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Suggestions for Design Based on Mohammedan or Saracenic Art.

(Continued from August issue.)

We now have to consider the most complicated class of patterns to which the term *"arabesque"* may be appropriately reserved, as these patterns are practically peculiar to Mohammedan art, and both in their complexity and in their æsthetic effect stand on a higher plane than the patterns hitherto considered.

In most square, hexagonal and octagonal patterns, the construction lines run in two, three or four directions respectively. In arabesque patterns the lines run in a much larger number of directions, suggesting that some unusual method is employed in their construction.

In Fig. 8 is represented diagrammatically, part of

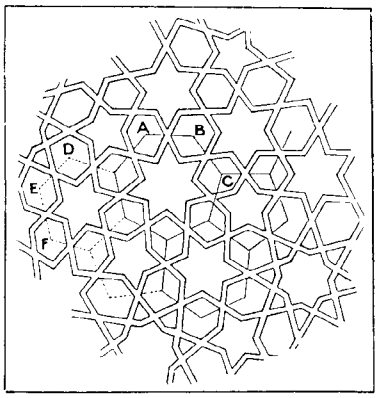

Fig. 8

an arabesque pattern that furnishes the clue to the method of construction of arabesque designs.

Lines *A B* and *B C* are parts of a seven-sided polygon, surrounded by five and six sided polygons taken alternately. These polygons completed, and shown at *D, E, F* surround the five, six, seven and eight-rayed stars of which the pattern is composed. Polygons in contact are easy to draw. Having drawn them, pairs of lines are drawn passing through the centres of each of the sides of the polygons. These pairs of lines cross the side of the polygon at nearly the same angle in each case. Each line is then prolonged until it meets a similar line that has crossed the centre of another side of a polygon. When this is done all over the surface nothing more remains to be done, for the pattern is now complete.

A few examples will show how simple is the method here indicated for drawing and designing arabesque patterns.

In Fig. 9 the space is first covered with octagons in contact, which may be easily drawn by means of an octagon template. The resulting lines may be called the primary construction lines. Two pattern lines have to be drawn through the centres of each of the primary construction lines. The first question is what angle or in what direction they are to be drawn. Within certain limits the exact angle does not matter, provided this angle is the same in all cases. But the best results are obtained if each pattern line is drawn parallel to a diagonal of an octagon. For instance, the pattern line *A B* is drawn parallel to the diagonal *C D*. But in practice it will be found easier to draw lines such as *T U*, which pass through the centre of the octagon and join the centres of its opposite sides. A pattern line is then drawn such as *E F*. This, of course, is drawn parallel to the neighboring diagonal of the octagon. It cuts line *T U* at point *E*. From the centre of the octagon as circle *G* is described which passes through the point *E*. All other pattern lines pass from points similar to *E* on the circumference of the circle. A guiding circle may similarly be drawn in the squares, as shown at *H*. These circles and interradii form the secondary construction lines.

In the portion of the pattern shown completed, it may be noticed that the pattern line, *M N* is nearly (but not quite) in a straight line with the pattern line *O P*, which is nearly (but not quite) parallel to the

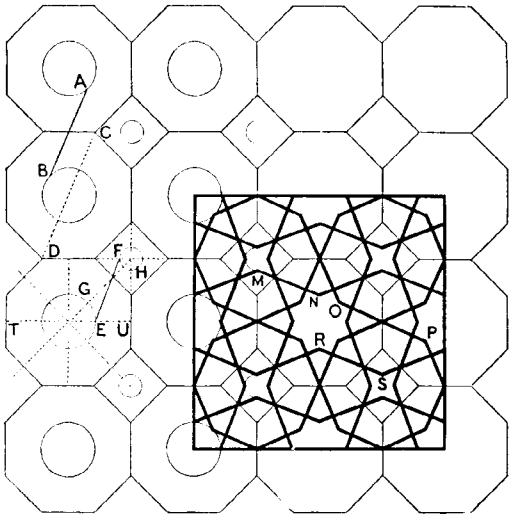

Fig. 9

pattern line *R S*, thus preventing any stiffness in the design. This pattern is one of the commonest of arabesque designs.

