

shade-arrangement, this principle of design has to be taken into account. For example, the check style given in Fig. 111 would not form a satisfactory pattern if combined with the check in Fig. 108; although both styles are composed of similar arrangements of shades, and have precisely the same colour features. The character of the respective checkings is, however, very different. In Fig. 111 the patches of colours are so grouped as to yield a broad and clearly-pronounced series of effects, whereas Fig. 108 is a compound of various minute types of woven design; hence the incongruity which would ensue from their amalgamation. The elements of Figs. 107 and 108 are, on the other hand, suitable for this purpose. The stripe is a style that may be utilized in various ways. Should, for instance, bands *A* and *B* be varied in width, a range of useful patterns for dress and mantling textures may be produced. Thus, stripes averaging from two to four inches in width, in mellow shades of twist or self-coloured yarns arranged on this system, are developed largely in worsted, woollen, and cotton materials.

In the check, Fig. 108, the development of this Compound scheme of colouring is shown. It is made up of the two types lettered *A* and *B*. Several groups of shades are given below illustrative of the type of colouring appropriate for the respective textures named.

## I. CLOAKINGS.

*Example A.*

For 12	}	1 thread of fawn.
threads.		1    "    light brown.
		1    "    brown.
For 24	}	2 threads of fawn.
threads.		2    "    light brown.
		2    "    brown.

*Example B.*

For 12	}	1 thread of light olive.
threads.		1    "    slate.
		1    "    medium blue.
For 12	}	2 threads of light olive.
threads.		2    "    slate.
		2    "    medium blue.

## II. DRESSES.

*Example C.*

For 24 threads.	$\left\{ \begin{array}{l} 1 \text{ thread of white.} \\ 1 \text{ ,, lilac (Tint 16, Plate VI.)} \\ 1 \text{ ,, olive (Shade 9, Plate VI.)} \end{array} \right.$
For 48 threads.	
	$\left\{ \begin{array}{l} 2 \text{ threads of white.} \\ 2 \text{ ,, lilac (Tint 16, Plate VI.)} \\ 2 \text{ ,, olive (Shade 9, Plate VI.)} \end{array} \right.$

*Example D.*

For 24 threads.	$\left\{ \begin{array}{l} 1 \text{ thread of yellow olive (Tint 10, Plate VI.)} \\ 1 \text{ ,, light blue (Tint 11, Plate IV.)} \\ 1 \text{ ,, olive (Shade 8, Plate III.)} \end{array} \right.$
For 48 threads.	
	$\left\{ \begin{array}{l} 2 \text{ threads of yellow olive (Tint 10, Plate VI.)} \\ 2 \text{ ,, light blue (Tint 11, Plate IV.)} \\ 2 \text{ ,, olive (Shade 8, Plate III.)} \end{array} \right.$

*Example E.*

For 6 threads.	$\left\{ \begin{array}{l} 1 \text{ thread of light brown (No. 3, Plate IV.)} \\ 1 \text{ ,, medium brown (No. 2, Plate IV.)} \\ 1 \text{ ,, dark brown (No. 1, Plate IV.)} \end{array} \right.$
For 12 threads.	
	$\left\{ \begin{array}{l} 2 \text{ threads of light brown (No. 3, Plate IV.)} \\ 2 \text{ ,, medium brown (No. 2, Plate IV.)} \\ 2 \text{ ,, dark brown (No. 1, Plate IV.)} \end{array} \right.$

*Example F.*

For 6 threads.	$\left\{ \begin{array}{l} 1 \text{ thread of brown and white twist (No. 3, Plate IV.)} \\ 1 \text{ thread of blue and white twist (No. 9, Plate IV.)} \\ 1 \text{ thread of olive and white twist (No. 15, Plate IV.)} \end{array} \right.$
For 12 threads.	
	$\left\{ \begin{array}{l} 2 \text{ threads of brown and white twist.} \\ 2 \text{ ,, blue and white twist.} \\ 2 \text{ ,, olive green and white twist.} \end{array} \right.$

The II. and IV. Schemes of the styles in three shades of Class A (see Table of Compounds) are not illustrated. The

former style is most frequently worked in six-shaft weaves, and the latter in four- and eight-shaft weaves. On account of the colours being grouped in larger quantities than in Scheme I., they give patterns of a broader and more effective character. They are used for similar classes of textiles as those to which Scheme I. is applicable, being selected when styles composed of well-emphasized types of textural work are required. Should

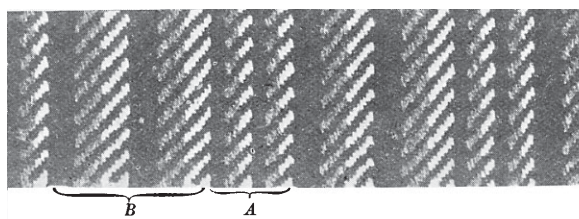


FIG. 109.

thick yarns be used, they give an excellent form of pattern for travelling rugs, shawls, and wraps.

The III. Scheme of these styles, consisting of three shades and of two simple types, is illustrated in the three patterns in Figs. 109, 110, and 111. The patterns are twice the size of Scheme III., that is to say, they contain fifty-four instead of twenty-seven threads, as given in the Table of Compounds, for

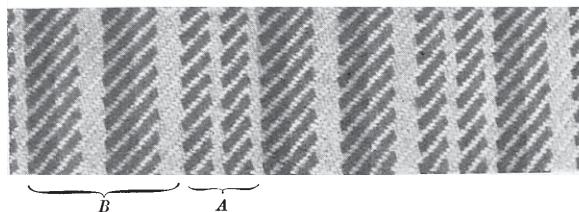


FIG. 110.

Sections *A* and *B* in producing the fabrics have both been repeated. Types *A* and *B* here combined work well together, and form a species of pattern which may be dissected. Contrast the effect obtained in Fig. 109 with the effect obtained in Fig. 110. The arrangement of shades in the warp is the same as supplied in the Table in both styles; but in the former the weft is black and in the latter white. Had a blue shade of weft yarn been employed, or any colour which would have formed an equal

weight of contrast with the black, grey, and white elements of the patterns, a species of design comprising increased effects would have resulted; or, had fancy colours instead of neutral shades been combined, a more elaborate type of colouring would have been produced. But to revert to the contrast of style due to changing the weft. It illustrates the importance of employing the proper shade of weft for developing the various elements of coloured styles. Each example is applicable to the dress and mantling branches of weaving, while in certain shades producing

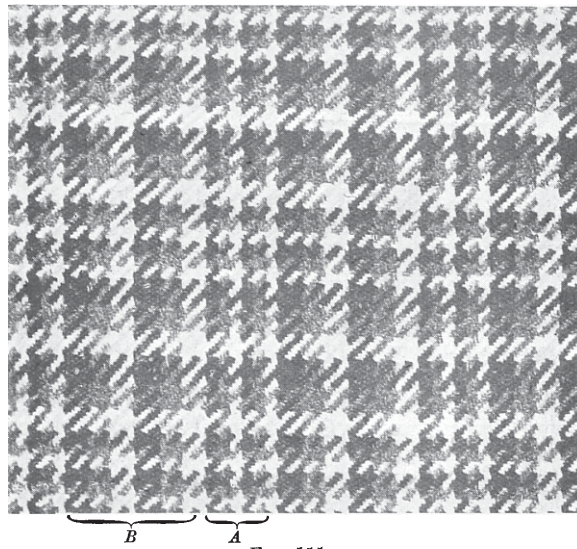


FIG. 111.

subdued and toned effects, they are used in trousering patterns. For dress textures, Sections *A* and *B* require to be increased in width in order to give more character and breadth of effect to the colourings.

Fig. 111, which is composed of the same warp yarns as the two preceding examples, and woven with a similar order of weft as warp colouring, is an effective plan of arranging shades. In Fig. 109, the black lines in parts *A* and *B* are quite solid, and the white and grey effects broken, being crossed with black; in Fig. 110 the white lines are clear, and the grey and black mingle with white; but in Fig. 111 Sections *A* and *B* each contain rectangular spaces of various sizes and shapes of black, grey,

and white yarns. These blend and interlace with each other. Part *A* of this style, being composed of the three-threes system of grouping colours, consists of a smaller series of effects than Part *B*, which results from the three-sixes plan of combining shades. The dimensions of each section of the pattern are varied according to the description of fabric in which it is developed.

159. *Styles of Four Shades containing Two Simple Types.*—

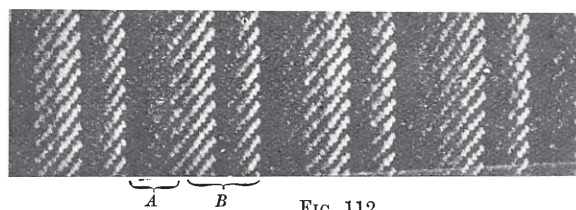


FIG. 112.

Four examples are given in these styles in Table XI. They do not form patterns so rich in mingled effects as the preceding compounds. This arises from their occupying an even number of threads, and constituting, as a consequence, a more regular and set description of pattern. Schemes I., II., and IV. are not illustrated, but they produce a similar species of style to

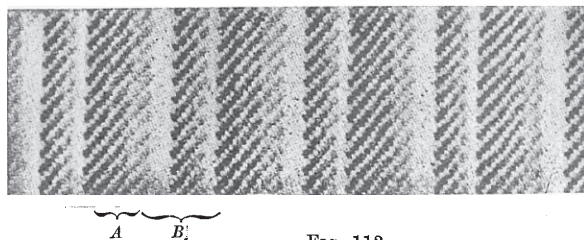


FIG. 113.

that resulting from Scheme III. in Figs. 112, 113, and 114. These types resemble each other in outline and textural detail. The only difference consists in the sizes of the effects produced. This is not the case in Schemes I. and II. of the styles in Three Shades, in which Parts *A* are composed of an odd and Parts *B* of an even number of ends. When the composition of the two types combined is thus dissimilar, the resultant compound is fuller of effects than if the two Simple Colourings both comprised an even number of threads. By, however, resorting to the use

of fancy weaves, the textural appearance of the patterns referred to may be considerably diversified.

Figs. 112, 113, and 114 have been acquired in the cassimere twill by repeating *A* and *B* of Scheme III. of the styles of Four Shades in Class A. In Fig. 112 the weft yarn is black; in Fig. 113, white; and in Fig. 114, the same as the warp. By using grey and light grey wefts, other stripes may be obtained. A contrasting shade of weft also forms a useful class of effects. Both Figs. 112 and 113 are bases employed in various kinds of

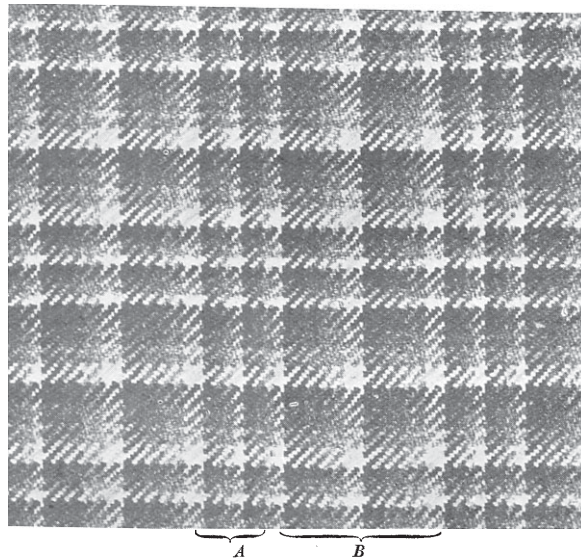


FIG. 114.

woollen, worsted, and cotton textures. In Fig. 114, the black weft destroys the effect of the warp shades, hence brown, blue, or olive would be more suitable. The check is regular in arrangement. It is a common base, and is employed in larger or smaller forms in the construction of dress and other fabrics.

160. *Styles composed of Three Simple Types* (see Table of Compounds).—As pointed out in reference to Fig. 103, which results from the adoption of Scheme I. of Class B (see page 200), when three elements of Simple Colourings are combined, a pattern is acquired rich in diversity of textural work. This is apparent in the example. Composed of black and white yarns,

it is a specimen of the diversity of style obtainable with two shades in compound patterns. It follows that if the number of the shades employed is increased, designs richer in character are

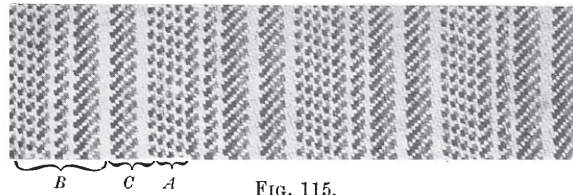


FIG. 115.

producible. If Figs. 115, 116, and 117, which have been woven from the arrangement of shades supplied in Scheme II. of Class B, are examined, it will be noticed that though the number

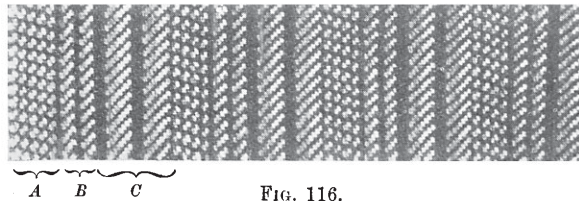


FIG. 116.

of effects corresponds with that of Fig. 103, yet the addition of the grey tint has produced quite a different form of style. Figs. 115 and 116 have been woven with white and black weft

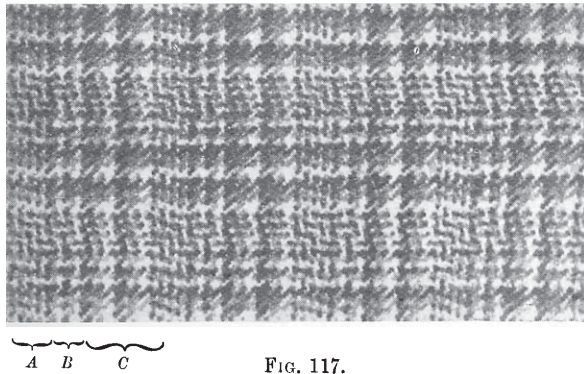


FIG. 117.

respectively. They are composed of three types of work, comprising minute effects in *A*, somewhat larger effects in *B*, and still broader details in *C*. The patterns are partially shaded, and as bases of colouring they are excellent. The three effects

each contains, may be combined in various ways, giving stripes of suitable proportions for dresses, mantlings, and trouserings, according to the class of materials employed. A few examples in colouring this base are given. Any of the three shades of which they are severally composed may be used for weft.

*I. Example.*

For	{	1 thread of brown (No. 1, Plate IV.).
6 threads.		1 " blue (No. 7, Plate IV.).
		1 " olive (No. 13, Plate IV.).
For	{	2 threads of brown.
12 threads.		2 " blue.
		2 " olive.
For	{	3 threads of brown.
18 threads.		3 " blue.
		3 " olive.

*II. Example.*

For	{	1 thread of olive (No. 9, Plate VI.) and white twist.
6 threads.		1 " blue (No. 9, Plate IV.) and white twist.
		1 " slate and white twist.
For	{	2 threads of olive and white twist.
12 threads.		2 " blue " "
		2 " slate " "
For	{	3 threads of olive and white twist.
18 threads.		3 " blue " "
		3 " slate " "

*III. Example.*

For	{	1 thread of light blue (No. 10, Plate IV.).
12 threads.		1 " rose (No. 4, Plate IV.).
		1 " white.
For	{	2 threads of light blue.
12 threads.		2 " rose.
		2 " white.
For	{	3 threads of light blue.
36 threads.		3 " rose.
		3 " white.



## IV. Example.

For	{	1	thread of russet (No. 7, Plate III).
12 threads.		1	" olive (No. 8, Plate III).
		1	" slatish purple (No. 14, Plate VI).
For	{	2	threads of russet.
12 threads.		2	" olive.
		2	" slatish purple.
For	{	3	threads of russet.
18 threads.		3	" olive.
		3	" slatish purple.

The I. and II. Examples are for suitings—one for dark and the other for light fabrics.

These may be produced in either woollen or worsted yarns. Example III. is for dress fabrics. The two smaller types of work of which it is composed form the same size of section in the texture; but the arrangement of the three 3's yields a section half as large again as that formed by the other elements of the style. A bold and clearly-defined pattern is thus produced by this order of colouring.

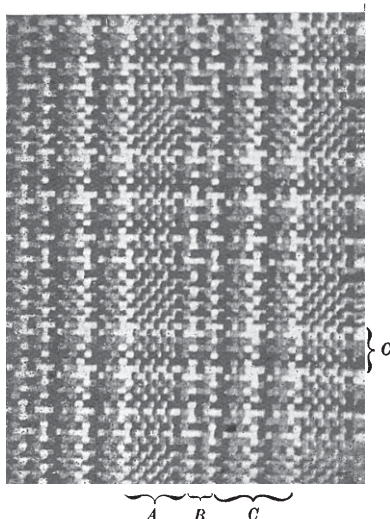


FIG. 117A.

Example IV. is intended for cloakings, and is composed of shades of a medium depth and intensity.

The checks, Fig. 117, in  $\frac{2}{2}$  twill, and Fig. 117A, in the  $\frac{2}{2}$  mat, contain nine species of work, well grouped and arranged. The two types *A* and *B* are just sufficiently emphasized to contribute to the neatness of the style, while the series of effects comprised in Bracket *C* give a distinctness of outline. These checks are workable in the colourings supplied for the stripes.

It is unnecessary to illustrate Schemes III. and IV. of Class B of the Table, which give similar patterns to those described, though there is considerable dissimilarity in the types of effect making the respective patterns.

161. *Irregular Compounds* (see Table XI).—Styles of this class are generally quite mingled in colouring. They consist of such methods of grouping threads as comprise various quantities of the different colours used. Thus, in Scheme I. of the Irregular Compounds there are twice as many threads of black as white in both sections *A* and *B*; in Scheme II. the black again predominates; while in Scheme IV. the several shades occur in different quantities. This is the colour feature which causes the dissimilarity between Irregular and Regular Compounds. In Part *A*, Scheme III., there is an excess of black, but in Part *B* an excess of grey. This species of pattern is therefore obtained by taking a simple base, in which one shade is in excess, and repeating it for a suitable number of threads, and then reversing the positions of the shades. The following examples of this system of compounding elementary schemes of colouring may be considered in addition to that supplied in Scheme III. of the Table:—

*Example I.*

- A.* For  $\left\{ \begin{array}{l} 4 \text{ threads of black.} \\ 2 \text{ ,, brown.} \end{array} \right.$   
 18 threads.
- B.* For  $\left\{ \begin{array}{l} 2 \text{ threads of black.} \\ 4 \text{ ,, brown.} \end{array} \right.$   
 18 threads.

*Example II.*

- A.* For  $\left\{ \begin{array}{l} 4 \text{ threads of brown.} \\ 2 \text{ ,, slate.} \\ 2 \text{ ,, blue.} \end{array} \right.$   
 16 threads.
- B.* For  $\left\{ \begin{array}{l} 4 \text{ threads of slate.} \\ 2 \text{ ,, blue.} \\ 2 \text{ ,, brown.} \end{array} \right.$   
 16 threads.
- C.* For  $\left\{ \begin{array}{l} 4 \text{ threads of blue.} \\ 2 \text{ ,, brown.} \\ 2 \text{ ,, slate.} \end{array} \right.$   
 16 threads.

In the *A* section of Example I. black is the principal and brown the secondary shade, but in the *B* section the positions of the colours are reversed. Such a method of colouring frequently yields attractive styles. This scheme in the four-shaft mat produces a twofold effect. Section *A*, when this colouring is worked in the mat, forms a black ground on which

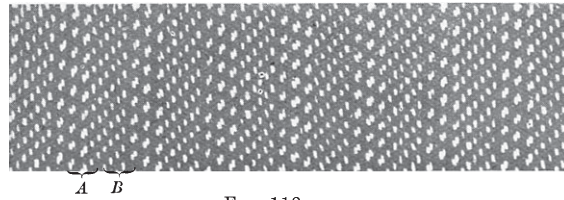


FIG. 118.

small lines of brown are set at right angles to each other, but Section *B* gives a brown ground with a similar series of black lines. The style is produced in both wool and cotton materials in the plain, twill, and mat weaves.

Example II. illustrates the method of changing the positions of the shades when three colours are employed in this class of

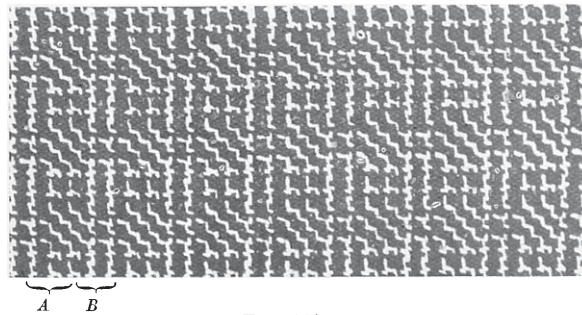


FIG. 119.

compounds. No perfect style can be obtained on this system unless each colour occupies every possible position in the repeat of the pattern. Reference to this example will make this point evident. Here three colours—brown, slate, and blue—are combined. In Part *A* the brown leads, in Part *B* the slate leads, and in Part *C* the blue. Even distribution of colouring is thus secured, and the production of a pattern in which uniformity of effects is paramount is effected. The principle of the compounds

illustrated by these examples affords considerable scope for ingenious arrangement of colours.

