schemes of checking. The example given—Fig. 22—only contains two sizes of checks, but such designs may be composed of a much larger series of different-sized squares. Here the plan of grouping is also elementary, including a set of eighteen small squares of black and white separated by similar-sized checks of white and black twilled, and also a number of large checks of black and white. The colourings are arranged as appended:—

4 threads of	black.	}	For
4 „	white.	}	24 threads.
8 „	black.		
8 „	white.		
8 „	black.		
4 „	white.		

In light shades and colours forming a mellow contrast, it makes a good style, being a check capable of development, and one that may be altered in several ways. Thus the single large square of white is divisible by two ends of black, which produce an over-check that considerably improves the whole pattern. Next, each of the squares of black should be divided with small lines of white, and lastly, both alterations should be combined.

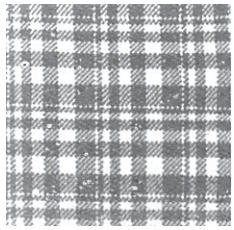


FIG. 23.

111. *Gradated Check.*—This style—Fig. 23—is not so largely employed as those described, but it gives an attractive pattern. The object of the arrangement is to graduate from a series of small to a series of large checks. In the fabric, the respective checks appear to run into each other. No less than eight sizes of squares occur in this example, varying from a check of two to sixteen threads, the order of colouring being thus:—

2 threads of	white.	10 threads of	white.
4 „	black.	12 „	black.
6 „	white.	14 „	white.
8 „	black.	16 „	black.

When using fine materials and high counts of yarns the series

of gradations is largely extended, continuing to checks containing as many as forty-eight and even sixty-four threads. Occasionally, the check is graduated from a maximum to a minimum size on both sides of the extreme large square, and not simply shaded off on one side as in the illustration.

112. *Broken Check in Two Colours.*—A species of irregular check in two colours is given in No. 1 on Plate XIX. The order of the threads is not intricate, being 8 threads of maroon, 8 threads of green, 2 threads of maroon, and 2 threads of green, and forms a mellow check style. This arises, first, from the corresponding strength of the two shades used; second, from the system of blending practised; and third, from the manner in which the weave distributes the threads. This pattern illustrates what neat effects may be acquired in two shades by an appropriate method of combining colours which contrast and harmonize. The style under consideration is composed of the contrasting colours green and maroon, which, when of corresponding intensities, as in this illustration, produce harmony. This is evident by the sense of completeness which characterizes the style when it is examined. It does not require any additional hue to brighten or freshen it, for it is apparently rich and mellow in colour composition.

The plan of grouping the shades causes the full checks of maroon and green to be in contact with each other, while the two threads of the respective hues give a shaded tone to the pattern—the colours seeming to vanish into each other. When making checks in which softness rather than loudness of effect is desirable, this toning of one colour into another is a very requisite element.

113. *Basket Check in Two Colours.*—Basket checks are obtained in two shades, and comprise two sizes of checking. They are produced in both four- and six-shaft twills, and also in fine yarns in the eight-end make. They contain four varieties of work, due to the manner in which the several sets of threads interlace with each other. A reference to No. 2, Plate XIX., will make it evident what is the nature of these effects. This is a basket check which has been woven in the cassimere twill, and in the order of threads which follows:—

For 64 threads.	4	threads of	slate.
	4	„	white.
For 48 threads.	2	„	slate.
	2	„	white.

The four-and-four grouping gives the shepherd-plaid effect bracketed A, and the two-and-two grouping the fine and minute checking bracketed B. The remaining effects in the pattern are due to the four-and-four wefting crossing the two-and-two warping—part C,—and the two-and-two wefting crossing the four-and-four warping in section D. In woollen, worsted, and other yarns this style of check is largely developed. In the illustration the sizes of the respective checks are not the same, the large plaid effect extending over 64 and the small plaids over 48 threads; but in some patterns they are exactly of the same dimensions. When the six-end twill is used, the shades are not grouped in fours and twos, but in sixes and threes, as in the example:—

For 48 threads.	6	threads of	white.
	6	„	fawn or brown and white twist.
For 48 threads.	3	„	white.
	3	„	fawn or brown and white twist.