Another arabesque is shown in Fig. 10. Here the primary construction lines are decagons in contact. As before, two pattern lines have to be drawn through the centres of each of the primary construction lines, and it is necessary to commence by finding out the direction in which these lines have to be drawn. *C* and *D* are centres of construction lines. A pattern line *A B* must be drawn through these two points. This pattern line is continued until it meets an interradius of the decagon at *B*. From the centre of the decagon a circle *H* is described that cuts *B*. Other pattern lines meet this circle at places where it cuts the interradii. This is the most frequent method of finding the position of the secondary construction lines.

In this pattern each decagon of the construction line leads to a ten-pointed star of the pattern surrounded by pentagons, regular in construction if the pattern has been correctly drawn.

Other similar arabesques may be designed in which

the primary construction lines are dodecagons and octagons, *or* dodecagons combined with regular nine-sided polygons. In these cases the resulting star-shaped spaces in the pattern are twelve, eight and

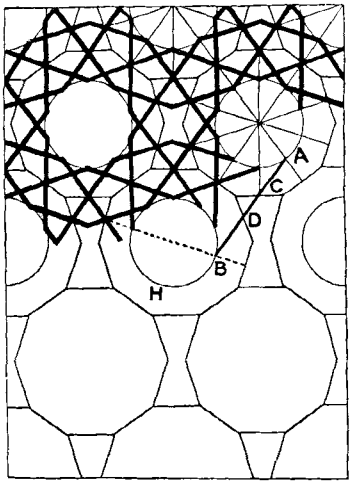

Fig. 10

nine-pointed, as the case may be, the pentagons being not completely symmetrical.

In Fig. 11 an arabesque of a slightly higher degree of complexity is given. Its primary construction lines are shown bold, and its secondary construction lines thin. The primary construction lines consist of regular decagons, regular pentagons, and irregular hexagons. The templates for this pattern consist of a decagon and a pentagon, or more conveniently a decagon may be drawn with a pentagon attached to each of eight of its sides, and which may be cut out of paper as one template. Such points as are required that are not on its periphery may be pricked through on to the drawing paper by means of a fine needle. The irregular hexagon requires no template, it being merely the space left where there is no room for pentagons.

In this pattern the secondary construction lines are found by the following method: The first pattern line *A B* is drawn through the centres of two con-

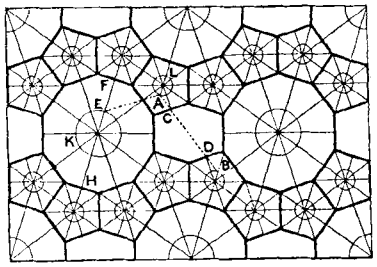

Fig. 11

struction lines at *C* and *D*, and continued until it meets radii of the pentagons at each end, as at *A* and *B*. A circle *L* is described in the pentagon cutting the point *A*. A second pattern line *A E* is now drawn, starting from the point *A* and passing through the centre of the side of the pentagon. It is continued until it meets the inter-radius *F H* of the decagon in the point *E*. Circle *K* is now drawn in the decagon, cutting point *E*. All the pattern lines have to be drawn starting from analogous points on the circles *K* and *L*, or from similar circles drawn in the other polygons.

The completed pattern is shown in Fig. 12, having alternate spaces filled in, so as to show the effect produced more plainly. It is well to notice that, as here drawn, the lines *E K, L A, F H, M N,* and *P R* are not quite in a straight line with one another. An artist not knowing the correct method of drawing the pattern would, with little doubt, have made of these lines a hard straight line running through the design, like a line in the pattern of a cane-bottomed chair. He would have added to this resulting and unnecessary stiffness by making the rays of the ten-pointed star of parallel lines, which is equally a mistake, for *A B* and *C D* are nearly but not quite parallel.