Two of the Irregular Compounds given are illustrated by sketches of woven samples, namely, Schemes I. and IV. Figs. 118 and 119 have been produced by Scheme I.,—Section *A* being repeated to 18, and Section *B* to 18 threads. As this

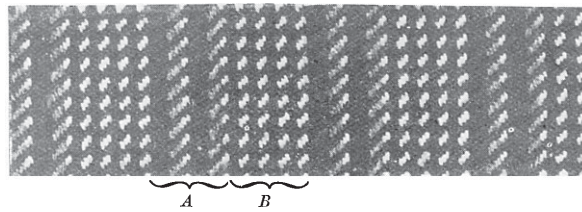


FIG. 120.

style is only composed of two shades, the textural result is somewhat wanting in variety of effect. Still, it is a useful base. Both the stripe and check arrangements are developed in woollen and worsted yarns. The check pattern is a compound of three effects, consisting of the spaces of vertical lines of black

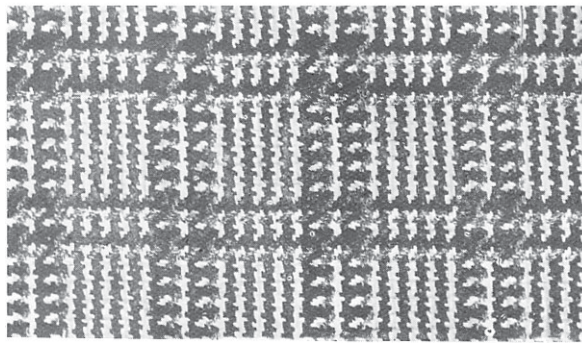


FIG. 121.

and white, of the parts of intermingled colouring, and of the sections of minute twilled work. In such couplets of shades as brown and fawn, blue and slate, and olive and slate and white twist, neater patterns may be obtained by this base than are producible in black and white.

Scheme II. gives even more mingled styles than those resulting from Scheme I. It is a composition of a Regular

and of an Irregular type; for grouping *A* is the simplest scheme of textile colouring, but grouping *B*, containing three elements of black to one element of white, is an Irregular base. This

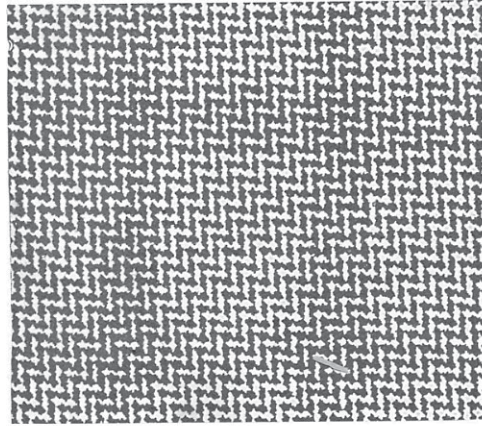


FIG. 122.

arrangement is extended and worked out in a considerable diversity of weaves. Scheme IV. is also constructed on this system. Part *B*, in this instance, is composed of the Regular

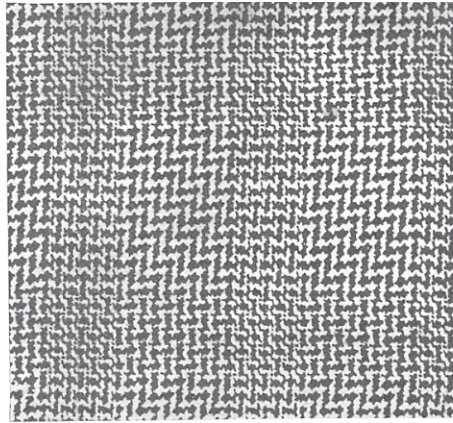


FIG. 123.

elementary type, and Part *A* of the Irregular type. The class of patterns it yields is illustrated in Figs. 120 and 121. \*The former of these styles has been woven with black weft, and the latter with the same shades of weft as warp. Part *A* has been repeated

to twenty-four, and Part *B* to twenty-four threads. More decided patterns generally result from combining Irregular and Regular types, than from combining two or more systems of each of these representative schemes of textile colouring. In the check pattern, Fig. 121, the Irregular type, constitutes broad rectangular spaces of white, grey, and black, which surround a series of small black and white checks. A diversity of shades and tints may be practised here, and the base modified and utilized in the construction of fancy fabrics of various descriptions.

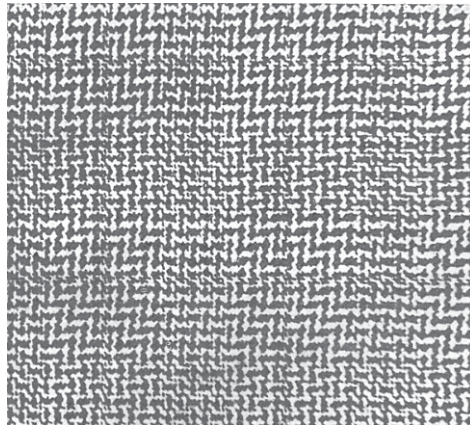


FIG. 124.

Figs. 122, 123, and 124 are other examples of compounds, the arrangement of the colours being as follows:—

*Fig. 122.*

3 black. }  
 3 white. } For 72.  
 4 black. }  
 2 white. } For 30.

*Fig. 123.*

3 black. }  
 3 white. } For 54.  
 2 black. }  
 1 white. } For 36.  
 1 black. }  
 2 white. }

*Fig. 124.*

3 black. }  
 3 white. } For 24.  
 2 black.  
 1 white.  
 1 black.  
 2 white.  
 3 black. }  
 3 white. } For 24.  
 2 black. }  
 1 white. } For 36.  
 1 black. }  
 2 white. }

They show how the simple grouping of colours may be effectively modified. In Fig. 122, the modification results in a compound of 3-and-3 and 4-and-2 colouring; the latter, causing the check to appear shaded on account of the 4-and-2 colouring, has one-sixth more black yarn than the 3-and-3. Fig. 123 consists of 3-and-3 colouring combined with 2, 1, 1, 2; and Fig. 124 of the same colourings differently grouped together.

## CHAPTER X.

### FANCY SHADES APPLIED TO SPECIAL DESIGNS.

162. Colour applied to Special Makes—163. Colouring of Corkscrews—164. Modified Corkscrews—165. Fancy Woollen Weaves—166. Granite Effects—167. Diagonals—168. Diagonals composed of Plain and Double Plain Makes—169. Stripe and Check Colourings on Diagonals—170. Methods of Colouring Fancy Weaves for Cottons or Silks—171. Gauze Textures—172. Systems of Colouring Gauzes—173. Imitation or Mock Gauzes—174. Colour in relation to Rib or Cord Styles.

162. *Colour applied to Special Makes of Cloth.*—Having examined the various schemes of grouping shades in relation to the elementary order of weaves, and also the methods of combining colours in both warp and weft, analysis may next be made of the principles of textile colouring for the development of specific woven effects. Here it may be an adaptation or an origination of a scheme of shades—the structure of the weave being the principal modifying factor. It is not now a matter of the application of a system of colouring, irrespective of any particular type of weave, but a question of employing that assortment of colours which will prove most effective in a certain design. The build of the fabric, the method of intertexture, and the weave, are fixed factors; and it becomes a problem of what grouping of threads will yield the most satisfactory style and best emphasize the design elements. All weaves employed in developing colour effects in simple fabrics belong to one of the orders of crossings given below:—

I. Weaves in which there is a preponderance of warp.

II. Weaves in which there is a preponderance of weft.

III. Weaves in which the warp and weft effects are equally pronounced.

The I. class of weaves, which may be termed warp effects, in-



cludes corkscrews, sateens, buckskins, certain species of diagonals and twilled mats; the II. class—weft weaves—is not so comprehensive, being composed mainly of ribs or cords, twills and small diagonals. A very extensive series of fancy makes of various types is found in the III. class.

But in addition to these important orders of intertexture, practised in the construction of single-make fabrics requiring special plans of colouring, there are some kinds of backed and double weaves that are so unique in build as to need exceptional treatment in a colour sense. This, however, is not so largely the case in backed as in double-make cloths. Backed, and also some types of double textures, such as trouserings, coatings, and simple effects in mantlings, are practically coloured on the same principles as single cloths. The under surface of these builds of woven styles is occasionally distinctive in shade-arrangement, but the face generally corresponds in scheme of colouring to single-make textures. In the combinations of double weaves, the exceptions to this method occur. Double-plain fabrics, for example, are coloured on quite distinct principles from some other descriptions of pattern. The double-plain weave is adapted to the development of a specific range of style, due to the utility of a formula of colouring only applicable to its structure. Some other types of double weaves have also their peculiar orders of shades.

163. *Colouring of Corkscrews.*—As corkscrews form one of the principal types of warp weaves, the application of colours to their construction may be primarily considered. The methods of colouring adopted here, relate collaterally to other weaves in which the warp effect is the most clearly developed on the face of the fabric. Corkscrews are adapted for several orders of warp colouring. Fancy shades are specially distinct when introduced into the warp of textures in which such weaves are used, making strong contrasts and high colourings in the warp unnecessary. But while these weaves thus afford ample provision for various methods of tinting in the warp, they neutralize the effects of weft colouring. This might be changed from black to dark blue in the common corkscrew without the character of the face of the fabric undergoing any perceptible modification in hue. If, for example, the warp and weft were,

in such a weave, twelve threads of brown and twelve threads of blue, a stripe, and not a check, pattern would result. Of course in a common twill this colouring would yield a decided check. There are two reasons why in corkscrews, warp cords, and similar weaves, such a scheme of shades forms a stripe—first, because textures composed of this class of weaves possess a warp face; and second, because they, if properly made, contain a larger proportion of warp than weft threads to the inch; hence the weft yarns are almost entirely concealed by the warp. On these grounds it will be obvious that variety of pattern in these weaves, when due to colouring, is a product of the warp. To the typical methods, therefore, of grouping fancy shades in the warp for corkscrew and kindred weaves, attention has mainly to be directed. In such instances, the weft is the factor which binds the threads together, and produces or builds, in conjunction with the warp yarns, the fabric; and hence it only to a small degree affects the style of the pattern, and consequently is a minor consideration in producing the design.

Patterns illustrative of the ordinary methods of colouring applied to corkscrew weaves are given in Figs. 125, 126, and 127. The style in Fig. 125 is a combination of three effects, viz., of the bands of solid colour, of the stripes *A*, and of the stripes *B*. The textural types, seen in the lettered sections, are due to two distinct but simple schemes of grouping shades, namely, the one-and-one and the two-and-one systems. They frequently occur in this weave, giving neat effects. The plan of warp colouring is as appended:—

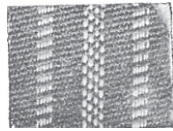


FIG. 125.

		18 threads of black worsted.
A.	For	{ 1 thread of white silk.
	9 threads.	{ 1 „ black worsted.
		17 threads of black „
B.	For	{ 1 thread of white „
	10 threads.	{ 2 threads of blue „

Should part *A* be modified thus:—1 thread of white and 1 thread of black for six threads; 1 thread of white and 1 thread of crimson for three threads; and 1 thread of white and 1 thread

of black for six threads—a very different style would ensue. Section *A* would, in this arrangement, consist of two small stripes of twills of black and white separated by a minute band of fine twills of crimson and white. Another alteration of this base, which is also frequently adopted, is as follows:—

		9 threads of black.
		9 „ brown.
		9 „ black.
<i>A.</i>	For	{ 1 thread of brown.
	27 threads.	{ 1 „ black.
		9 threads of black.
<i>B.</i>	For	{ 1 thread of tan silk.
	6 threads.	{ 1 „ black.
<i>C.</i>	For	{ 1 thread of slate silk.
	6 threads.	{ 1 „ black.
<i>D.</i>	For	{ 1 thread of tan silk.
	6 threads.	{ 1 „ black.

On analyzing this group of shades it will be evident that it comprises several elements. First, there are the three nine-thread stripes, viz., black, brown, and black. These are succeeded by stripe *A*, composed of twills of black and brown. Between this part and Sections *B*, *C*, and *D* there is another series of nine threads of black. Coming to the last three groups, the black yarns alternate with both the tan and slate silk in succession—an arrangement which tends to mellow the effect of the bright hues here employed. Of course the number of threads in the several sections of this pattern of warp may be varied according to the dimensions of the style required.

Two further examples developed in warp corkscrew are those in Figs. 126 and 127, the colourings being:—

For Fig. 126:—

	For 4.	{ 1 thread of lavender.
		{ 1 „ black.
		1 „ lavender.
	For 4.	{ 1 „ lavender silk.
		{ 1 „ black.
		1 „ lavender silk.

For 4.	{	1	thread of lavender.
		1	„ black.
For 30.	{	1	„ lavender.
		1	„ slate.
		1	„ lavender silk.
		1	„ slate.
		1	„ brown silk.
		1	„ slate.
		1	„ lavender silk.
		1	„ slate.
For 30.	{	1	„ slate.
		1	„ lavender.

*Weft.*

All one shade.

FIG. 126.

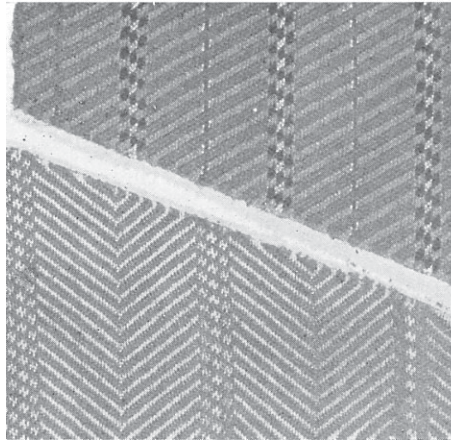


FIG. 127.

For Fig. 127:—

For 108.	{	1	.	.	.	Shade 1.
		1	.	.	.	„ 2.
For 6.	{	1	.	.	.	„ 1.
		1	.	.	.	„ 3.
For 6.	{	1	.	.	.	„ 1.
		1	.	.	.	„ 2.
For 6.	{	1	.	.	.	„ 1.
		1	.	.	.	„ 3.

*Weft.*

All one shade.

164. *Modified Corkscrews*.—In order to obtain a weft effect in corkscrews, the weaves are altered in the principles of construction. Take an example. The weave supplied in Fig. 128 is in reality a corkscrew, for should the ☒'s be erased and the ■'s be added, the weave, though occupying twenty-four threads,—which is not a number on which this type of weave is usually constructed,—would possess the main features of this description of twill. But the weave must now be considered as being composed of the □'s and ☒'s only—the ■'s corresponding to the □'s. The thread-and-thread scheme of warping in this modified corkscrew has a different effect from what it has in the common type of this weave. Taking the shades to be brown and slate, and the weft blue, a pattern containing four species of work results. First,

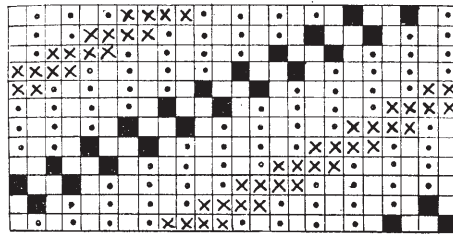


FIG. 128.



FIG. 129.

there are the two fine twills of the respective shades of warp yarn; and, second, a furrow of intermingled colouring, due to the solid floats of warp in the design. These effects are purely warp products. In addition to these, a fine diagonal of blue, resulting from the flushes of weft, is also formed, so that an alteration of this kind in the corkscrew system of twilling considerably increases the diversity of work producible by a simple arrangement of shades.

Another very useful style might be developed in this crossing (Fig. 128) by warping nine threads of a dark and three threads of a light shade of yarn, and weaving with a medium colour of weft. Supposing the shades to be black and white for warp, and grey for weft, then a pattern consisting of a series of furrows of black interrupted by small effects of white, arranged on a grey surface, would result.

In Fig. 129 is given the effect of twilling this weave, Fig. 128,

to the right and left alternately, when the thread-and-thread system of warping is adopted, and when the weft is all one colour. If the ordinary build of corkscrew had been employed, the diagonal of black and white would only have been produced. The grey twills are distinctly a weft development, and result from the  $\boxtimes$ 's in the weave. This and the preceding examples are but types of the styles producible, by modifying this useful weave, in worsted fabrics.

165. *Fancy Woollen Weaves*.—There is not a large diversity of weaves employed in the construction of woollen fabrics; still there are some crossings used in these textures which require

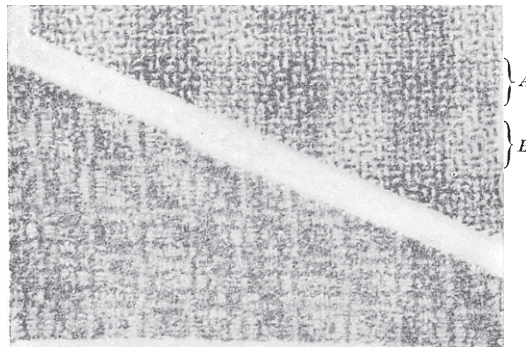


FIG. 130.

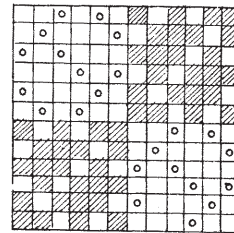


FIG. 131.

specific colouring. Patterns are produced by using weaves which are tinted on principles harmonizing with the scheme of interlacing. Such an example is given in the upper section of Fig. 130. A neat combination of textural effects has here been obtained by the employment of an uncommon weave. (See Fig. 131.) The scheme of colouring for this style belongs to the elementary class, being as follows in both warp and weft:—

$$\begin{array}{l}
 \text{A.} \\
 \text{24 threads.}
 \end{array}
 \left\{ \begin{array}{l}
 \text{For} \\
 1 \text{ thread of black.} \\
 1 \text{ " grey.} \\
 1 \text{ " black.}
 \end{array} \right.$$
  

$$\begin{array}{l}
 \text{B.} \\
 \text{24 threads.}
 \end{array}
 \left\{ \begin{array}{l}
 \text{For} \\
 1 \text{ thread of grey.} \\
 1 \text{ " black.} \\
 1 \text{ " grey.}
 \end{array} \right.$$

Hence it is the weave which has given the novelty of cast to the pattern. In a simple twill it would yield an ordinary style, but in this weave (Fig. 131) it forms a series of minute effects. The weave is of a check type, and is workable on twelve shafts. In the sections marked  $\boxtimes$  and  $\boxminus$ , the weft floats on the surface of the texture, while in the sections marked  $\square$ , the warp effect is clearly emphasized. Both warp and weft are equally prominent. But as the method of floating these threads, groups the weft effects and the warp effects alternately, the result is a pattern possessing minute markings of an interesting character. These are the products of three shades. If a twill or mat had been used, this diversity of pattern composition by three colours and simple plan of shade-arrangement would not have been possible; so that it is obvious that new systems of weaving on a small and regular base may be employed in woollen textures to advantage, if novel patterns are required. The intermingled check characteristic of the style is due to the system of grouping the shades. Thus the plan of colouring is in two parts; in *A* black is the principal, and grey the secondary shade; and in *B* vice versa. By this means, in some parts of the fabric a dark or black groundwork is figured with grey, and in others a grey ground with black. The scheme of colouring here illustrated is also applicable to worsted and cotton as well as to the woollen textures.

A different style is supplied in Nos. 1 and 2, in Plate XXIII., to that described. Its novelty is, however, due to the use of an uncommon weave; this is of a fancy twill order, being arranged on the base of the following plan of interlacing, which is the first pick of the design:—

$$\frac{1 \quad 2 \quad 2 \quad 3 \quad 2 \quad 2 \quad \cdot}{3 \quad 3 \quad 2 \quad 1 \quad 1 \quad 2 \quad \cdot}$$

Had, for instance, the six-end twill been used, the patterns would have lacked that richness of style and newness of colour by which they are characterized. It may therefore be understood that in woollens of a suiting and costume class, the weave may be arranged to add to the freshness of the styles obtainable from given methods of colouring. The scheme of shade-grouping in these samples is:—

<i>Pattern 1</i> (Plate XXIII.).			<i>Pattern 2</i> (Plate XXIII.).		
4	threads of fawn.		4	threads of grey.	
2	„	olive brown.	2	„	olive green.
2	„	brown.	2	„	dark brown.
4	„	dark brown.	4	„	blue.
2	„	brown.	2	„	dark brown.
2	„	olive brown.	2	„	olive green.

The order of the weft colouring for Pattern 1 is the same as the warp; but in Pattern 2 slate takes the place of olive green.

