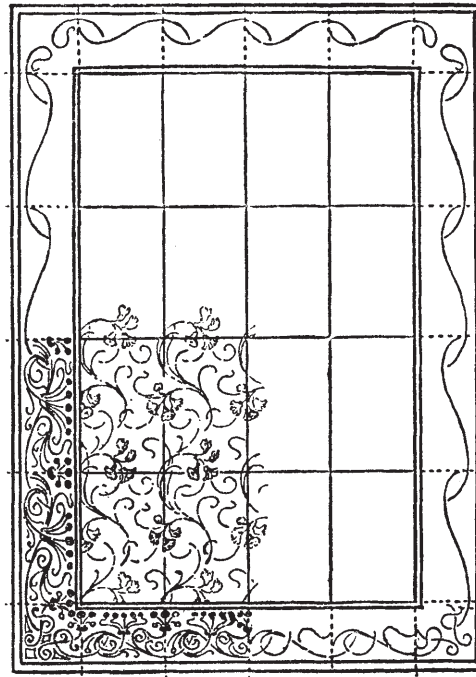


DIAGRAM 27

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.

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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

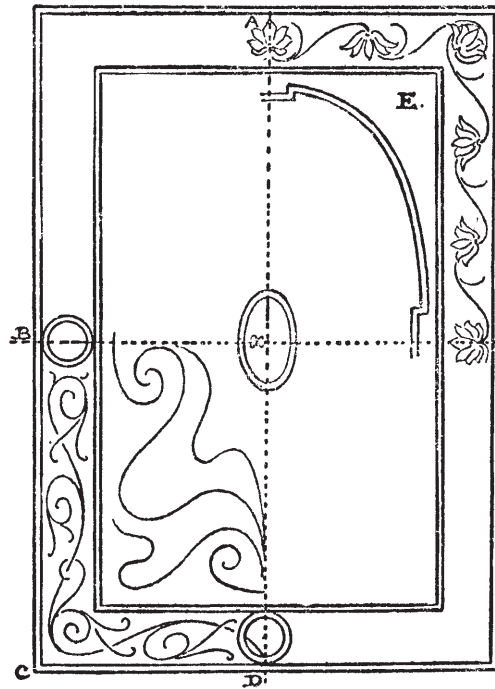


DIAGRAM 28.

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 BCDX, 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 FH with FHK.

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;

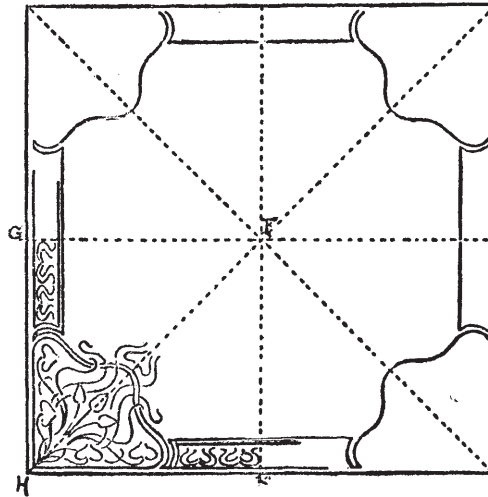


DIAGRAM 29.

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

ORNAMENTAL DESIGN

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 begin-

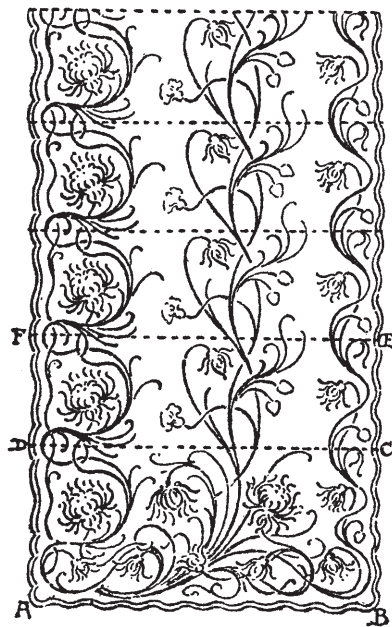


DIAGRAM 30.

ning 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

BORDERS, CORNERS, ANGLES, ETC

exactly balanced on $x y$. Only half the full width of the curtain would need to be prepared for on the design paper, $G H K L$ being the amount required for the dado, and $K L M N$ (which includes the border and filling) for the upper part



DIAGRAM 31.

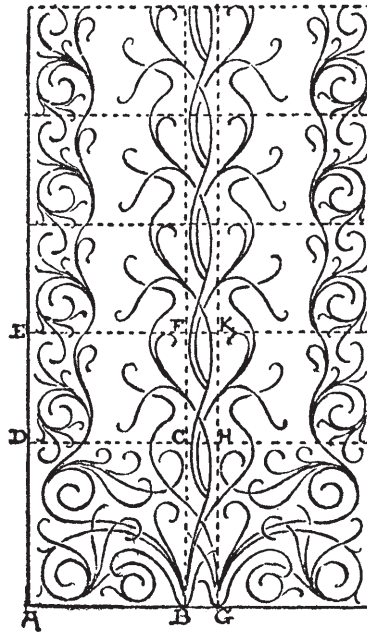


DIAGRAM 32.

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, $A B C D$ in the dado and $C D E F$ 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 $B G H C$ in the dado and

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C H K F 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



BORDERS, CORNERS, ANGLES, ETC

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

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the border acts as the vertebrâ 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