For drawing Fig. 13 two templates are required. One is a regular sixteen-sided polygon, the other is a regular heptagon, the length of whose side is the same as the length of the side of the sixteen-sided polygon. With the latter template the outline *B* is drawn as shown. The heptagon template is placed with one side touching *B* at *K H*. By this means the heptagon *D E F G H K L* can be drawn. Two sides of this heptagon, *F G* and *G H*, are indicated merely as dotted lines, as they are not further required. The centre of this heptagon is at *N*. A second similarly situated heptagon is now drawn, having its centre at *P*. The sixteen-sided polygon template is placed touching the sides *E F U* of the twinned heptagons, and a sixteen-sided polygon is thereby drawn, shown at *A*. Twinned heptagons are similarly drawn at symmetrical intervals round the original sixteen-sided polygon *B*, and on one side the twinned heptagons indi-

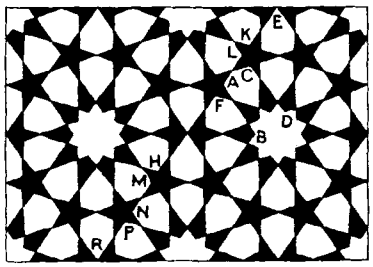

Fig. 12

cate the position of another sixteen-sided polygon which is shown in the figure drawn round *C*.

Between the sixteen-sided polygon *A, B,* and *C* is left a space which is filled up by a dodecagon *R*. Similar spaces are filled up by similar dodecagons at *S* and *T*, and also (partly drawn) at the three corners of the illustration. These dodecagons are not quite symmetrical, but must be drawn as regular as the space available permits.

In each of the twinned heptagons smaller heptagons have to be drawn, such as those shown with centres at *N* and *P*. Each of these heptagons has its centre identical with the centre of its larger surrounding heptagon, and is drawn of such a size that one of its sides touches or is the same as the side of its mate. The primary construction lines have now been completed.

The secondary construction lines consist of the radii of the different polygons, and of one or two circles drawn in each of the latter, their size being ascertained by a few trials.

In the previously described arabesques the pattern lines were drawn through the centres of the construction lines. In the arabesque now under consideration this is not the case. Each primary construction line — that is to say, each side of a polygon — is to be divided by two dots into three equal parts. The pat-

tern lines are drawn through the dots. Some of the pattern lines have been drawn in as dotted lines in part of the figure. These will serve as a guide to enable the student to complete the pattern with facility.

Supposing it is required to discover the construction lines of any given arabesque, the following is the means of procedure: The centres of all the larger spaces included in the pattern are marked, excepting (as a rule) the star-shaped spaces. These centres are then joined. The polygons thus produced are the primary construction lines.

Supposing it is required to copy an arabesque; on looking at the pattern, it is easy to imagine lines join-

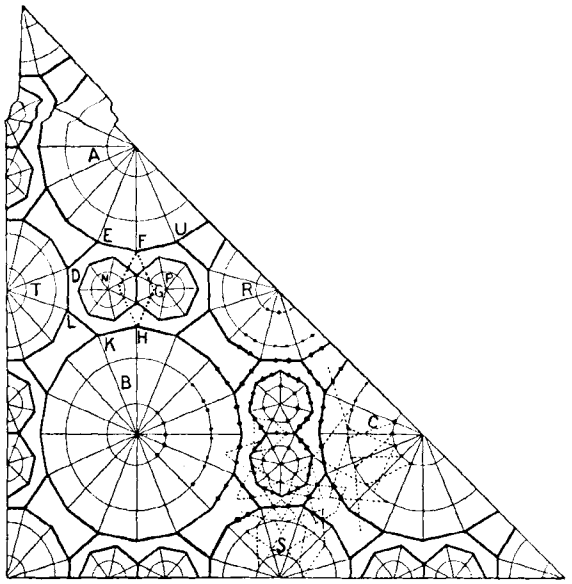

Fig. 13

ing the centres of the larger spaces, which lines describe polygons. A rough sketch may be made of these imaginary polygons. From this an accurate drawing has to be made. In doing so, it is necessary to make the different polygons as symmetrical as possible, and, so far as possible, having their sides all of equal length. Guided by this rule, and after a little practice, any complicated arabesque pattern can usually be solved in a few minutes.