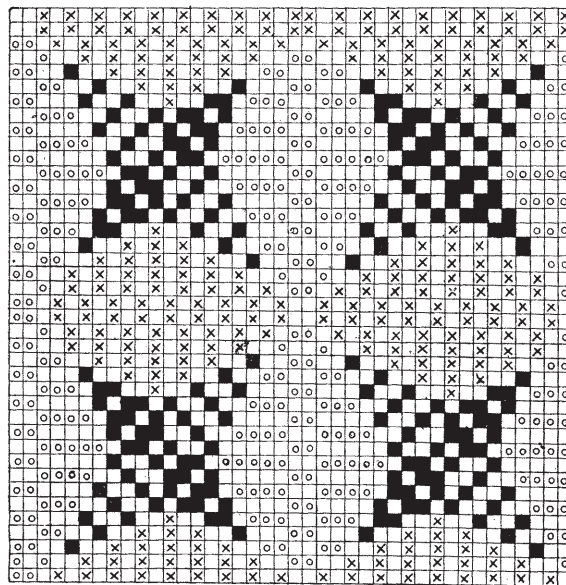


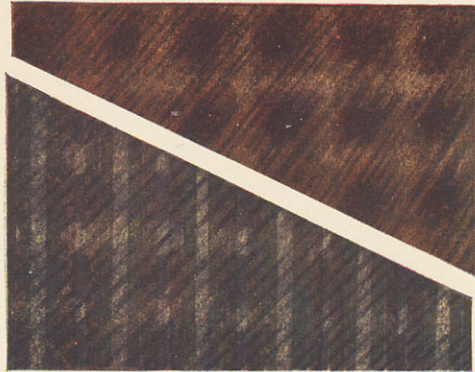
FIG. 132.

By varying the weftings, modifications of these effects may be acquired. One rule should be observed in this work—the warp colourings should slightly preponderate. They should in no case be subordinated to the scheme of wefting, which is rather a subsidiary, than a primary element, of this class of patterns.

The diagonal utilized here being a combination of twills, each of which floats the warp and weft to a different degree on the face of the fabric, yields a style composed of various effects.

166. *Granite Effects*.—These are produced in woollen yarns, the nature of which is adapted to the construction of blended



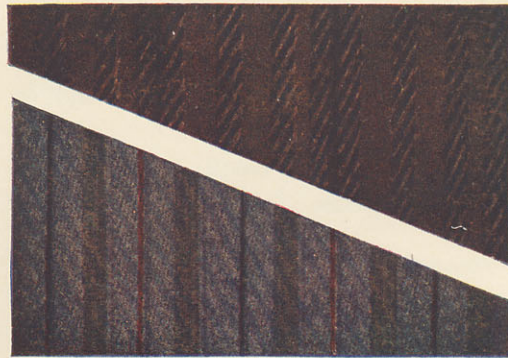


1

2



3



4

5

Plate XXIII

CHECK AND STRIPE PATTERNS

1 and 2. Checks

3. Gauze Stripe

4. 5. Cord or Rib Stripes

and intermingled styles. Patterns of this class may be due to the employment of special kinds of fancy yarns, or to the use of a peculiar type of weave in combination with a given order of threads. With these effects, as producible by coloured yarns, there is no need to deal, as they have been treated of with the ordinary class of mixtures. Reference may therefore be made to the function of weaves in the production of granite and other blended styles. The pattern supplied in the lower section of Fig. 130 is an example of this species of weaving. Its mottled effect is mainly due to the construction of the design used and the order of colouring practised. The weave is given in Fig. 132. It is a compound of several crossings, warp and weft cords, and warp and weft prunelle twills. The order of colouring for both warping and wefting is thus:—

For	{	1 thread of black.
24 threads.	{	1 „ slatish lavender.
		2 threads of black.
For	{	1 thread of black.
6 threads.	{	1 „ slatish lavender.
		2 threads of black.
For	{	1 thread of black.
10 threads.	{	1 „ slatish lavender.
		2 threads of black.
For	{	1 thread of black.
6 threads.	{	1 „ slatish lavender.
		2 threads of black.
For	{	1 thread of black.
26 threads.	{	1 „ slatish lavender.

This scheme of warping and wefting, conjointly with the weave to which it is applied, cannot fail to give an intermingled pattern. Even if the weave were of a common class, the result of this series of shades would be a broken, irregular style; but the design is arranged on a base to give a mixed distribution of colouring. The warp and weft cords in the plan are useful weaves for mingling fancy shades, and so are the twilled weaves combined. Add to these characteristics the arrangement of the design, which groups the several weaves

into small figures of different forms. The style is workable in worsted, woollen, and cotton yarns, and in twists as well as self-colours. This assortment of weaves is appropriate for patterns in which mingled colouring, combined with a definite species of marking or textural form of effect, is required.

167. *Diagonals*.—As a rule, diagonals are but plainly coloured. Being complex in weave-construction, they do not require elaborate colouring; moreover, they are frequently of such a character as to yield intricate and textural patterns in the simplest arrangements and contrasts of shades; there are, however, some exceptions. Certain important types can only be satisfactorily developed when specific colouring is practised. Some illustrations in these may be considered. First, suppose two

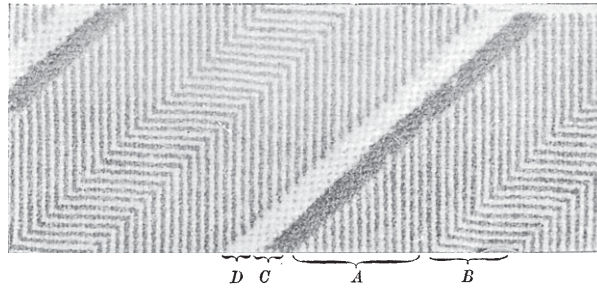


FIG. 133.

corkscrews—flushing the warp and weft respectively—were combined in a diagonal pattern of medium size. This arrangement of weaves, if the yarns were grouped on the one-and-one method in both warp and weft, would form a style in which one section of the diagonal would be developed in the warp and the other in the weft. By arranging the bands of the diagonal to run at a different angle from the twills of either the warp or weft corkscrew of which it is composed, an additional effect is obtained, than would have been the case if they had moved in a line with the twills. Regarding the application of this principle of pattern development, it relates to all diagonals composed of two or more simple weaves. One of the methods of applying colour to such designs is to adopt a simple scheme of shade-grouping, which develops neat but contrasting effects in the several makes combined.

168. *Diagonal composed of Plain and Double Plain Makes.*—  
 In Fig. 133 is furnished an example of how simple schemes of colouring may be made to produce quite a diversity of effects running diagonally in the fabric. This style has been developed by arranging the colours one thread of white and one thread of black, in the warping and wefting alike, and constructing the design on the base of the sixteen picks given in Fig. 134. It is unnecessary to explain here how the several effects have resulted, as the principles involved in producing the types *A* and *B*, which are composed of plain weave, are already understood; while the varieties of patterns obtainable in the double-plain makes, forming Sections *C* and *D*, will be considered in a subsequent chapter. Still, it may be observed that in solid shades such a grouping of weaves would give but an indefinite pattern, one lacking character and precision of outline. The weaves employed in this example, are the only ones which can be made to develop effects of this order, though in some types of simple, double, or compound weaves, such figured designs are producible by dissimilar schemes of colouring. There are certain restrictions to the methods of combination. Figuring, requiring large spaces of the double-plain makes, is not feasible; these crossings are necessarily looser and more open in structure than the single weaves, and may therefore only be used in comparatively small quantities; moreover, the weaves may not be grouped in the stripe form, or the texture will not be satisfactory as to firmness and soundness, nor will it weave regularly. The fact that the weaves in the example run diagonally, equalizes the interlacing of the warp and weft and ensures the construction of a uniformly-built fabric.

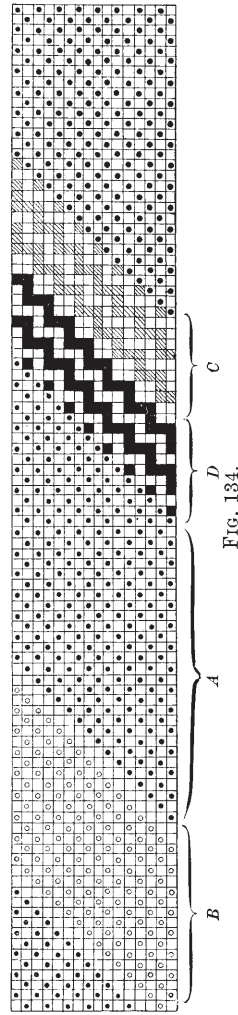


Fig. 134.

169. *Stripe and Check Colourings on Diagonals.*—Other methods of colouring weaves of a diagonal construction comprise the development of stripe and check effects, in neatly-toned shades. Coatings, dresses, and vestings comprise patterns of this order. It is necessary, in order to have the same weight of colouring in both warp and weft of such styles, to modify the design on those threads and picks on which the fancies occur. Unless this is done, the effect produced is irregular and imperfect. By, however, altering the design where these bright striping or checking shades are added, complete balance of colouring is acquired both across and lengthways of the fabric.

170. *Methods of Colouring Fancy Weaves for Cottons or Silks.*—Generally, these require brighter and more cheerful combinations of shades than woollen or worsted fabrics, but the weaves, when of a similar construction to those used in the production of these textures, are coloured on similar principles. It is in the selection of the shades where specific treatment is required. There are, however, some specially-constructed weaves employed in the manufacture of fancy cottons, and these have to be coloured according to their principles of arrangement and the type of pattern they are required to form.

Amongst these weaves are small fancy effects, such as those illustrated in Figs. 135 and 136, and leno and gauze combinations. Reference may, in the first place, be made to Figs. 135 and 136. The former is a striped pattern composed of two sateen weaves. The alternate bands have warp- and weft-flushed grounds. On the weft-flushed surface a warp spot is formed, and on the warp-flushed surface a weft spot. A marked and well-emphasized contrast of effects is thus secured. The arrangement is an excellent one, and capable of many modifications. Section *B* might, for example, be repeated several times, or the whole design might be enlarged with good results. A third variation is possible by converting the pattern into a check. A light warp and a medium shade of weft should be used. Supposing, for instance, the warp were light blue and the weft medium blue, then stripe *A* would consist of light blue ornamented with small spots of medium blue, whereas stripe *B*

would consist of medium blue mainly, with light blue spotting. This method of colouring is useful where the designs are arranged on a base of this character. Another plan of introducing fancy shades in such weaves involves the use of two shades in the warp—one for stripe *A* and another for stripe *B*.

One further method of varying styles of this kind may be mentioned. Add to the design as here given a band of fancy twill, which might be coloured with bright yarns in the warp, and the sateen sections plainly coloured, allowing of clear and distinct development of the spotting.

The next weave, Fig. 136, may be more diversified in

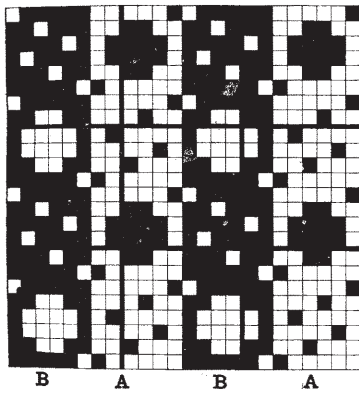


FIG. 135.

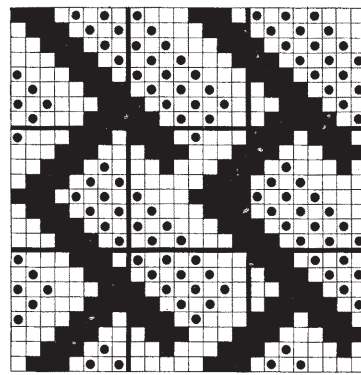


FIG. 136.

colouring. In the woven texture, it forms a species of serpentine pattern filled in with small figures of plain make. The warp and weft flushes compose similar figuring. Analysis of its composition shows that it comprises three varieties of crossings. First, there are the plain weave parts; second, the solid warp-flush figuring; and lastly, the wave effect formed by the solid floats of weft. If the thread-and-thread system of colouring were adopted, an interesting woven effect results. Thus, assuming the colourings to be pale blue and light olive, the plain sections would consist of longitudinal stripes of these colours; the blank spaces in the weave would give warp floats of the same shades; and the solid floats of weft transverse but very diminutive lines of olive and blue. Should one colour of warp yarn be used—such as light fawn, and a second colour for

weft, tannish brown, for instance—quite a different species of style would be obtained. In this example, a wave figure of light fawn would be adjacent to a similar figure of tannish brown, and the oblong figures composed of plain weave in mixed colouring.

These styles, Figs. 135 and 136, when coloured on the lines indicated, are suitable for silk and mixed materials, as well as cotton textures, for which they have been arranged.

171. *Gauze Textures*.—Gauze or leno effects are different in structure and appearance from ordinary woven fabrics. When combined with the common methods of weaving, a variety of useful designs may be obtained. Compared with ordinary

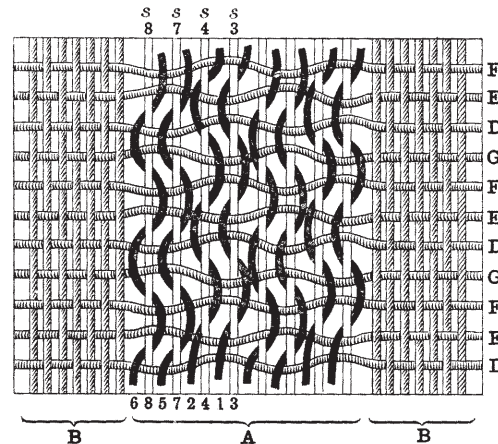


FIG. 137.

woven results they are what may be defined as porous or transparent in composition, or, more strictly speaking, they consist of compact and open spaces which regularly alternate. The dimensions of the perforations, and the intervals at which they occur, are determined by the weave used and the method of healding adopted. On examining a sample of these textures, the threads appear to be drawn together in some sections and in others to be separated and apart. Section *A* of Fig. 137 affords some idea of the mode in which the yarns twirl round, over, and under each other. Note, for example, the crossings of threads 1 and 2 with 3 and 4. The two former rise alternately on the right and left of the two latter. Further analysis shows that some of the threads—namely, those lettered *s*—are not

drawn out of their positions. They preserve uniform fixedness of position, being always under the picks of weft and twined round by the whip yarns 1 and 2, and 5 and 6, etc. If one of these yarns is removed, the whole structure of the fabric is decomposed. Fig. 138 is a photo-micrograph of a cotton warp and silk weft gauze fabric showing distinctly the twisting of the double warp threads round the soft floss weft. In the sample of fancy gauze, Fig. 137, two whip threads rise on the left and on the right of the threads

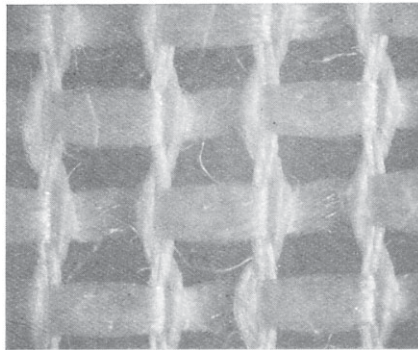


FIG. 138.

s simultaneously, forming a wavy texture. The picks are introduced at such intervals as to be bound together in pairs, first by ends 1 and 2, *D* and *E*, *F* and *G*, etc.; and, second, by ends 5 and

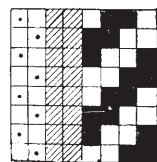


FIG. 139.

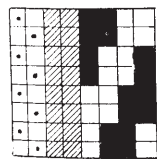


FIG. 141.

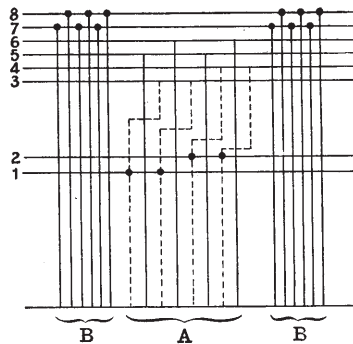


FIG. 140.

7, *E* and *F*, *G* and *D*, etc. The bending of the picks is due to the method of coupling them together. In producing such a style, first arrange for a band or stripe, of about one inch in width, of the gauze effect *A*, and then for a band of 1½ to 2 inches in width of the plain, like the sections lettered *B*. The weaving plan of this pattern is Fig. 139, and the healding draft Fig. 140. A word or two of explanation is necessary on the latter. Shafts



1 and 2 are the doupe heddles. In healding, the whip threads are first entered into shafts 3 or 4, then into shafts 1 or 2, as the case may be. It is necessary that these should be drawn underneath the stationary ends. When the doupe heddles rise, the whip ends are lifted on the right of the fixed threads, but when shafts 3 and 4 rise they are lifted on the left. The weave given in Fig. 141 is a modification of this structure.

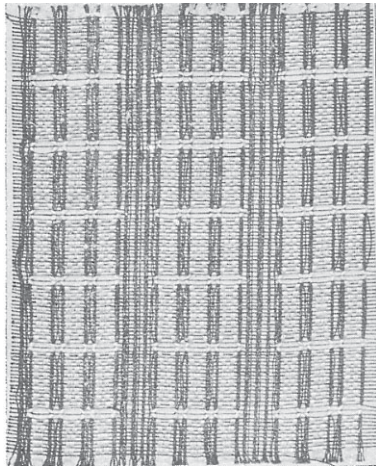


FIG. 142.

For some sixteen picks the gauze yarns interweave regularly, and then pass round four threads, being thereby drawn together by the picks, and at the same time made to prevent them from being forced into contact with each other. It is thus that the porous features of the pattern are originated. Between each series of gauze effects there is a band of twelve threads of fine cotton, not including the side threads which, conjointly with the whip yarns, form the interstices at intervals. In healding for this style, the douping threads pass under four ends in succession, so that five threads are sleyed together in the gauze sections. In the plain parts, however, only four threads are entered into each reed, while a vacant split is allowed between the different sets of these yarns. This sample, like the preceding one, and that given in No. 3 on Plate XXIII., illustrates the diversity of textural arrangement feasible in gauze fabrics.

This weave, in the same draft, gives the stripes of plain unaltered, but those of leno are more pronounced in waviness, for four picks are in this case grouped together at each change of the whip threads. Numerous variations might also be wrought in the same method of healding, and by the same plan, by simply altering the dimensions of the respective stripes.

The style given in Fig. 142 is of a different class from that sketched in Fig. 137.

172. *Systems of Colouring Gauzes.*—The methods of colouring these patterns may be grouped under three heads, as follows:—

I. Gauze patterns in which colour is applied to those sections composed of the ordinary principles of intertexture only.

II. Gauze patterns in which colour is applied to the gauze parts only.

III. Gauze patterns coloured in both the ordinary and gauze sections.

Examples in each class may be considered. Primarily, then, it is feasible to apply colour to these styles on such a system that the gauze sections will be developed in one shade, while the adjoining effects may be coloured on any system applicable to single-make designs composed of simple weaves. Thus, taking Fig. 137 as a design which it is required to colour by this method, then the weave of parts *B* being plain, any of the Simple or Compound Schemes of Colouring might be used; or these parts might be coloured on a special system to form, for example, a shaded band of tints. If the colours used were pink and white, the maximum quantities of pink could approach the band of gauze effects, when the largest portion of white would fall in the centre of the plain stripe; or the shading might proceed from white at the edges to a pink central band. Whether the first or the second arrangement is adopted, the stripe of gauze should be in white, and the weft also of this shade. Obviously the ordinary schemes of colouring are applicable to such sections as *B* of any gauze pattern. With some slight modification, or rather adaptation, they also relate to the leno or gauze portions of these styles. When it is required to introduce the fancy shades into the gauze proper, the structure of the fabric has to be taken into consideration. Fig. 142 is a sample of gauze in which the fancy yarn constitutes the gauze effect. By making it such, the character of the pattern is more clearly developed. It is only by an arrangement of this kind that the twisting of the gauze yarns can be prominently brought out. If the ground threads had been white, and the whip yarns black, the effect would not have been nearly so good. Hence it is advantageous in applying colours to these textures to make the twisting or whip threads into fancies.

Another important feature about the application of colour to gauze effects is that different materials and thicker yarns may be employed for the whip than for the ground ends of the fabric. This is the case in Fig. 142, where the gauze threads are silk and several fold in thickness. The object of this contrast of materials and in sizes of yarns is to cause the gauze effects to appear prominent and distinct from the other characteristics of the pattern.

The third example in the colouring of these styles is Pattern 3 on Plate XXIII. There are several textural principles here for analysis. The gauze sections are developed in three kinds of yarns. The variegated silk threads form the main element of the tinting. Such yarns are only used in the finest of these fabrics. They impart richness of tone and lustre to the whole effect. Next there are the thick threads of cotton forming the diamond-work in the gauze parts. Intervening these thick yarns, and constituting the smaller interstices, the fine threads occur. These various yarns are effectively employed—the silks give the twisting, the thick threads the open gauze, and the fine threads the groundwork. The other sections of the style are composed of twill and plain. Fancy shades might be forcibly added to the twilled part, and so the pattern converted into a colouring of the third class of gauze styles.

In addition to these striped combinations, a limited range of checkings in gauze are obtained, while figured effects are produced in this scheme of weaving in a considerable diversity of tints.

173. *Imitation or Mock Gauzes.*—The somewhat intricate mounting required to produce gauze fabrics has led to numerous ingenious attempts to obtain a gauze effect in the texture without increasing the complication of the weaving process. One of the most important methods of accomplishing this is shown in Fig. 143. The small weave (Section A) in this design, marked in ☒s, yields an imitation of the real gauze, and so groups the threads and picks that they result in forming a fabric full of small perforations. It is used in combination with the plain weave and fancy makes in the origination of various descriptions of patterns. As a rule, the colourings are of a simple order, only

a limited variety of shades being used. The stripe in Fig. 143 may be colourable in the warp as follows:—

- 20 threads of tan.
- 32 „ light blue.
- 20 „ tan.
- 24 „ light blue.

The weft might be either light blue, tan, or a tint that would contrast with both the colours in the warp. Assuming it to be blue, the pattern resultant would consist of a stripe of mock gauze in solid blue, a stripe of plain in brown and blue neatly mingled, a stripe of hopsack in which the respective shades

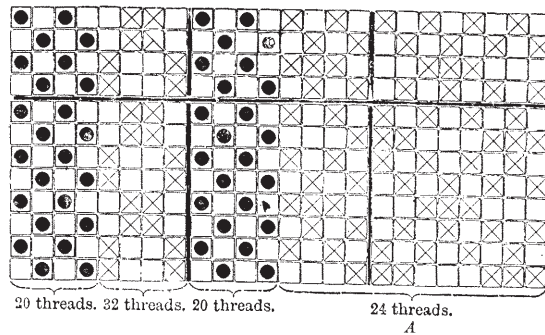


FIG. 143.

would form small diaper-work, and of a second stripe of plain weave of intermingled colouring. The novelty of these patterns is largely proportionate to the ingenuity exercised in varying the methods of combining the weaves and in the selection of new types of crossings; while the special function of the colourings is to develop the weave elements.

The check example, Fig. 144, further illustrates the method of colouring these mock effects. Fig. 144A is a photo-micrograph of the fabric, showing the interlacing of the threads, and the difference in structure of “mock” and gauze fabrics (Fig. 138). It is produced in Fig. 144B, and coloured:—

Light green . . .	12	12	12	12	24	-
White . . . . .	48	24	-	12	-	24
Medium green . .	-	-	24	12	12	-

174. *Colours in relation to Rib or Cord Styles.*—The rib make of cloth is utilized in the construction of fancy patterns. It is

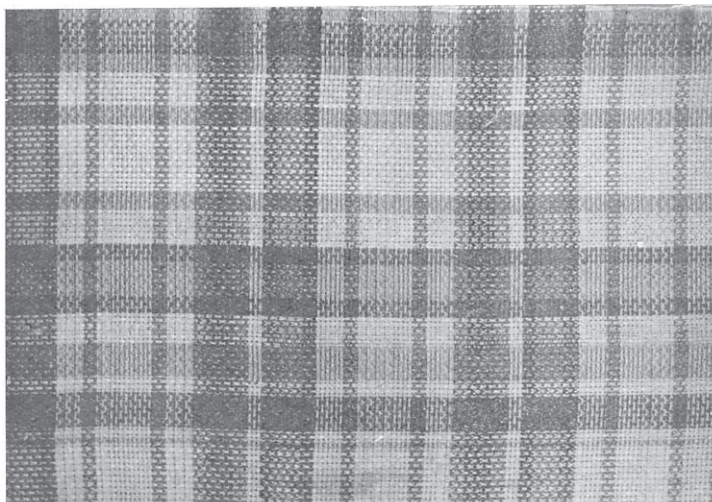


FIG. 144.

one of the neatest schemes of weaving that can be used for this purpose. It allows of considerable scope for both colouring and

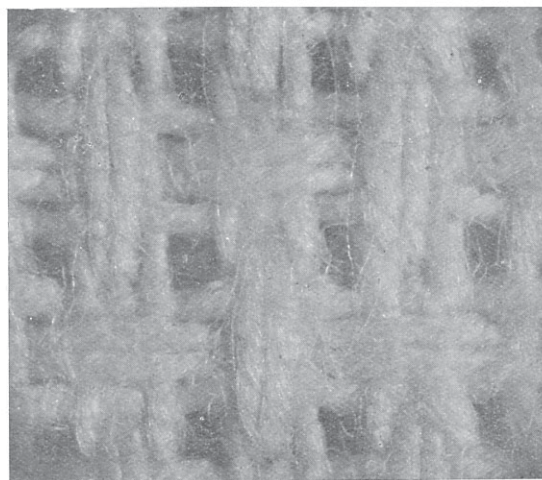


FIG. 144A.

designing. Though two wefts may be employed in producing this class of design, only one of them appears on the face of the

fabric when forming the rib or cord effect. As a result of this, the cord may be variously coloured, and yet quite independently of the other sections of the style. Fig. 145, which is the plan of the rib style given in Pattern 4, on Plate XXIII., illustrates the base on which such designs are arranged. Part *A* forms the cord. It is produced solely by the even picks. These, in weaving, come as close together as if the odd picks were not part of the construction. At the same time they float under the several sets of threads forming the other parts of the style. It is this arrangement which makes it feasible to develop the cord in any order of colours without modifying the pattern as a whole. Pattern 4, Plate XXIII., shows the rib of a distinct shade. The method of colouring is as appended:—

*Warp.*

- 10 threads of brown.
- 10    "    brown and white twist.
- 20    "    brown.
- 10    "    brown and white twist.
- 10    "    brown.
- 10    "    brown and white twist.
- 6     "    brown.
- 10    "    brown and white twist.
- 10    "    brown.

*Weft.*

- 1 pick of brown.
- 1    "    black.



FIG. 144B.

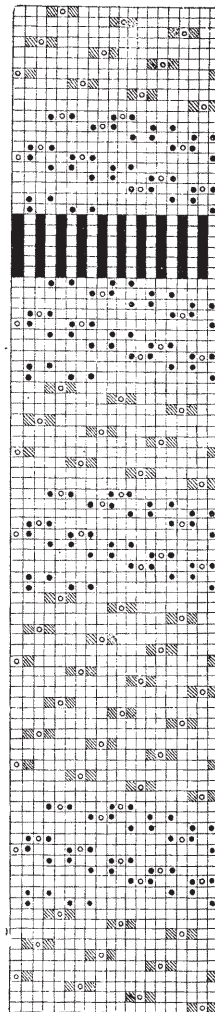


FIG. 145.

(If necessary, stitch or tie beneath the cord section *A*.)

It is the black weft which forms the cord. Greater diversity

of effect in this section of the fabric might have been acquired by wefting thus:—

$$\begin{array}{l} \text{For } \left\{ \begin{array}{l} 1 \text{ pick of brown.} \\ 1 \text{ ,, black.} \end{array} \right. \\ 92 \text{ picks.} \\ \text{For } \left\{ \begin{array}{l} 1 \text{ pick of brown.} \\ 1 \text{ ,, silk.} \end{array} \right. \\ 4 \text{ picks.} \end{array}$$

In this scheme of wefting the rib is spotted with silk. Occasionally two colours of silk are employed, so that there is evidently some facility for fancy weft tinting in designs of this character. It is not necessary to enter into the details of the warp colouring, which depend largely on the weaves combined.

Pattern 5 of Plate XXIII. is a rib of a different arrangement from that of the preceding example. In Fig. 146, used in its

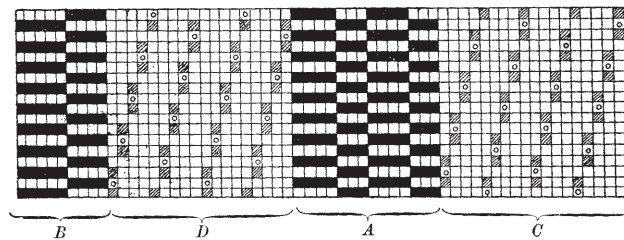


FIG. 146.

manufacture, three sizes of ribs are combined. It should be noted that where more than one rib constitutes any stripe, both the odd and even picks are utilized in forming the corded effect, and, as a consequence, it is no longer possible to have the whole of the rib stripes of a distinct weft shade from the rest of the design. If Band *A* only contained three ribs, the pick-and-pick method of colouring might be practised, because in such an arrangement the fine twill would start on the first pick of the design in both Sections *C* and *D*, admitting of the small ribs in *A* and of the large ribs in *B* being of a different colour from the opposing cords and also from the twilled parts. But this order of wefting, if applied to the design given in Fig. 146, would partially destroy the solidity and neatness of one of the twilled bands. Should the odd picks be selected for the fancy colour, it would be stripe *C*, but should the even picks be

selected, it would be stripe *D* that would be modified by the additional shade of weft.

It may be observed that as a rule weaves of a warp type are combined with corded effects; clearer patterns, comprising more forcible contrasts of textural work, result from the use of these than from employing crossings which flush a considerable proportion of the weft yarn on the face of the fabric. Mellow and choice colouring is therefore important in the warp of these styles, because the yarns composing it float with comparatively few weft interruptions on the upper surface of the texture.



## CHAPTER XI.

### COLOURING OF COMBINATION DESIGNS.

175. Principles of Colouring Weave-Combinations—176. Examples in Colouring Compound Designs—177. Main Points in applying Shades to Weave-Combinations—178. Examples in Drafted Patterns—179. Designs composed of Two Prunelle Twills—180. Drafted Designs composed of Two Four-Shaft Weaves—181. Styles composed of Prunelle and Cassimere Twills—182. Combinations composed of two-, Six-, Seven-, Eight-, and Nine-Shaft Weaves—183. Drafted Designs composed of Three or More Weaves—184. Fancy Stripe Combinations—185. Irregular Woollen Weave-Combinations—186. Cotton Stripes—187. Colouring of Designs containing several Weaves of Varied Construction—188. Figured Designs striped in the Warp.

175. *Principles of Colouring Weave-Combinations.*—In applying fancy shades to designs containing several weaves, not only has the character of the pattern as a whole to be considered, but also the character of its component parts. That grouping of shades which forms a perfect style in the common twill may yield incongruous effects in other fancy weaves with which it may be associated, necessitating in some designs—particularly in those of a stripe and check order—the adoption of various systems of colouring, according to the structure of the crossings forming the different sections of the pattern. Generally, the elementary schemes of colouring are the most appropriate for weave-combinations, as they constitute the most uniform effects. To exemplify the methods practised in colouring this description of textile designs, some illustrations may be considered in detail. Supposing, in the first place, a design were composed of prunelle twills and the plain weave, and it were required to colour it on such lines as to obtain neat textural effects in each weave. Now, it will be clearly understood from the analyses made of Simple Colourings that several schemes might be employed, so far as the plain make is concerned, such

as the one-and-one, the two-and-one, and the three-odd-thread systems; but if these analyses have been carefully studied, it will at once be evident that neither the first nor the last of these colourings would be suitable for application to this design, because, while producing satisfactory types in the plain sections, they form unsuitable ones in the twills; and it is imperative in this case to use a method of grouping shades that will give equally clear and regular effects in the prunelle as in the plain crossings. On this ground, therefore, both these systems must be rejected. There is not the same objection to the two-and-one arrangement, for it yields a good pattern in each of the makes. In the plain weave it forms a species of neat spotting; in the warp prunelle, lines lengthways of the fabric; and in the weft prunelle, lines of the two shades across the fabric.

176. *Examples in Colouring Compound Designs.*—Let the following examples also be considered: I. a design composed of four-end twill and mat; II. a design with a cassimere twill ground, small upright twill for figure, and swansdown twills for extra spotting; III. a design consisting of six-shaft twill in the ground, with warp and weft cords for figuring; IV. a design containing mayo, common twill, and mat; and V. a design with twilled mat for ground and double-plain for figuring.

In the first design mentioned, two weaves are combined in which several schemes of colouring might be utilized, such as the two-and-two, the four-and-four, and the four-two's arrangements. But assuming that it were required to adopt an order of colouring which would cause the twilled parts of the design to consist of minute checkings, and the hopsack parts of fine vertical stripes, then it would become a necessity to employ the two-and-two colouring. This order is, in some respects, one of the best that could be employed in all-over patterns consisting of twill and mat weaves, for it not only thus produces a distinct effect in both makes, which in figured styles would result in the precise development of the integral parts of the design, but also a combination in which the sections consisting of the respective crossings are equally pronounced.

The second type of design named contains four weaves, but the one most largely employed and which constitutes the ground

of the fabric is common twill. Now, in colouring such patterns the ground weave must be primarily considered, other makes, so far as the application of fancy shades to the entire design is concerned, being of secondary importance. In a combination comprising four weaves it is not, however, usual to adopt an order of shades calculated to produce a special effect in any of the crossings, but rather to employ a scheme of colouring largely composed of one shade. In other terms, it is advantageous in designs of this class to allow the bulk of the fabric to be composed of yarns of one tint—any fancy threads which may be introduced being used sparingly, and frequently singly, and not in larger groupings, as is the case in other modes of colouring. By adopting this arrangement, the weave characteristics are clearly emphasized, and yet the surface of the texture is neatly embellished with fancy shades.

The six-shaft twill is the main factor of the third type of style. It is therefore a question of selecting in the first instance a plan of colours that is adapted to its structure. As it forms the bulk of the texture, it requires to be primarily considered. Reference should be made to the series of simple and compound colourings applicable to this weave, and then that method employed which, while making a neat pattern in the twill, will not form an unattractive effect in the cord weaves. Some of the standard groupings of shades for this weave are quite unsuitable when used with these cords. The three-two's and two-three's are arrangements of this character. They form neat patterns in the twill, but imperfect styles in the ribbed crossings. The one-and-one and the three-odd-thread schemes are the most appropriate in a combination of such weaves. They are both capable of producing regular effects in this compound design. Thus, take the thread-and-thread order. In the six-end twill it forms neat spotted work; in the warp rib, transverse bands of colours; and in the weft rib, vertical bands of colours, varying in dimensions according to the size of the rib-weaves used.

The IV. class of example in mayo, twill, and mat is a combination in which several schemes of shades are feasible. The point to be acquired when such is the case, is the employment of a method of colouring that will yield effects in each weave, sufficiently

marked in character to contrast neatly with each other, and yet constitute a harmonious pattern. This can only be practically worked out by comparing the patterns resulting from each crossing in standard groupings of shades, which will lead to the application of that order of yarns known to develop forms of pattern in the respective makes, calculated to harmonize satisfactorily in combination.

When single and double weaves are combined, as in section V., the elementary schemes of colouring to be used have also to be applied in relation to the general effects producible.

Fig. 147 is a pattern containing such weaves, the ground being single in structure and the fingering double-weave structure. A section is given in Fig. 148. The simplest arrangement of colouring, one-and-one, has been used, because it produces the figure in light and dark portions, and the ground in intermingled colouring. The

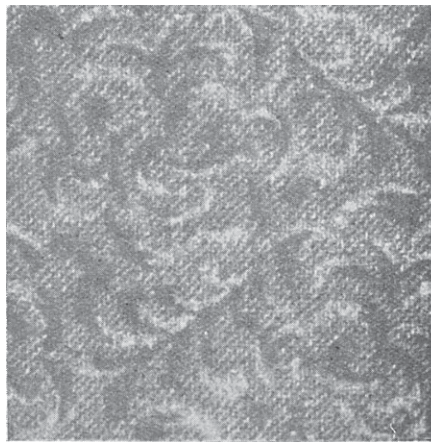


FIG. 147.

relation of the colour effect to each weave gives satisfactory definition to the figuring in contrast with the intermingling of the shades in the ground.

177. *Main Points in applying Shades to Weave-Combinations.*—From these examples in the methods of colouring designs consisting of several elementary crossings, it is apparent that there are certain principles which must be observed in introducing fancy yarns into this class of woven patterns. First, whatever the character of the design, the primary factor for consideration is the structure of the weaves—the weave which occurs in the largest quantities being the most important, and requiring specific colour treatment. Second, when the weaves combined are similar in construction, a simple scheme of colouring should be adopted. Third, no order of shades should be

employed which, while giving pleasing patterns in one weave, produces indifferent results in others. Obviously, these rules are only applicable to designs composed of elementary weaves, and in which the variety of crossings is very limited. For example, in designs comprising such a series of dissimilar weaves as obtains in Figs. 163 and 166, it will be clear that, to acquire a

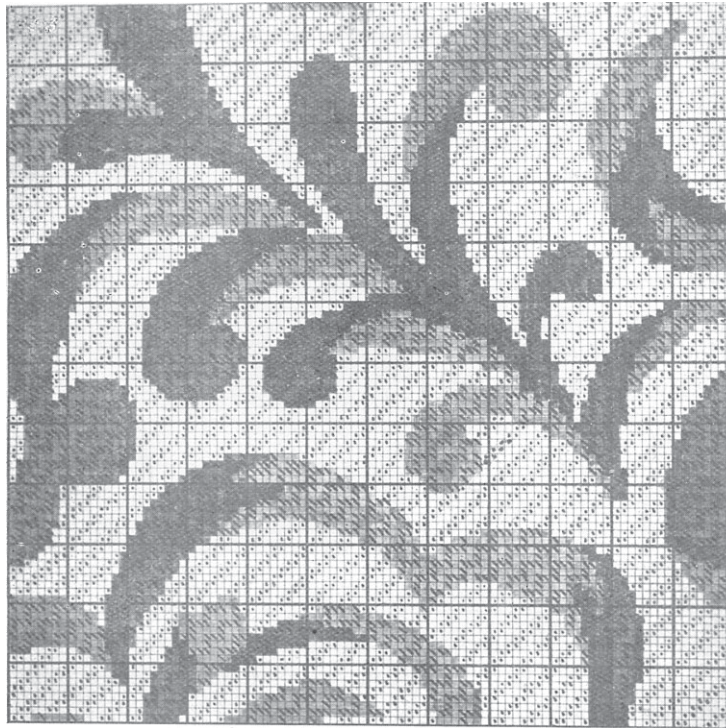


FIG. 148.

well-balanced pattern as to colouring; the several sections of the style must be specially treated in a colour sense. To warp an assortment of weaves of this type on one system throughout, could only result in the construction of a most unsatisfactory range of effects. The order of colouring must vary with the alteration in weave. This of course is only feasible in stripe and check designs, but is absolutely necessary in styles comprising a considerable diversity of intricate weaves arranged on either of these methods.

178. *Examples in Drafted Patterns.*—These may be considered as follows:—

I. Designs composed of weaves related to each other in structure and occupying a similar number of threads, and in which the several makes are used in corresponding proportions.

II. Designs of a stripe and check arrangement diversified in weave assortment.

III. Designs composed of several crossings, but with a simple twill, mat, or plain weave for the ground of the texture.

In the I. group a range of irregular patterns occur, consisting mainly of three-, four-, and six-end makes. In colouring these patterns, it is necessary to consider how the simple schemes of colouring develop in the several weaves combined, in order that the scheme which will give the most uniform result in all the crossings may be applied. If three or four weaves obtain in the same design it is occasionally advantageous to employ an irregular grouping of shades, or one which is not intended to give a particular type of pattern in any one of the weaves combined.

Increased colouring ingenuity and practical skill are required in the treatment of the second group; because in the designs included here, it is frequently necessary to adopt various orders of colouring—one for each type of weave in the design.

The third group of drafted patterns is largely developed in cotton fabrics, dress goods, and other fancy textures. The method of colouring these patterns is twofold, relating, first, to the treatment of the ground crossing, and second, to the use of a plan of shades that will yield neat effects in all the weaves combined.

Examples in each group will be fully analyzed and described.

179. *Designs composed of Two Prunelle Twills.*—An extensive assortment of styles in woollen, worsted, and cotton yarns is obtained in these two weaves by drafting. These are produced in trouserings, suitings, dresses, etc. When these two makes are combined and coloured on the two-and-one method, they give opposite effects, the warp twill forming vertical, and the weft twill transverse lines of colour. It is this principle which governs all the patterns obtained in designs composed of

these crossings. In making styles of this kind, the first work consists in mapping out the form of the design, and the second

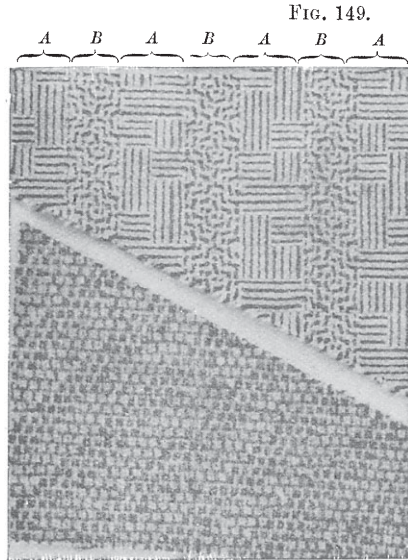


FIG. 149.