It will be advisable to conclude with a few remarks on some of the rules observed in Mohammedan decorative art.

One of the objects of decoration is to prevent the eye being displeased by monotony. A geometrical pattern, however elaborate, if used too much, will produce that effect of monotony that it was intended to prevent.

A few words may be added as to the amount of accuracy needed and advisable in drawing geometrical patterns. In elementary text-books of design it is commonly asserted that pattern outlines look better when drawn in by hand, than when drawn in by compass and rule. The truth of this statement may be admitted without reserve, so far as the simplest pattern shapes and outlines are concerned.

With regard to less simple patterns, however, some reservation is necessary. If a hexagonal pattern is made with the aid of construction lines, that have not been drawn at exactly the correct angle, every hexagon in the pattern will be distorted. If lopsidedness occurred in a single hexagon, it perhaps would not matter. But when every hexagon is lopsided to the same extent, and in the same direction, the effect is unpleasant to the eye. The suggestion that the artist was trying to draw hexagons and failed because he didn't know how to do so, is a suggestion that obviously should be avoided. If, however, the construction lines of a hexagonal pattern are drawn in with accuracy, the pattern may well be drawn in by hand.

Arabesques are usually found drawn accurately. In the case of the more complicated arabesques this would seem to be necessary to produce their full æsthetic effect. But a relatively simple arabesque, such as that shown in Fig. 12, may be distorted in order to make it fit the space — that is to say, to get exactly quarter stars in each of the corners of the design. In order to do this it is necessary to draw first the construction lines, modified or adapted to the space, and then on these lines draw the pattern. By observing which patterns were placed in prominent positions and which were placed where they could not attract much notice, it is possible to arrive at some ideas as to what features of a pattern would be considered good by artists.

The best patterns are those in which all the constituent spaces have either a radial or a bilateral symmetry — that is to say, are free from lopsidedness. A pattern is bad if it contains spaces of the same shape, but differing slightly in size. If a construction leads to such a result, the pattern must be modified so that the spaces become either identical in size or else widely different. Cases have been mentioned in this article in which gracefulness in a pattern is obtained by drawing it in conformity with some geometrical rule. Cases also may be found (though rarely) in which the geometrical method leads to a clumsy result but which can be remedied by freehand drawing.

The Sizing of Cotton Yarns.

Substances Used in Sizing Yarns.

The subject covers such a wide field that it will be impossible for me to do more than treat it very briefly. There is such a variety of substances used in sizing, each having different chemical properties or different characteristics, that I cannot possibly deal even briefly with them all. I shall therefore omit some of the least important, and discuss only those in general use.

In the first place let us consider what is the object of sizing cotton yarn. As you are aware, this depends upon the class of goods which it is intended to produce. In pure sizing, the yarn is coated with starchy matter to strengthen it, and thus enable it to stand the rubbing and chafing action of the healds and reeds. In this class of sizing there is no attempt to incorporate more size than is necessary to accomplish the above objects. In light, medium, and heavy sizing, however, the yarn has to be more or less increased in weight. It may also require to possess a certain "feel." In some cases the yarn has not only to be weighted, and to have a certain feel, but it must be tinted to a desired shade of color.

The sizer has to obtain these results in such a manner as to give the sized threads as much strength and pliability as possible. There must also be in every class of weighted goods a uniformity in the weight, the feel, and the color; otherwise, it will be impossible to build up a permanently successful business in this