FIG. 152.

work in running the twills on to the ground and figured sections respectively. Fig. 149 is a pattern partially constructed from these weaves. Stripes *A* are a composition of warp and weft twills. The reduced design and the draft for the same are furnished in Figs. 150 and 151. From these it will be evident that it is the transition from warp to weft twill which gives the results lettered *A* and *B* in the illustration taken from the woven fabric.

Many types of figuring, whether floral or geometrical in arrangement, can be developed on this system.

There is another mode of colouring this design besides that considered. It consists in employing three shades in single threads, but as it is somewhat more intricate than the two-and-one system, and yields a similar pattern, it is not so extensively employed.

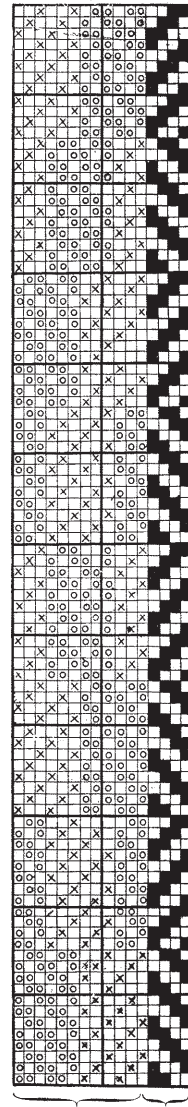


FIG. 150.

180. *Drafted Designs composed of Two Four-Shaft Weaves.*  
 —These obtain in greater diversity than designs resulting from three-shaft weaves. This is owing to the considerable series of makes of twill and mat types producible on four shafts, enlarg-

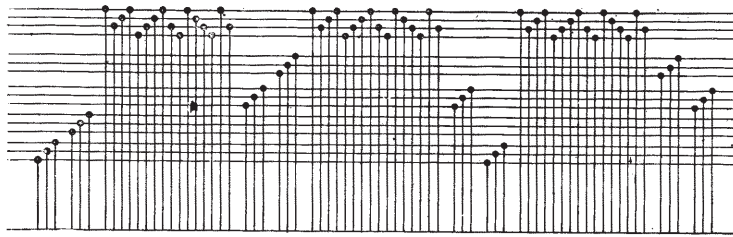


FIG. 151.

ing the scope for the origination of all classes of combination styles. Various illustrations in these designs will be examined, and the principles of colouring them explained. First, the pattern, Fig. 152, may be referred to.

It has been obtained in the design and draft supplied in Figs. 153 and 154. Strictly speaking, it is composed of only one weave, which, to gain variety of effect, is twilled in two directions. It will be observed, if any of the sections are analyzed, that every other pick of this weave is plain. This accounts for the effect seen in the fabric in Fig. 152. The arrangement of the shades is one-and-one, so that one weave here being the reverse of the other, while the parts developed in ■'s are forming one textural type, the parts developed in □'s are yielding a second type. It is the plain

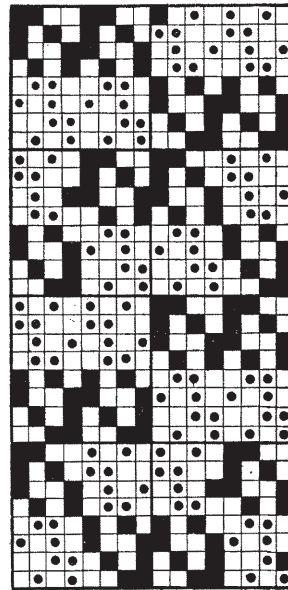


FIG. 153.

picks of the respective sections which constitute the minute skeleton squares of grey and black; the twill picks filling up the spaces formed by the grey with black, and those formed by the black with grey. This pattern may be developed in various



shades of fancy yarns ; and the two weaves may also be blended on such methods as to form stripe and check styles of several descriptions.

The fabric given in No. 1 on Plate XXIV. has some principles of construction common with the effect just described, inasmuch as the design employed in its manufacture is a composition of cassimere weave twilled to the right and left successively. Thus,

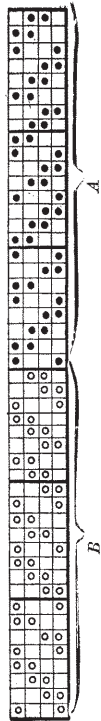


FIG. 155.

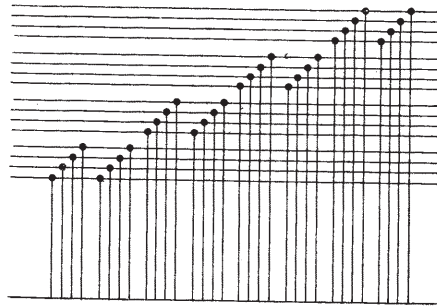


FIG. 154.

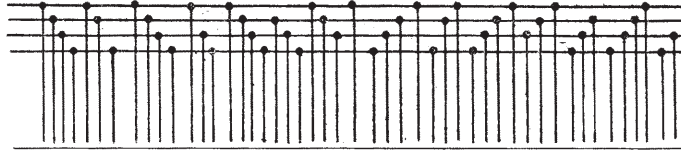
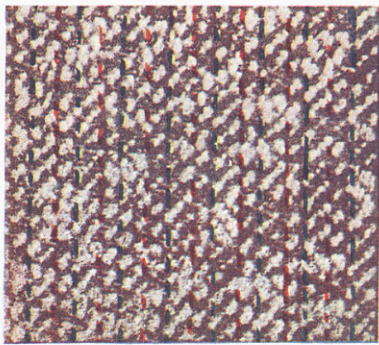


FIG. 156.

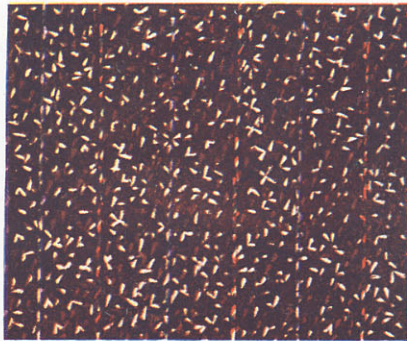
it results from the plan and draft given in Figs. 155 and 156 ; hence it is, in reality, a cassimere twill pattern, for this is the only weave used. But as it runs forward for six picks, and then starts again—this process being repeated throughout sections *A* and *B*, in which the weave twills in both directions—there is formed by the draft a check pattern, occupying forty-eight threads and picks, and in which the weave twills to the right in each alternate space of twenty-four threads. The order of colouring is somewhat intricate, being as appended :—



1



2



3

Plate XXIV

COLOURING OF DRAFTED STYLES

1. Weave Compound; Prunelle and  $\frac{2}{2}$  Twills
2. " "  $\frac{3}{1} \frac{1}{3}$  " " "
3. " " " " " " " Twist-warp Yarns

*Warp.*

- 2 threads of a dark shade.
- A. For 16 threads. { 2 " " light "  
                   { 2 " " dark "  
                   1 thread of a light "  
                   1 " " fancy "
- A. For 12 threads. { 2 threads of a dark "  
                   { 2 " " light "  
                   2 " " dark "  
                   4 " " light "  
                   2 " " dark "  
                   4 " " light "  
                   1 thread of a dark "  
                   1 " " light "  
                   1 " " fancy "  
                   4 threads of a light "  
                   1 thread of a fancy "  
                   1 " " light "  
                   1 " " dark "  
                   4 threads of a light "  
                   2 " " dark "  
                   4 " " light "  
                   2 " " dark "
- A. For 16 threads. { 2 " " light "  
                   { 2 " " dark "  
                   1 thread of a light "  
                   1 " " fancy "
- A. For 12 threads. { 2 threads of a dark "  
                   { 2 " " light "

*Weft.*

- For 21 picks. { 2 picks of a dark shade.  
                   { 1 pick of a light shade same as warp.  
                   2 picks of a dark shade.  
                   1 pick of a fancy "

There is a sort of broken or irregular shading produced by this arrangement, the construction of the design having an im-

portant effect on the grouping of shades. The particles of two-and-two colouring, which occur in brackets *A*, develop, in the weaves cutting each other, the waviness characterizing the coloured effects (Pattern 1, Plate XXIV.). The comparatively large patches of one group of yarns in the warp do not form a clear stripe in the fabric, because the system of wefting is irregular, being such, however, as to tally with the plan of changing the twilling of the weave on every sixth pick. The effect of the two-and-two order of shades in the warp in this drafted design shows the extent to which the construction of the plan of interlacing may modify the result of a simple order of shades.

181. *Style composed of Prunelle and Cassimere Twills.*—This is rather an irregular combination, but in the two-and-one system of colouring, if the weaves are skilfully adjusted, it is capable of producing a species of pattern rich in textural details. Referring, for example, to section *B* of Fig. 149, the effect of the cassimere twill worked into checks of sixteen threads and picks in this grouping of shades is given. It is a neat type of pattern, contrasting with the effects of the prunelle twills with which it is combined. The quantity of cassimere twill must not be large in combinations of this class, or a cloth lacking uniformity of structure will be produced. Further, the weaves require to be correctly fitted together, or a fabric possessing an irregular surface will ensue. It is a suitable scheme of weaves for dress fabrics. The arrangement is also adaptive, in small styles, to trousering and similar fabrics.

182. *Combinations composed of two-, Six-, Seven-, Eight-, and Nine-Shaft Weaves.*—There are several varieties of patterns obtained in designs containing six-end makes. As a rule the twill is the principal weave. One example in which the hopsack and a fancy crossing are combined may, however, be described, as it is an interesting and typical specimen of the general range of patterns obtained in this class of weaves. This style is sketched in Fig. 157, while the design producing it is a composition of the two makes in Fig. 158. The method of colouring is three threads of white and six threads of black in both warp and weft. In the mat sections the minute figures

are formed, but the intermingled checking is a consequence of the weave marked in full squares in Fig. 158. These two crossings are combinable in figured arrangements suitable for costumes and dressing-gowns. In soft colours, brightened at intervals by a few fancy threads, this compound of weaves and scheme of colouring are capable of yielding a series of fancy fabrics. By changing the mat to twill, quite a distinct species of pattern is obtained. Both weaves now yield check effects, but

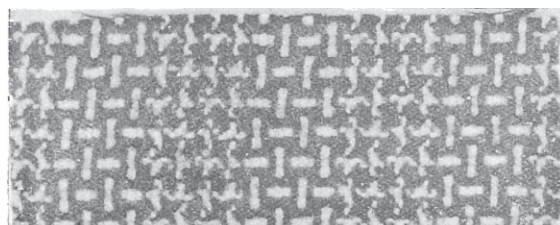


FIG. 157.

the type of effect resulting from the twill is uniform and regular in appearance. Some neat figured and check designs are also obtained in six-shaft makes by employing the twill for the ground of the texture, and small weaves which may be readily combined with it, and colouring on the three-one's, two-three's, and three-two's systems.

The variety of styles workable in seven-shaft crossings is somewhat limited. Such weaves as the corkscrew and twill, and the upright twill and small diagonals, are blended here.

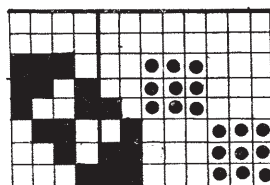


FIG. 158.

In combinations containing a large portion of corkscrew, the one-and-one method of colouring is appropriate, particularly if the make is of a common twill construction. The five-and-two, four-and-three, and six-and-one groupings of shades are useful in designs in which an ordinary seven-shaft twill forms the bulk of the texture.

Eight-thread weave combinations comprise the largest variety of styles. Designs composed of several classes of twills, of simple, twilled, and fancy mats, of minute diagonals, and small

figured types, are all colourable on the Simple and Compound systems of blending shades containing four and eight threads.

Nine-shaft compounds, consisting of weaves about equally balanced as to warp and weft floats, are principally developed in the following groupings:—

I.	II.
5 threads of a dark shade.	7 threads of a dark shade.
4 „ „ medium „	2 „ „ medium „
III.	IV.
3 threads of a dark shade.	4 threads of a dark shade.
3 „ „ medium „	3 „ „ medium „
3 „ „ light „	2 „ „ light „

183. *Drafted Designs composed of Three or more Weaves.*—Four-, five-, six-, and eight-shaft weaves are all used in the construction of these designs, belonging to the second group, but such styles generally consist of four-end makes. For fine textures, and for fabrics in which a broad cast of pattern is required, weaves occupying a larger number of threads are employed. It will, however, be sufficient if illustrations are considered in designs composed of the four-thread weaves. These are given in Nos. 2 and 3 on Plate XXIV. They are taken from woollen textures. The colourings are as follows:—

PATTERN I.

*Warp.*

2 threads of white.  
 1 thread of black and scarlet.  
 2 threads of white.  
 1 thread of black and green.  
 2 threads of white.  
 1 thread of black and white.

*Weft.*

Medium grey.

PATTERN II.

*Warp.*

For 9 threads. { 1 thread of black and brown.  
 1 „ brown and white.  
 1 „ scarlet and green.  
 For 9 threads. { 1 „ brown and white.  
 1 „ black and brown.  
 1 „ blue and green.

*Weft.*

1 pick of black.  
 1 „ black and white twist.

Referring to the draft (Fig. 159), and the reduced design for Pattern 2 (Fig. 160), these are arranged to form the same series

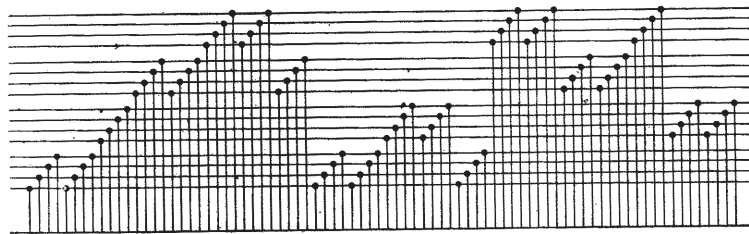


FIG. 159.

of interlacings on each thread, which ensures the construction of a regularly-built fabric.

It will be noticed that both plans of colouring are irregular, the first scheme containing nine, and the second scheme twenty threads. Now as the weaves forming the designs are on four shafts, the fancy yarns fall on different threads of the respective makes in different parts of the figuring. In this way a blended effect is acquired. The bulk of the first warp being white, and the weft of a medium shade, the weave details are clearly seen. The three makes, comprising the design (Fig. 160), are all traceable. The small spaces of white are due to the twill marked in crosses; the spaces of slate to the twill marked in full squares; and the spaces of slate and white, equally mixed, to the cassimere twill which forms the ground of the design. When the warp consists of broad bands of neatly contrasting shades, this type of

weave-combination gives excellent results in dress and mantling fabrics.

Pattern 3, Plate XXIV., though produced in the same draft and composed of similar weaves as Pattern 2, is very different from it in appearance and composition. It forms a type of granite mixture. The colours being arranged practically on the one-and-one system throughout the fabric, the effects of the various crossings are partially subdued. Cheviot yarns and medium counts of worsteds are adapted for this type of intermingled pattern in fancy costume fabrics.

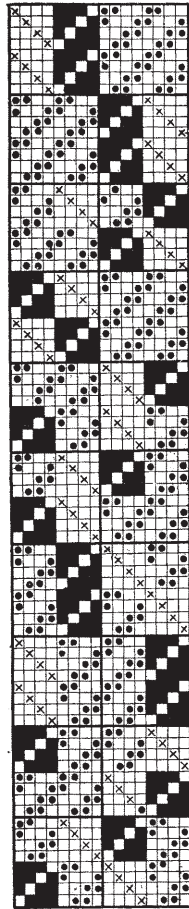


FIG. 160.

184. *Fancy Stripe Combinations.*—Designs of this class for worsted trouserings, cotton textures, and tweed mantlings, may be intricate in both weave and colour composition. Indeed, it follows as a natural sequence that if a striped design is well diversified in weave arrangement, it will be correspondingly complex in colouring. Not only in a weave, but in a textural and colour relation, is there intricacy of technical contrivance in these fabrics. First, a uniform texture is indispensable; second, this quality must be obtained in conjunction with novel weave effects; and, third, the arrangement of colouring must be harmonious in shading and in accordance with the structure of the weaves combined.

185. *Irregular Woollen Weave Combinations.*—A compound of crossings, forming a style of design specially suitable for woollen yarns, is supplied in Fig. 161. Whether produced in fine or medium yarns for dress or cloaking fabrics, it forms an effective pattern. It is workable on fourteen healds, the plan of drafting being as follows: Threads 1 to 14 straight drawn, then shafts 6, 5, 4, 3, 2, 1, 7, 8, 14, 13, 12, 11, 10, and 9. Should this method of drafting be adopted, Parts *A* and *B*



would constitute the reduced plan. Though the design contains fourteen distinct threads, it is, nevertheless, merely a modification of the first seven ends. These form a species of diagonal weave suitable for worsted coatings.

The arrangement of this pattern may be divided into four sections. Parts *C* and *D* have the diagonal moving to the right, and parts *A* and *B* to the left. The manner in which each diagonal commences and terminates is the chief characteristic of the pattern, and is illustrative of a method of combining this type of weave that may be followed out with satisfactory results. For dress

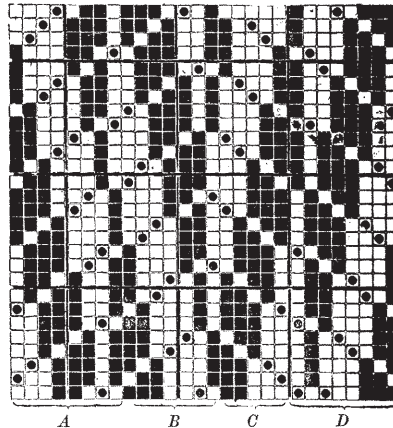


FIG. 161.

materials the following weaving particulars are appropriate :—

*Warp.*

- 1 thread of fine black and white twist.
- 5 threads of medium grey.
- 1 thread of fine black and white twist.

*Weft.*

All dark grey.

Little variety of colouring is needed; a light shade of warp and a medium shade of weft are sufficient to give due precision and proper development to the various features of this design.

186. *Cotton Stripes*.—These have frequently a plain ground, and belong to the third group of drafted designs. The figuring is developed in warp and weft flushes neatly grouped in diamonds, twills, and fancy mats. An example of these designs is Fig. 162—a compound weavable on twelve shafts. It consists of bands of plain weave, warp rib, and wave effect. Section *A* consists of objects of the same shape and dimensions developed in both warp and weft floats. Thus, while the figure marked in solid squares would, in the fabric, be composed of weft flushes,

the part marked in crosses would consist of floats of warp; hence, providing the warp is light in shade, and the weft of an intermediate colour, these figures would be of distinct

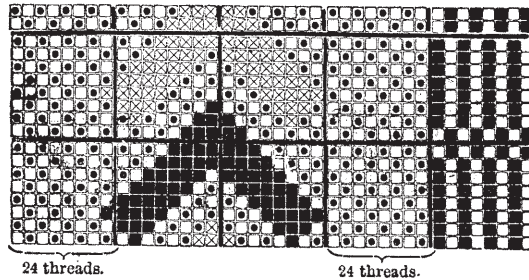


FIG. 162.

hues. The following scheme is illustrative of the methods generally adopted:—

*Warp.*

	2 threads of lavender.	
	4 „ white.	
	2 „ lavender.	
	4 „ white.	
	2 „ lavender.	
	4 „ white.	
	2 „ lavender.	
	16 „ white.	
	2 „ lavender.	
For	{ 4 „ white.	
18 threads.		2 „ lavender.
		8 „ bright blue.

*Weft.*

All lavender.

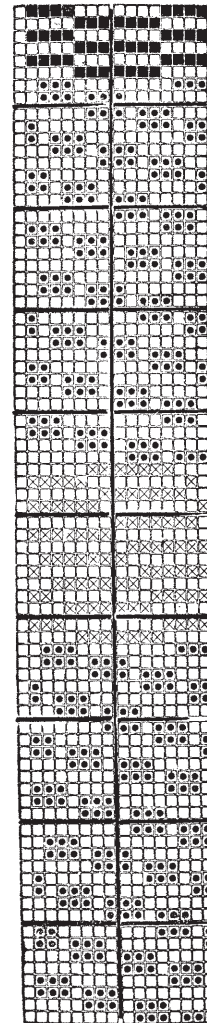


FIG. 163.

According to this arrangement of colours the rib section would consist of furrows of bright blue and lavender, while the bands of plain would be divided into stripes of solid lavender of two threads each, and of mixture stripes of white and lavender of two and four threads in width. As to the Section A, the effect in warp flushes would be solid white on a ground of

lavender and white; whereas the effect in weft floats would be solid lavender on the same mixture ground. This order of colours, but in different shades, such as pink and white, slate and white, and salmon and white, also develops well. In these latter shades, bright and pale pinks, and salmon and a deep and pale slate, are requisite to obtain the proper gradation of tinting.

187. *Colouring of Designs containing several Weaves of Varied Structures.*—Three typical illustrations in the methods of introducing fancy shades into this sort of compound designs may be considered. They are given in Figs. 163, 164, and 165. These examples show how full of weave effect, styles of this class may be. Thus, in the first design, Fig. 163, which is composed of three weaves, there are four distinct stripes, consisting of fancy mat weave, corkscrew, and rib respectively. An effective method of colouring such a compound is as follows:—

	10 threads of light mixture.
	10    "    medium mixture.
	10    "    light mixture.
For	{ 1 thread of light mixture.
15 ends.	{ 1    "    medium mixture.
	10 threads of light mixture.
	10    "    medium mixture.
	10    "    light mixture.
	2    "    medium blue silk.
	2    "    white silk.
	2    "    medium blue silk.

According to this system of colours, the rib section consists of medium blue and white silk, the bands of fancy mat of stripes of light and medium mixture yarns, and the section of corkscrew, being warped thread and thread, consists of diagonals of the two shades of yarns employed.

Fig. 164 is a composition of vertical and oblique twills, with a strong contrast in the weave effect. The make marked in  $\boxplus$ 's forms an oblique twill, of about the same degree as the upright twill yielded by the crossing developed in solid marks. In combination, the weaves, though dissimilar in woven results,

produce a uniform texture. The following is an appropriate scheme of colouring:—

	8 threads of blue.
	3    "    slate.
	2    "    brown and white.
	3    "    slate.
	8    "    blue.
	8    "    brown.
Repeat	{ 1 thread of brown.
	{ 1    "    black and crimson.
	{ 1    "    brown.
	{ 1    "    black and green.
	8 threads of brown.

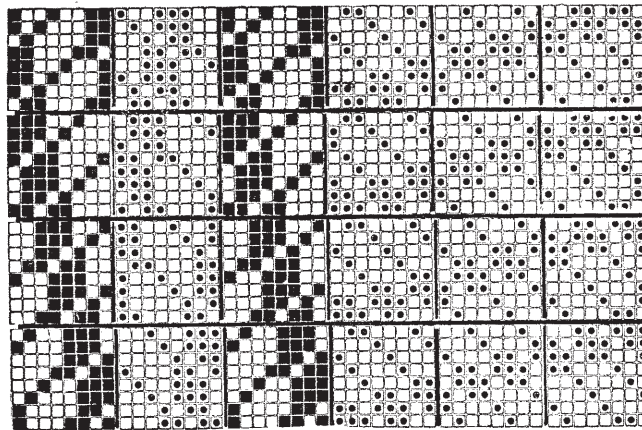


FIG. 164.

The centre of the large band of twenty-four threads is thus neatly tinted with fancy twist threads; while the diagonals developed in ■'s are composed of the blue, the same diagonal, when twilling to the right, consists mainly of slate, with a fine line of brown and white twist down the centre. There is, therefore, not only in this arrangement an apt grouping of shades in a colour sense, but the plan of adjustment produces a form of stripe in keeping with the construction of the design.

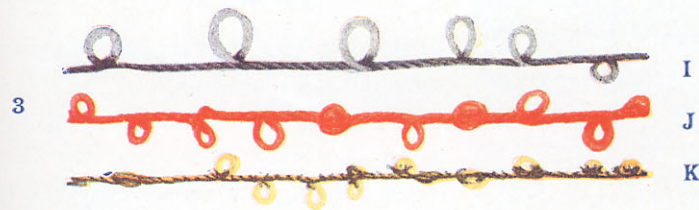
The subsequent three-weave stripe—Fig. 165—is composed of an uncommon set of crossings, namely, of sixteen-shaft twilled



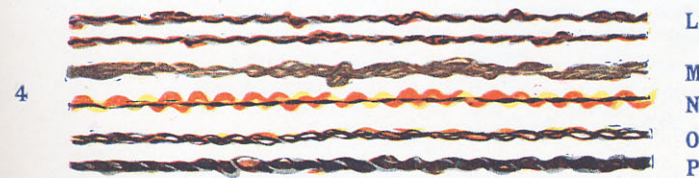
A  
B  
C



D  
E  
F  
G  
H



I  
J  
K



L  
M  
N  
O  
P

Plate XXV

FANCY YARNS

1. Ordinary Folded, or Two-Ply and Three-Ply Yarns
2. Flakes and Cloud Twists
3. Curl Twists
4. Gimp ..

hopsack, of an eight-shaft diagonal, and of a fine warp cord. The threads making the cord section ought to be on a separate beam.

A good system of introducing colour here consists in shading

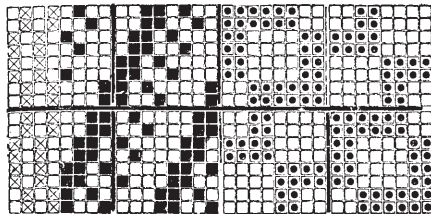


FIG. 165.

the diagonal with colour, as indicated in the plan of working given below :—

- 16 threads of slatish green.
- 4 „ light brown.
- 4 „ medium brown.
- 4 „ dark brown.
- 4 „ white silk.

The depth of the brown and the slatish green must be about the same; if anything, the latter should be the darker.

It is not unusual in these designs to employ bright shades of silk for weaves of a rib class, which are so constructed as to show the characteristic qualities of yarns of this material. Moreover, it is almost a general rule to apply the brightest colours to those sections of the design composed of warp cord crossings.

Fig. 166 is a worsted trousering style, and is composed of four weaves, namely, a warp wave, corkscrew warp flushed, corkscrew weft flushed, and of fine twill. But it is not merely the variety of crossings which deserves notice, but also the arrangement or plan of combination. On both sides of the warp wave are bands of weft twill, contrasting with not only the former weave, but the bold stripes of fine twill represented in dots. These latter bands are intervèned by

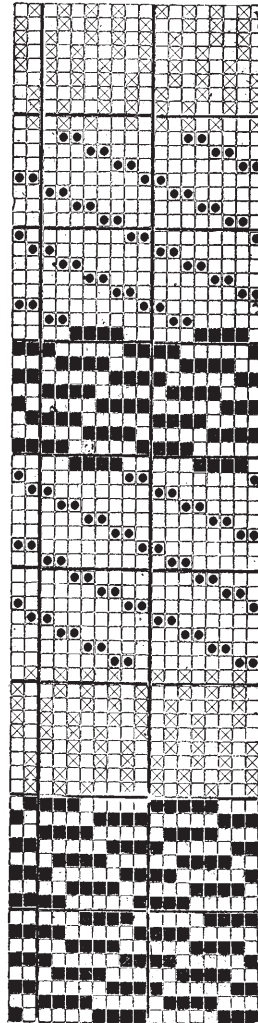


FIG. 166.

a line of nine-head corkscrew or round twill. The scheme of warp colouring should be such as to admit of the corkscrew sections being developed in fine worsted and silk twist. This can be effected by colouring as below:—

*Warp.*

For	{	1 thread of light brown mixture.
16 ends.	{	1     ,,     brown mixture.
		23 threads of blue mixture.
		10     ,,     fine worsted and white silk twist.
		23     ,,     blue mixture.

*Weft.*

All brown or blue mixture.

By this arrangement the bands of upright twill are developed in blue mixture, the warp wave in light brown and brown, and the corkscrew in silk twist threads. Should the weft be brown, the bands of weft twill marked in ☒'s would be of this shade.

188. *Figured Designs striped in the Warp.*—Designs of this type are chiefly workable in cotton and silk yarns. The idea is to obtain variety of colouring by the use of only one colour in the weft; therefore, the coloured style consists of some diversity of striping in the warp. For this purpose, the examples in fancy stripe colourings, Figs. 11 and 12, may be used. For instance, Fig. 167 (Design 167A) contains three weave effects, there being, first, the continuous line of figuring developed in ■'s, and second, the detached smaller figures in □'s, both being produced in weft, on a warp sateen ground. Underneath such figuring, stripe colouring may be arranged.

Two examples, based upon *C*, Fig. 11, and *D*, Fig. 12, are given. In order to fit carefully with the repeats of the design, the proportions of warp colouring in the former would be as follows:—

		18 threads of white.
Three	{	5     ,,     medium heliotrope.
times	{	5     ,,     white.
		18     ,,     medium heliotrope.
Three	{	5     ,,     white.
times	{	5     ,,     medium heliotrope.



FIG. 167.

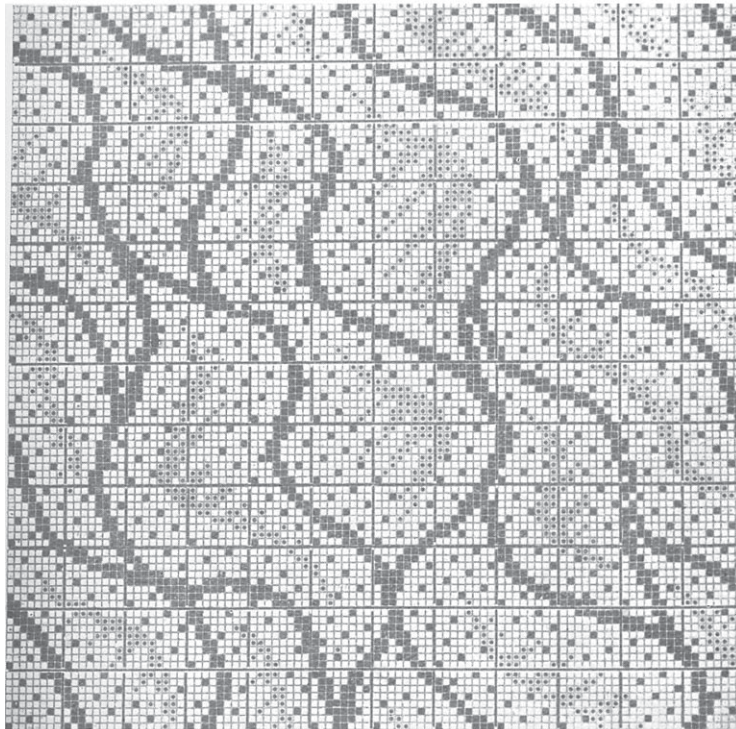


FIG. 167A.



If a dark heliotrope were used in the weft, then the figuring would be woven in such colour upon the striping of white and medium heliotrope.

The design may also be woven in a stripe of a three-colour class. If *D*, Fig. 12, were used, suitable proportions of colours would be:—

40 threads of white.	8 threads of white.
8 „ green.	8 „ pink.
8 „ white.	8 „ white.
8 „ pink.	8 „ green.

If two materials were used, say cotton in the warp and silk in the weft, then white silk would be suitable for the weft; but if the weft is cotton, then a light tone of heliotrope would form a pleasing contrast with the striping in the warp. It is a type of figured designing, economically coloured in the weft, but diversified both as to the degree of contrast of colour, and method of shade assortment or striping in the warp.

## CHAPTER XII.

### SPOTTED EFFECTS.

189. Varieties of Spotted Fabrics—190. Spots due to Specific Systems of Weaving—191. Swansdown Twill Spotted—192. Spots composed of  $\frac{3}{1}$  and  $\frac{1}{3}$  Twills—193. Weave-Spotting produced by both Floats of Warp and Weft—194. Irregular Spotted Stripes and Checks—195. Spots developed by single Extra Warp Threads—196. Fabrics Spotted with Single Picks of Weft—197. Mat Weaves Spotted—198. Corkscrew Weaves with Extra Spotting Picks—199. Spotted Diagonals—200. Warp and Weft Spots compared—201. Spotting in both Warp and Weft—202. Advantages of the Warp and Weft Methods of Spotting—203. Yarns used for Spotting—204. Spotted Effects in Ordinary Weaves—205. Application of Fancy Yarns to Compound Weaves.

189. *Varieties of Spotted Fabrics.*—Woollen, worsted, cotton, and linen fabrics are all more or less ornamented on the spotted principles of designing and colouring. In all cases, it is sought to distribute or arrange, on a tinted groundwork, a series of minute spots, which may be composed of either the same or of distinct shades from those used in the construction of the general surface of the fabric. When this species of pattern is developed in woollens and worsteds, the spotting consists of mere specks of colouring, resulting from the employment of a special scheme of interlacing the warp and weft yarns. Cotton and linen styles require bolder and clearer spots than woollens, and, as a rule, are fuller of effects. There are various points to be considered in the construction of these patterns, relating to the method of development, the plan of grouping, and the dimensions of the spots.

Respecting the method of development, this is subjective to the facilities at command. Thus, if the spotting can only be worked out in those yarns that constitute the ground of the texture, then it is more a matter of inventing a suitable scheme

of weave-design than of any specific process of colouring. But should a special series of warp threads be used for the spotting, then it becomes necessary to utilize both a particular type of weave and order of colours. Generally considered, spotted patterns are of four varieties, as follows:—

- I. Spots developed by the ordinary warp and weft of the fabric.
- II. Spots obtained by using an extra series of warp yarns.
- III. Spots obtained by using an extra series of weft yarns.
- IV. Spots obtained by using both an extra series of warp and weft yarns.

The first is the simplest class of spots. It is due to special

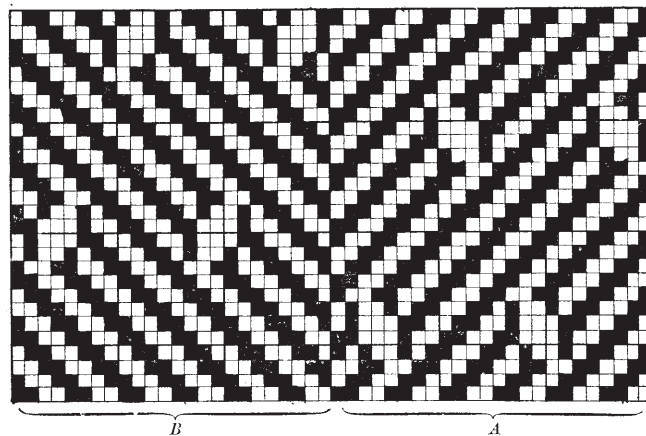


FIG. 168.

schemes of floating the warp, weft, or both these sets of yarns, at regular intervals in constructing the fabric; that is to say, if the construction of the texture were of the mat order, here and there the mat effect would be substituted by groups of warp and weft flushes, lending to the surface of the fabric a spotted aspect. This type of spotted weaving is largely practised in designing for various descriptions of fancy woollens, worsteds, and cottons. In the second, third, and fourth classes of these patterns extra groups of shades, entirely independent of those forming the ground of the texture, are employed. They allow of the production of more intricate effects than those developable by the first system, but are more difficult to manipulate in both weave and colour combinations. Ornamental styles coloured in

the warp for vestings, dresses, robes, and mantlings, also in the weft, and in both warp and weft, are but developments of these forms of weaving and shade-arrangements. Subsequent analyses of these textiles will demonstrate the affinity of the principles of their construction with those of the spotted designs now under consideration.

190. *Spots due to Specific Systems of Weaving.*—As these are purely a product of the plan of building the fabric, they may be designated Weave-Spots. Thus the design given in Fig. 168 would yield a spotted effect, however simple the system of colouring might be. The pattern resulting, Fig. 169, is an example. The shades in this texture are slate and white—the latter being the warp—and the effects consist of small white spots on a twilled surface. Of course in silk and worsted dress fabrics the spots are of various forms, and are arranged on geometrical bases; but in woollens small effects, as in the illustration, are the most appropriate. Still, the principles of this type of designing, whatever the form of the spot and the scheme of distribution, are the same, relating prim-



FIG. 169.

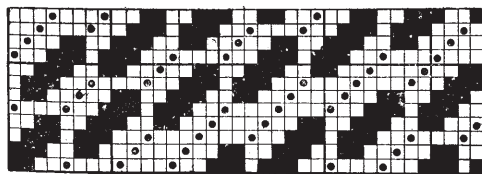


FIG. 170.

arily to a diversification of the plan of weaving. In Fig. 168 the twill is interrupted at certain periods, to allow of the formation of a spot composed of floats of warp yarn of some three threads in width and five picks in length. In Section *A* such spots lean to the right, and in Section *B* to the left, or in both parts of the style they run with the twill. It should be observed that, when modifying a common weave to develop spotted results, care must be exercised not to injure the general build of the fabric, for this is a factor that must always remain intact. As

to the size of the spot, it varies according to the fineness of the fabric and the nature of the pattern to which it is applied.

191. *Swansdown Twill Spotted*.—The spots in this instance are due to the weft yarn. They may consist of small diamonds, minute figures, and other forms, and be arranged in diagonals, twills, or on such a system as to constitute an irregular effect. For example, in Fig. 170 they run in oblique lines, and in Fig. 171 they compose a vertical diagonal. As a rule, the colouring of these styles is of a simple order, merely comprising the employment of neatly - contrasting shades. If any additional shade - effects, besides those yielded by the spots of weft yarn, are required, fancy yarns are introduced into the warp to a limited extent. Take an illustration in colouring Fig. 170,

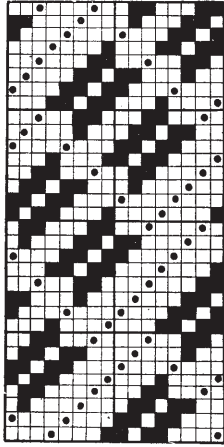


FIG. 171.

in which the yarns are combined to form a striped pattern for cotton dresses:—

<i>Warp.</i>	<i>Weft.</i>
26 threads of medium blue.	All bright medium brown.
2 „ „ slate.	
2 „ „ medium blue.	
2 „ „ white.	
2 „ „ medium blue.	
2 „ „ slate.	

This arrangement gives a pattern consisting of a bold band of medium blue, succeeded by fine lines of slate and white ornamented with spots of bright brown on a warp-twill ground. Now consider Fig. 171 in relation to worsted dress goods. Taking the warp to be a light fawn shade and the weft brown, again a texture results with a twilled surface, but in this instance the ground parts are fawn spotted with brown. It will be apparent from these illustrations that in designs of this class but a small variety of colouring is needed, and that the fancy shades are usually worked into the warp, while the weft, in

order to afford uniform emphasis to the spotting, is of one shade throughout the texture.

192. *Spots composed of  $\frac{3}{1}$  and  $\frac{1}{3}$  Twills.*—The main elements of these styles are the irregular character of the spotting, the uniformity of the weft floats—these never covering more than three threads in succession—and the clearness of the patterns when shades forming a strong contrast are used for warp and weft. They form an extensive series of weave combinations, and examples are given in Figs. 172, 173, 174, 175, and 176. What-

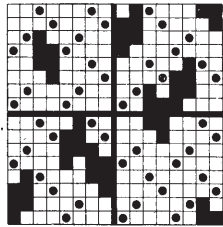


FIG. 172.

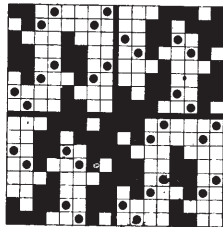


FIG. 174.

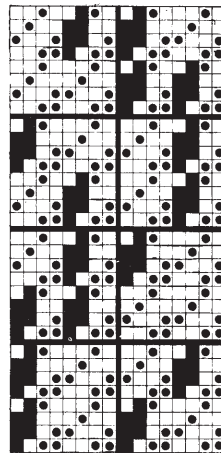


FIG. 173.

ever the weft yarn employed in the manufacture of these textiles, it constitutes, as in the preceding styles, the spotting, while the warp yarns tint the ground of the fabric. Though in these designs the spots generally appear to be irregularly arranged, still, on closer examination, it will be obvious that in the planning of each weave well-defined principles of textural composition are observed. Thus, in Fig. 172 each thread is depressed six times in each repeat of the design; in Fig. 173 sixteen times; and in Figs 174 and 175 eight times. Here, therefore, is one element of uniformity of structure denoting the designing principles in these weaves. This uniformity of interlacing extends to the picks also, hence the designs are essentially

regular in construction, and, with the exception of Fig. 172, yield patterns in which the flushes of warp and weft are equally balanced. It is needless to observe that this is an all-important

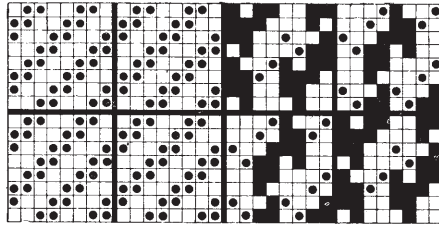


FIG. 175.

characteristic in the build of spotted combinations.

Respecting the schemes of colouring practised here, they are so various that only a few of them may be indicated. First, suppose

Fig. 172 were woven in a brown and white twist warp, and crossed with black, slate, or blue weft. The pattern resulting from this arrangement would consist of a brown and white twist ground spotted with minute spots of different shapes of black, slate, or blue, according to the weft yarn used. Fig. 173 produces a more regular

cast of pattern than the preceding style. Here an appropriate method of colouring in the warp is two-and-two, while the weft again should be one solid shade. For example, let the warp be 2 threads of slate and 2 threads of medium blue and white twist, and the weft brown, then the pattern would consist of some diversity

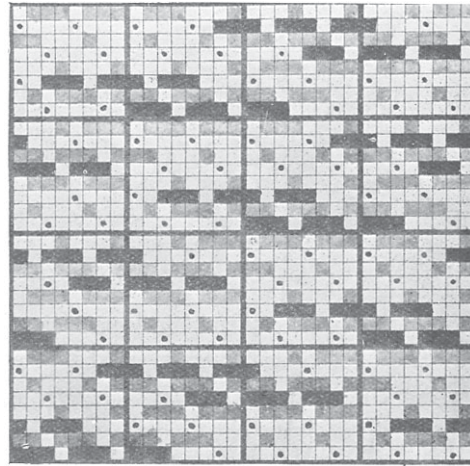
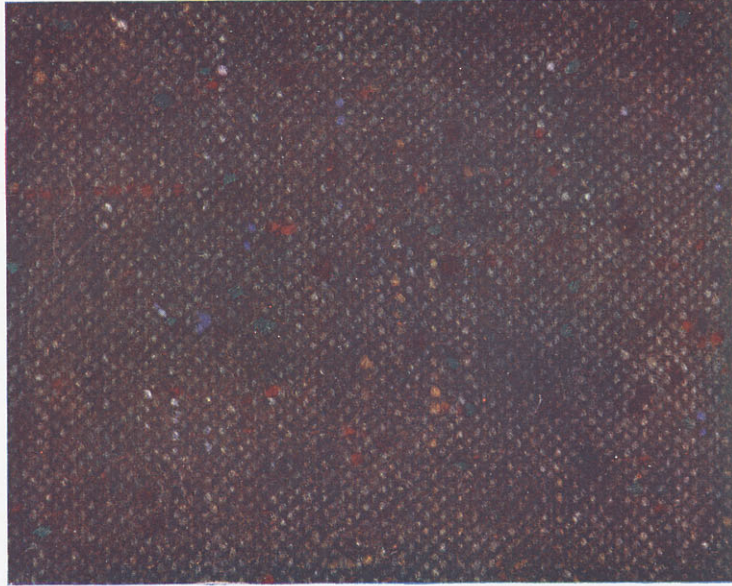


FIG. 176.

of tinting. It is only furnished as an illustration in shade-arrangement, and ought, in practice, to be considerably varied; a fabric would result possessing a brown, slate, and medium blue and white twist ground, spotted with small patches of twist threads and of brown.

A still more irregular plan is given in Fig. 174, by which a



1



2

Plate XXVI  
FANCY YARN COLOURINGS  
1. Donegal Tweed  
2. Compound Weave Worsted



marked intermingled effect is acquired. The warp and weft shades used in this design should slightly contrast, but produce a soft mellow colouring. The pattern may be striped in the warp, 16 threads of medium grey, and 16 threads of light grey, and woven with blue weft.

The shade of blue used should form exactly the same depth of contrast with the light as with the medium grey.

Fig. 175 is of the striped order, for the spotted effect is here combined with a band of sixteen threads of cassimere twill. Any simple method of colouring the twilled section may be practised, because if the scheme of colouring is too elaborate it does not contrast well with the shades forming the latter part of the design. Such a scheme as the one appended is typical of what is usually applied in this class of effects:—

*Warp.*

- 1 thread of black and grey twist.
- 1 „ black and green twist.
- 2 threads of black and grey twist.
- 2 „ brown.
- 1 thread of black and green twist.
- 2 threads of black and grey twist.
- 1 thread of black and green twist.
- 2 threads of brown.
- 2 „ black and grey twist.
- 1 thread of black and green twist.
- 1 „ black and grey twist.
- 16 threads of brown.

*Weft.*

Blue.

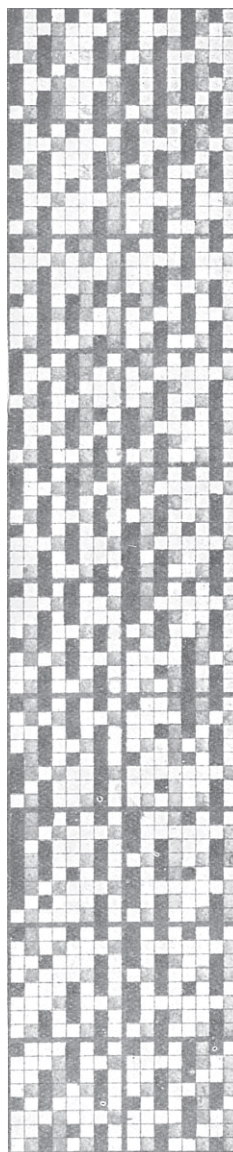


FIG. 177.

The former, or twilled part of the style, would thus be striped with lines of colour, while the latter part of the design would

be developed in brown and blue, the brown shade composing the ground, and the blue the figured or spotted appearance.

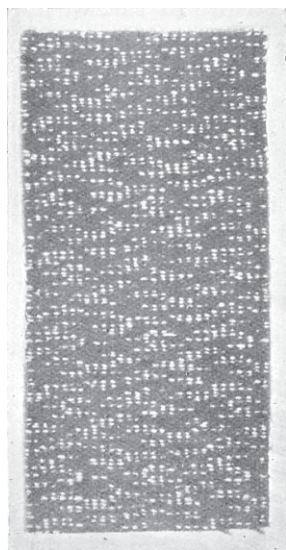


FIG. 177A.

Figs. 176 and 177 are examples in the methods of colouring such weave compounds in the weft, the weaves being grouped to form types of broken figuring. Both patterns are wefted one-and-one, but two-and-two and irregular weftings are also practised, the warp being, in each case, of one shade, but contrasting in colour with the shades used in the weft. Fig. 177 gives the effect seen in Fig. 177A, the warp of which is cotton and the weft fine woollen. Another feature of Fig. 177 is that the floats of weft are increased in order to produce an additional effect in the fabric. This principle of designing and colouring

is applicable to fabrics of a figured character, and may be developed in dress, vesting, and fancy cotton textures.

193. *Weave - Spotting produced by both Floats of Warp and Weft.*—A more elaborate and interesting species of patterns results from this plan of spotting than from that of producing the spots by the warp or weft separately. All the shades entering into the texture now assist in the development of the spotted effects—an element of the designs which increases the diversity of

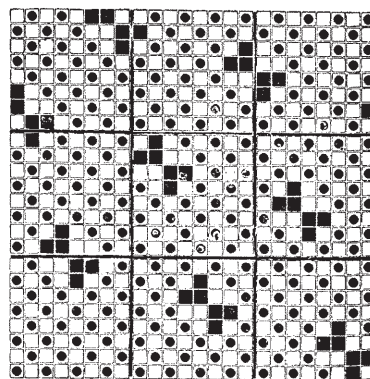


FIG. 178.

colouring and pattern formation feasible. Three very distinct specimens of this scheme of spotting are Figs. 178, 179, and 180. Considering Fig. 178 first, it has a plain ground, the spots being arranged on an eight-shaft sateen base. Such a

design may be coloured on two methods—the warp and weft may be of distinct or of the same shades. Supposing, therefore, that in the first place the warp is of one colour only, such as brown mixture and crossed with blue mixture, then the mingled effects due to the plain ground would be enhanced by the specks of these colours resulting from the spots in the weave marked

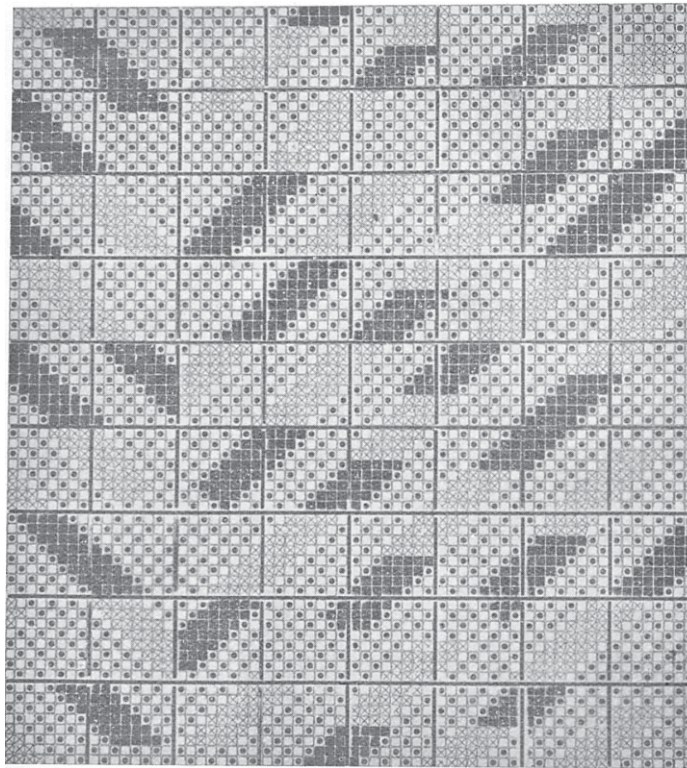


FIG. 179.

□'s and ⊠'s=warp.      □'s and ■'s=weft.

in full squares. By adopting, in the second instance, the thread-and-thread system of colouring in both warp and weft, a still more diversified style would ensue. In such a case the ground of the fabric consists of vertical lines with slightly indistinct spots at regular intervals. For fabrics in which clear effects are requisite this latter system of colouring is the most appropriate, but in goods where mingled colouring is required the former



while the spots developed in ■'s consist of medium grey weft; but as the groundwork of the pattern is a compound of small dark and medium grey checks alternating, the spots would not be pronounced. Another useful method of colouring is as follows:—

<i>Warp.</i>	<i>Weft.</i>
12 threads of brown mixture.	Blue mixture.
1 thread of black and blue twist.	
1 „ black and crimson twist.	
2 threads of brown mixture.	
1 thread of black and crimson twist.	
1 „ black and blue twist.	
6 threads of brown mixture.	

In this instance, the spots marked in the design in ☒'s would, in the texture, be brown mixture, and those in ■'s blue. This arrangement of spotted pattern is also coloured on such principles as to form mixture, check, and other styles.

194. *Irregular Spotted Stripes and Checks.*—These styles constitute a further important type of weave-spotting. Designs constructed on this base are compounds of three weaves. Generally the ground weave is common twill, but it may be also mat or any other crossing which combines well with the twills employed in forming the spotted lines. If the weaves are of the four-shaft class they are generally those combined in Fig. 181. This pattern (see Fig. 182) is a spotted check. The fine warp and weft lines running transversely and longitudinally in the fabrics are of similar dimensions. Thus the effects formed by threads *A* exactly correspond to those formed by picks *A*<sup>1</sup>. In both instances there is one small weft and warp line, and one large weft and warp line. It is a rule for each spotting thread and pick in these designs to be of the same interlacings.

If Fig. 181 is woven in a white warp and dark weft the cassimere twill sections would be a mixture of brown and white twills, while the surface of the texture would be dotted with lines of the respective shades, so grouped as to form indefinite rectangular figuring. Should the picks *A*<sup>1</sup> be changed to common twill, the spotting would only be lengthways of the fabric,

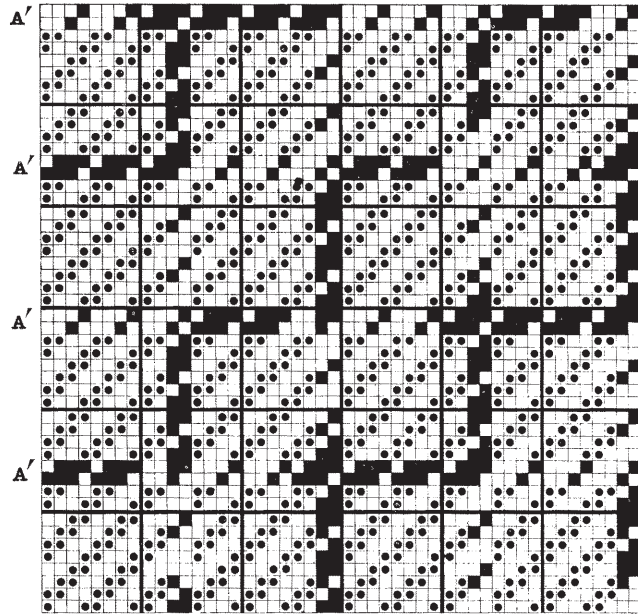


FIG. 181.

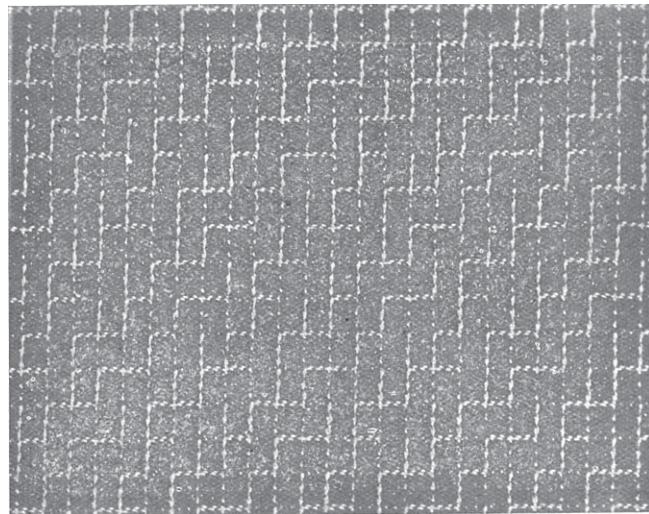


FIG. 182.

illustrating the principle on which the spots are made to produce striped patterns.

There are several methods of colouring practised in this build of design. Firstly, the spotting threads and picks are alone fancy yarns, the intervening threads and picks being composed of solid colours, thus:—

*Warp.*

10 threads of medium grey.  
 1 thread of black and green twist.  
 1 „ black and orange twist.

*Weft.*

10 picks of dark grey.  
 1 pick of black and blue twist.  
 1 „ black and orange twist.

Secondly, the ground or common twill parts may consist of small checkings, and the spotting threads of bright shades. This scheme is worked out in fancy suitings and dress fabrics. A third arrangement comprises the use of cotton, silk, and worsted yarns, warping and wefting ten dark and two light, as in Fig. 182. This method is varied by using three or more colours for the spotting threads and picks, thus:—

*Warp.*

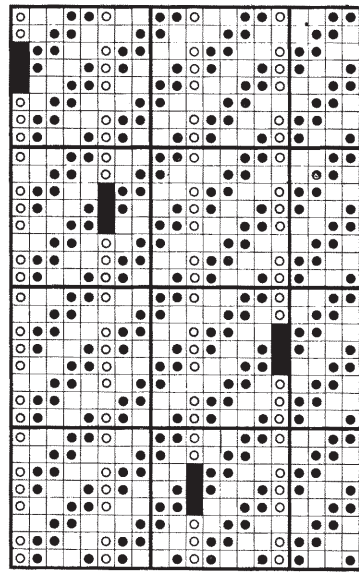
10 threads of white.  
 2 „ light blue.  
 10 „ white.  
 2 „ light brown.  
 10 „ white.  
 2 „ green.

*Weft.*

Same as warp.

195. *Spots developed by Single Extra Warp Threads.*— Patterns of this character are applicable to woollen, worsted, and cotton and silk textures. Differing in construction from the preceding examples, the system provides for the interlacings of a special series of fancy warp yarns in developing the spotted effects. These threads yield a pattern supplementary to that

resulting from the colourings forming the ground of the fabric, and from the twilled or other weaves used in the structure of the cloth. Any plan of weave or system of colouring may be adopted in producing the general foundation of the pattern; for the spotting is obtained by a distinct set of threads, and is controlled by a section of the weaving plan entirely independent of the design giving the cloth proper. As all spots got on this



For 8 threads. For 8 threads. For 8 threads. For 8 threads.  
 ○ = Spotting threads depressed. ● = Weft.  
 ■ = Spotting threads on face of fabric. □ = Warp.

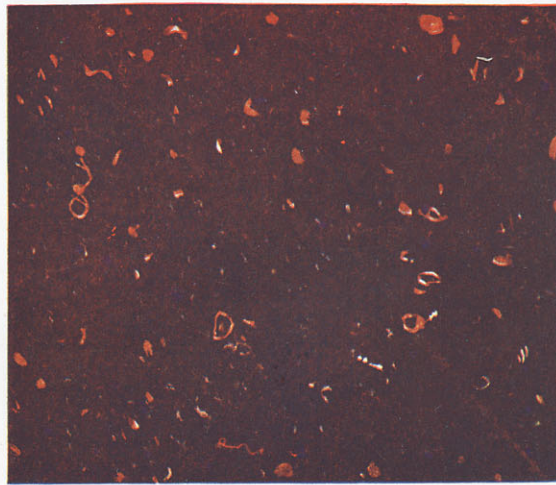
FIG. 183.

principle are due to the use of a regular yarn, and not to fancy twists of a knop, cloud, or spangle class, the fabric resultant is quite uniform in texture and smooth on the surface. This is a feature the weave method of spotting possesses over the yarn system. Threads of a knop type, though giving the requisite spot, yield a fabric more or less rough in appearance and handle, while the patterns, as regards the spotting, have no definite form or arrangement. On the other hand, in the weave system, the spots may be located or distributed over the face of the fabric according to the effect required. If desirable, the spotting may be arranged to form check, diamond, small figure, and other

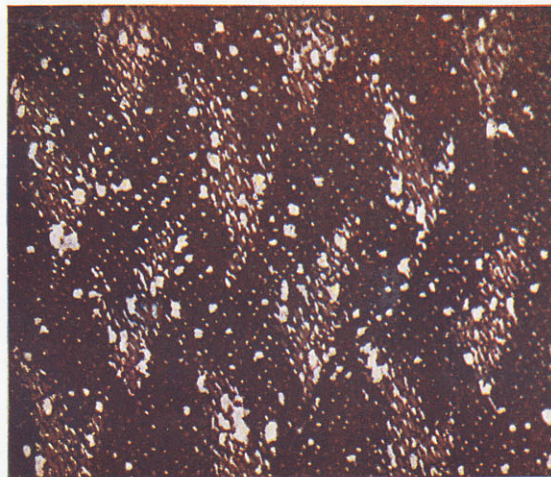
designs. Further, there is another difference between these two systems of introducing spots of bright colouring into woven pattern. When fancy twist yarns are used for spotting, the whole design, both ground and weave effects, results from the interlacing of these threads; whereas, in the weave arrangement, the spotting yarns do not constitute the groundwork of the texture, but merely add freshness to the pattern.

Fig. 183 is an illustration in this method of spotting. It will be observed that there are eight threads of twill to one thread of spotting. According to the patterns of warp which are given





1



2

Plate XXVII  
COLOURING WITH CURL AND KNOP YARNS  
1. Twill Weave  
2. Small Figure

below, the spotting yarns are much brighter in colour than those forming the ground of the fabric. This is the general rule. The spots appear on the face of the pattern in those positions in the design where they flush over three picks in succession, but run on the back of the texture in all other instances. The spotting ends are so controlled that the small specks of bright colouring they give are arranged on the four-shaft broken swansdown base, and hence are not only regularly distributed, but are also at equal distances from each other in the woven cloth. The groundwork of the pattern is simple in colouring, and forms a species of shaded check.

Two examples in colouring this design are appended :—

*I. Warp.*

1 thread of tan.  
 4 threads of black.  
 4 „ medium grey.  
 1 thread of blue.  
 4 threads of light grey.  
 4 „ black.  
 1 thread of scarlet.  
 4 threads of medium grey.  
 4 „ light grey.

*II. Warp.*

1 thread of green.  
 4 threads of black.  
 4 „ brown.  
 1 thread of lavender.  
 4 threads of medium brown.  
 4 „ black.  
 1 thread of orange.  
 4 threads of brown.  
 4 „ medium brown.

*I. Weft.*

4 picks of black.  
 4 „ medium grey.  
 4 „ light grey.

*II. Weft.*

4 picks of black.  
 4 „ brown.  
 4 „ medium brown.

196. *Fabrics Spotted by Single Picks of Weft.*—There are various methods of producing weft spots, but they may be grouped under two heads, thus: First, effects in which certain picks of the weave are removed and substituted by special picks that will bring the spotting yarns on to the face

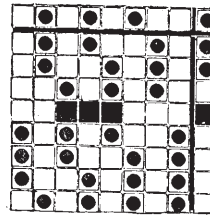


FIG. 184.

of the texture; second, effects in which a special series of spotting picks is employed. The latter system is the one most practised, because it gives the best results and the most uniform style. Fig. 184 is an illustration of the first method. It is a weave with a corkscrew-twill ground, the fifth pick of which has been

changed to the pick marked in squares, which brings the fancy silk pick on to the face. The warp is usually a solid or mixture shade, and the weft the same or a contrasting shade, with the spotting pick in bright colour.

197. *Mat Weaves Spotted*.—One of the most useful methods of spotting with weft is given in Fig. 185. The spotting picks, *A*, appear on the face of the fabric where the full squares are seen. They have been arranged on the eight-shaft sateen base, which ensures an even and regular distribution of the spots. The structure of the design is elementary. It only differs very slightly from the hopsack weave backed with weft. The solid squares ■, are the only features which cause it to possess a different structural appearance from the same weave when backed with the  $\begin{smallmatrix} 3 \\ 1 \end{smallmatrix}$  twill. These marks are, however, sufficient to produce the required spotted effect in the woven cloth, when fancy yarns are introduced into picks *A* of the pattern.

The following are two typical methods of colouring this class of weave. In the first system, the ground of the fabric is one solid colour, but in the second system, it is striped with twist yarns.

*I. Warp.*

Blue or slate mixture worsted.

*I. Weft.*

2 picks of blue or slate mixture worsted.

1 pick of silk, or worsted and silk twist.

*II. Warp.*

16 threads of brown.

1 thread of black and scarlet.

1 „ brown.

4 threads of black and lavender.

1 thread of brown.

1 „ black and scarlet.

*II. Weft.*

2 picks of black.

1 pick of black, blue, and white silk twist.

198. *Corkscrew Weaves with Extra Spotting Picks*.—The scheme of spotting given in Fig. 186 possesses one advantage over that in Fig. 184—the ground weave or crossing is kept intact. Any weave or combination of weaves may be employed for

forming the texture, and the spots may be distributed on any simple principle. If a fancy effect is required, special spots can be made to form diamond, check, and small figured patterns. The spots are somewhat more distinct than in the previous design, but in this example they have only been arranged to give a very minute dot in the fabric. Should a heavier texture be wanted than it is possible to produce by this single weave, a warp back, as in Fig. 187, may be added. In a single-make

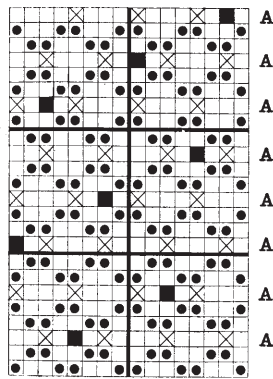


FIG. 185.

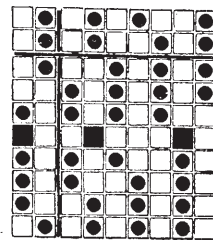


FIG. 186.

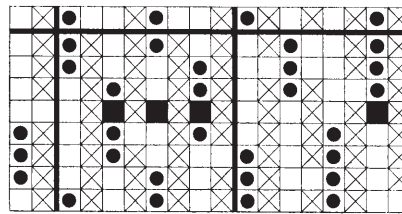


FIG. 187.

fabric it may be woven in one shade of warp and ground weft, with the spotting pick in bright colour.

199. *Spotted Diagonals*.—Fancy diagonals, as well as other types of fancy weaves, are frequently spotted with silk yarns, particularly in the construction of vesting patterns. An example in this class of designing is furnished in Fig. 188, which consists of a twenty-four shaft diagonal composed of corkscrew and ordinary twilled effects.

Here special picks have been inserted for developing the spot. Thus the picks *A*, marked in  $\boxtimes$ 's, produce the spotting. They form a broken twill pattern, two of the spots leaning to the left and two to the right. The weave comprises three distinct effects: first, a solid, compact warp twill; second, a similar twill of weft-flush; and, third, a furrow of corkscrew twill. The warp

colouring might be solid, but the weft should consist of one pick silk and of six picks of worsted.

200. *Warp and Weft Spots compared.*—Probably the method of developing spots by an extra series of warp threads is better adapted to woollens and cottons than to worsteds. In the last style of fabrics silk is the common material used for spotting purposes. Being fine and lustrous, it imparts richness of character to the woven fabric. For several reasons it is preferable to use extra picks in spotting worsteds. Thus the weft principle of spotting allows of considerable latitude for figured

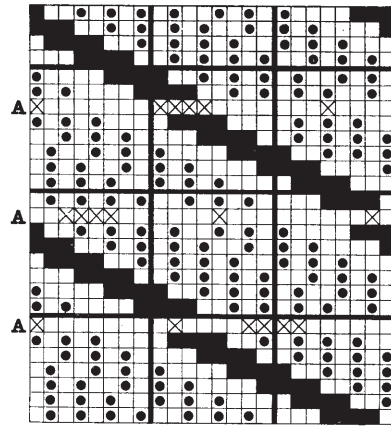


FIG. 188.

work and variety of pattern, and does not largely increase the cost of weaving, nor add materially to the complication of design construction. In spotting worsteds by the warp system with silk, an extra warp or chain beam is required, and an additional set of healds—which multiply the difficulties of the weaving process. Even when these increased facilities are requisitioned, the amount of figuring feasible is limited; whereas, by the weft method, the spot can be of any form or dimensions. On the other hand, the warp scheme is specially suitable for woollen effects of a tweed order in which colouring is the main element, and where the extra yarns form mere dots of colour on the surface of the texture. Each principle has therefore its specific place in textile designing.

201. *Spotting in both Warp and Weft.*—This principle of design combines the two preceding methods of spotting—making it feasible to spot the surface of the fabric both in the warp and weft. It follows that patterns fuller of effect and richer in spotting are producible by this system. There is, however, one disadvantage in the employment of this method of spotting—it adds to the intricacy of the weaving operation, for special threads and picks are necessary in the production of fabrics.

work and variety of pattern, and does not largely increase the cost of weaving, nor add materially to the complication of design construction. In spotting worsteds by the warp system with silk, an extra warp or chain beam is required, and an additional set of healds—which multiply the difficulties of the weaving process. Even when these increased facilities are requisitioned, the amount of figuring

The spotted twill, Fig. 189, illustrates the plan of arrangement. The twill or ground weave is, in designs of this class, continuous, and forms, independently of the spotting threads and picks, a perfect texture. Further, the spotting is so arranged that it does not interrupt the twilled effect. It is an additional and separate element of the design. When constructing such styles, the order and size of the spots are the two main points for consideration. The methods of grouping the spots are similar in both warp and weft; thus, if there are four threads of ground weave to one thread of spotting in the warp, there will be the same proportion of ground and spotting picks in the weft. Adherence to this rule results in the manufacture of a uniform pattern. Having decided upon the scheme of grouping, say five threads of ground to one thread of spotting, as in Fig. 189, proceed by marking out the spotting threads and picks on point paper in colour, next add the ground weave, and, lastly, determine the dimensions and order of the spots. As to the ground, it may consist of any well-planned assortment of twills, mats, or fancy weaves. With regard to the size of the spots, this varies according to the class of the texture being manufactured. For tweed fabrics, small effects are the neatest, but in some types of mantlings, in which the spotting yarn is mohair or lustre worsted, large, clear, and bold spots yield the best patterns. Worsteds, linens, and cottons, with silk or mercerized cotton yarns for spotting, are, as a rule, designed with minute, precise, and smart effects. Distribution of the spots is done on numerous systems, such forms of arrangement as the diamond, simple figures, and sateens being used. In

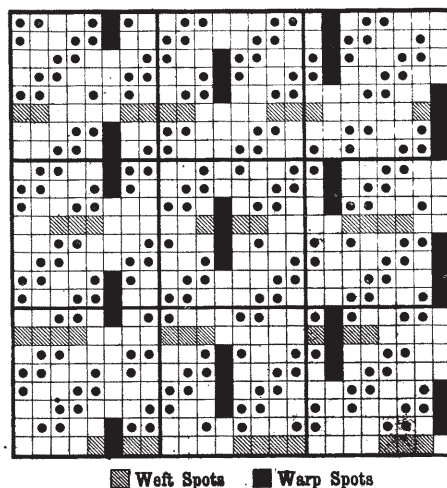


FIG. 189.

the example, Fig. 189, the spots are grouped on a broken-check base. Three methods of colouring this design require explanation.

#### I.—COLOURING FOR COTTONS.

\* *Warp and Weft.*

For { 1 thread of tan.  
5 threads. { 1 „ fawn.  
          1 thread of pale blue (spotting).  
For { 1 thread of fawn.  
5 threads. { 1 „ tan.  
          1 thread of rose pink.

#### II.—COLOURING FOR WORSTED SUITINGS.

\* *Warp and Weft.*

5 threads of dark blue mixture.  
1 thread of black worsted and green silk twist.  
5 threads of dark blue mixture.  
1 thread of black worsted and russet silk twist.

#### III.—COLOURING FOR WOOLLENS.

\* *Warp and Weft.*

4 threads of black.  
1 thread of dark blue.  
1 „ dark brown and green.  
3 threads of dark blue.  
2 „ black.  
1 thread of black and tan.  
2 threads of black.  
3 „ blue.  
1 thread of dark brown and green.  
1 „ dark blue.  
4 threads of black.  
1 thread of black and tan.  
4 threads of dark blue.  
1 thread of black.  
1 „ dark brown and green.

\* *In each case, the order of picking must correspond with the order of the spotting picks, in the designs.*

3 threads of black.  
 2 „ dark blue.  
 1 thread of black and tan.  
 2 threads of dark blue.  
 3 „ black.  
 1 thread of dark brown and green.  
 1 „ black.  
 4 threads of dark blue.  
 1 thread of black and tan.

In the first colouring, the ground of the fabric is a composition of tan and fawn grouped on the thread-and-thread system, the spotting yarns being pale blue and rose pink. The second scheme is for textures consisting of one solid shade in the ground; the surface of the fabric in this instance is dark blue mixture, having the check spotting produced by the weave—Fig. 189—in fancy worsted and silk twists. The third arrangement is a simple four-and-four check composed of black and blue, the spots falling in different parts of the checks. Should it be necessary to have the spotting always in the centre of the four threads, the construction of the design would have to be modified. Instead of the arrangement being five threads of ground to one thread of spotting, it would require to be four threads of ground to one thread of spotting.

202. *Advantages of the Warp and Weft Method of Spotting.*—In all fabrics in which spotting is the chief characteristic, the warp and weft principle of design construction is the most effective. Mantlings of a matelasse order, worsted dress textures, fancy cottons for vestings and quiltings, are all spotted by this method. Allowing, as it does, for the employment of a double series of spotting yarns, it yields patterns characterized by much diversity of tinting and intermingled effects. By causing the two sets of spotting threads to interlace with each other, and arranging for them to be of different colours, patterns full of textural details are produced. Still, for ordinary suiting fabrics either the warp or weft method is generally practised, because in these textiles the spotting yarns are only intended to dot the surface of the fabric with minute specks of bright colouring, and not to form decided patterns, as in mantling and dress styles.



203. *Yarns used for Spotting.*—The yarns used for spotting purposes are of various types. All classes of fancy threads, including knop yarns produced in carding, but single in construction, and twists or folded yarns of various types are used.

The first type is that employed in the production of Donegal tweeds, where the yarns are single, but coloured knops or specks are formed at intervals on the thread. These are due to distributing on the material, during carding, nebs of fibrous material of different colours, which enter into the condensed sliver and become part of the spun thread. By this method the position of the colour on the thread is not mechanically controlled, but the selection of the nebs of fibres used for spotting determines the harmony of colour result in the woven fabric. There must first be a suitable blend of ground colour obtained in the carding of the material, and this having been fixed, the strength and blend of colour for nepping purposes is arranged. No Donegal pattern would be satisfactory in colour quality—which is the chief design characteristic such fabrics possess — unless the nepping colours gave strength and character of contrast to the ground colouring, as seen in No. 1, Plate XXVI.

Some of the fancy and folded threads used for similar purposes as knop carded yarns, are those illustrated in Plate XXV., comprising 3-ply, cloud, knop produced in twisting, curl, and gimp yarns. Yarns *A*, *B*, and *C* are ordinary threefold twists, being composed thus: *A*, black and scarlet worsteds, and salmon silk; *B*, black and green worsteds, and salmon silk; *C*, black, russet, and orange. For spotted worsteds, there are few yarns so useful as this class of worsted and silk twists. Samples *D*, *E*, *F*, *G*, and *H* are cloud threads. They are chiefly used in fancy tweeds. As a rule, they are rich in colouring. Threads *D*, *E*, *G*, and *H* are analogous in construction, for they are all composed of four colours and have one thread, which may be termed the central or principal yarn, all other threads twisting or twining round it. The composition of these respective twists is as follows:—

*D.* Black for the central thread or shade, and crimson, green, and blue for the intermittent colours.

*E.* Grey for the central thread or shade, and scarlet, black, and tan for the intermittent colours.

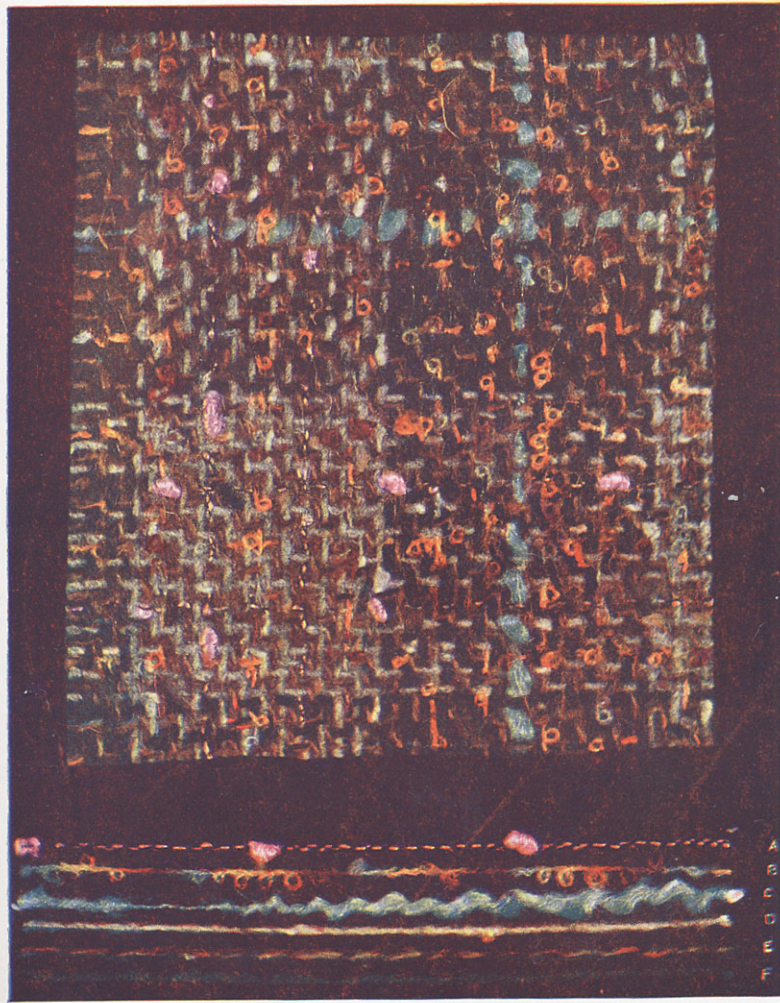


Plate XXVIII  
COSTUME COLOURING IN FANCY YARNS

*G.* Dark olive for the central thread or shade, and blue, yellow, and light olive for the intermittent colours.

*F.* Light drab for the central thread or shade, and black, scarlet, and tan for the intermittent colours.

Obviously, the result of using such yarns is to spot the surface of the texture with the various tints entering into their composition.

Threads *F*, being of several thicknesses, differ in construction from threads *D*, *E*, *G*, and *H*. Still, this type of thread gives effects in the fabric somewhat resembling those resulting from the yarns with which it is grouped, and is also designated a "cloud" or "flock." It is, however, less complex in colouring, and forms an elongated spot in the texture.

The curled yarns are illustrated in types *I*, *J*, and *K*. Three examples are given—slate, crimson, and fawn. The curls or loops are of different sizes. Such threads are applied to both woollen and worsted fabrics, but mainly to tweeds and fancy costumes. They give to the pattern a richly-tinted aspect. Some classes of trimmings may be made entirely of these threads, but their relation to spotted fabrics is here alone considered.

Gimp and knop twists are also employed largely in designs of a spot class. Five illustrations of these are given in samples *L*, *M*, *N*, *O*, and *P* on Plate XXV. These threads are generally only applied to the more fancy designs. Yarn *L* is a composition of three threads—black, blue, and tan. The black and blue form a two-ply twist to which the tan is added in the twisting operation. Small knops, causing the yarn to be somewhat irregular in thickness, are formed at intervals by the tan thread. Compound *M* is more irregular in colouring and construction. Loose in twine, and of various thickness, it gives a novel type of spot, but on account of the lack of adhesiveness in its composition it is a difficult thread to manipulate in weaving, and hence is but sparingly employed. Yarn *N* is a real gimp. Two black threads, well tensioned in twisting, have been combined with yellow and crimson threads of slack twist, and running loosely. Thread *O* is similarly constructed to *N*, only the gimp is not so prominent, owing to the several colours being more evenly tensioned during twisting. Compound *P* is a

combination of gimp and knop. Thus knops or buttons of tan colour—see *a*—are formed at intervals on the thread. Yarns *N*, *O*, and *P* are suitable twists for spotted goods of various descriptions.

204. *Spotted Effects in Ordinary Weaves.*—The several classes of spotted patterns analyzed have all resulted from the employment of special builds of weaves. There are, however, some important species of these effects obtained in designs constructed on the ordinary principles of intertexture, which are extensively developed in both plain and ornamental fabrics. Allusion will now be made to several types of these patterns. It may be observed that in producing the spotting in these styles the fancy twists described in the preceding paragraph are utilized. Pattern No. 1 on Plate XXVII. is a specimen of fancy tweed spotted by this method. The cloth is woven from a twelve-end twill, the weft being black, and the order of warping as appended:—

- 2 threads of dark blue.
- 1 thread of black and tan curl.
- 2 threads of dark brown.
- 1 thread of black, brown, and white small curl.
- 2 threads of dark grey.
- 1 thread of black and blue curl.

It is scarcely necessary to observe that the curled yarns are the main elements of this colouring, spotting the fabric with small loops of tan, blue, and white. Knop, cloud, and gimp threads are similarly introduced into fancy fabrics. The effect of the knop twist is seen in the next illustration—Pattern No. 2, Plate XXVII. The minute figuring is due to combining two broken crow weaves. It is a style of design for union mantlings, and is capable of being varied to an unlimited extent in both colouring and ornament. The warp is entirely composed of brown and white knop cotton twist. The dots of white noticed in the texture are a product of the warp yarns, and not of any peculiarity in the structure of the weave or design. Such an irregularly spotted combination as this sample is only producible by yarns of the knop and cloud kind.

A third example, full of colour elements, No. 1, Plate XXVIII., may be described. It has been designed for a fancy coloured costume in the plain weave, and is illustrative of the variety of effect producible by order of warping and wefting, and diversity of yarn structure in which hues, tints, and shades of colours are used. The yarns are of six varieties, *A*, *B*, *C*, *D*, *E*, and *F*, being composed of two or more colours, and all different in construction. *A* is a pronounced knop yarn; *B* a curl yarn, of four varieties of colour, namely, deep crimson, orange, pale orange, and green; *C* shows the difference in thickness and in wavy effect possible in gimp yarns; *D*, irregular twist with knops of fibres; *E* and *F*, more ordinary twists, slack and hard spun intermittently. These, when arranged as in the fabric to make a check pattern, with over-checking in green, make a groundwork of colour which can only be acquired in textiles by using diversity of yarn structure. Blending in the material, or distributing colour in the weave, as in the spotted designs, Nos. 168 to 180, all repeat the colour regularly or in a prescribed pattern; but when the yarns are so diversified in construction, the colours are, as seen in the fabric, not selected on any definite method.

205. *Application of Fancy Yarns to Compound Weaves.*—Only two examples need be considered here, as the character of the results is similar to that of those obtained in single weave fabrics; only by reversing the position of the threads in the warp and weft, a prescribed form of pattern, see Plate XXIX., may be produced. On this principle, any type of design, as to figure or form, may be constructed, but it will have the same varied tinting as single weave fabrics, in which similar yarns are used. In this design, fancy knops and other cotton twists have been used. These yarns give the spots of lavender, tan, and scarlet, which are regularly distributed throughout the pattern. It is a double-weave structure arranged one thread ground, one thread of fancy yarn, and one thread of ground.

A different example produced in worsted yarns, and worsted and cotton twists, is that given in No. 2, Plate XXVI. It is double in structure, arranged one thread ground, and one thread fancy yarn, and not two-and-one, as the style on Plate XXIX. The ground yarn is a single thread, forming the plain portions of the

fabric, the curled yarn being in dark crimson, heliotrope, orange, and pale orange. A certain simple outline of pattern is formed by reversing the face and backing yarns. It is a good blend of colour, in which there is contrast of hue between the heliotrope and orange, and contrast of tone between the crimson and heliotrope; but the chief characteristic is the diversity of colour surface due to the curl or loop twist yarns, and the way in which the colours in consequence of their arrangement are softened in quality.