One feature in colouring these checks is that no strong contrast of shades is suitable. Seeing that the system of grouping the shades is enough to produce ample diversity of style, loudness of colouring is unnecessary. From the illustration given, it will be seen that there is no marked distinction of hue in the colours combined. Such shades as white, and slate and white twist; white, and brown and white twist; and white, and blue and white twist, all yield patterns of the requisite depth of contrast. These examples are in light shades, but this type of checking also obtains an important place in dark patterns for ulstering and mantling fabrics.

Checks of Three or more Colours.

114. *Principle of Checking with Three Colours.*—The principles of design and colouring involved in making check styles in three

shades are more intricate than those relating to checking with two colours. More ingenious patterns, fuller of detail and more diversified in composition, are producible with three than two shades. The third colour is important and valuable in toning and mellowing the check arrangement. Thus, supposing a light and dark shade formed the principal sections of a check composition, then by introducing into it a third and intermediate colour, increased softness of effect could be acquired and harshness of contrast obviated. Check arrangements of this class are employed in many types of woven goods, and are particularly useful in designing for some species of suitings, mantlings, cotton and silk fabrics. They are not so formal in cast as two-shade patterns, the square spaces of colour being better toned. Some of the most generally adopted systems of grouping the shades in these styles are represented in Figs. 24 to 32 inclusive. By comparing them with the checks obtained in two colours given in Figs. 15 to 23, it will at once be evident that they contain a more complete range of effects and are more diversified in outline than the preceding examples. The function of the third shade and its utility in improving the aspect of the patterns will also be observed. Fig. 25, for instance, though a simple arrangement, possesses a mellower character than any of the checks developed in two shades. The grey factor not only increases the multiplicity of effects appearing in the patterns, but enhances the value of the respective checkings by giving a softly-toned cast to them. Amongst the forms of check combinations illustrated in these figures are the common three-shade pattern, the set check, the compound base, the counter-change base, the interchanging base, and counter-change with over-check base.

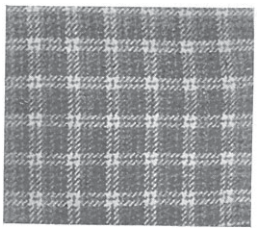


FIG. 24.

115. *Ordinary Three-shade Check.* — The commonest and most elementary form of three-coloured checking is that in which the squares of colour are equal in size, *e.g.*, 10 black, 10 grey, and 10 white. When the squares of each colour are large, the check is satisfactory; but if they are minute, say

about four threads each, and composed of neat colourings, it is improved in character. Should the colours be dark, medium, and light, or black, grey, and white, a shaded check is formed of limited gradation. In greys, blues, browns, or slates, this arrangement makes a very useful form of pattern, and one that may be modified in various ways. It might, for example, be shaded off on both sides by allowing the intermediate shade to alternate with the dark and light colours. Another change may be effected by bisecting one of the squares of colour, say the black, with two ends of a lighter shade, in which instance one outline check would be obtained in each repeat of the pattern, which would give quite a new aspect to the style. If this idea of dividing the checks is further worked, a considerable range of appropriate modifications of this base may be acquired. Let one example be considered. Alter this form by arranging the shades as below (Fig. 24):—

4	threads of	black.	4	threads of	medium grey.
2	„	medium grey.	4	„	white.
4	„	black.	2	„	medium grey.
4	„	medium grey.	4	„	white.
2	„	black.			

According to this scheme the check would be completely changed, though the base remains unaltered. Each square of colour is here divided into four sections. The black checks are divided with an outline check of grey, the grey with an outline check of black, and the white with an outline check of grey. It will be clear from this method of modifying the simple order of colouring, that it is an elementary principle of grouping three shades to form a check which may be utilized in the development of fancy patterns.

116. *Set Check.*—A check pattern in which certain squares—namely, black in the illustration—form the main feature of the design, and are set at corresponding distances apart, with the respective shades alternately intervening, is supplied in Fig. 25. It is designated a "set" check, on account of the manner in which the large spaces of the leading shade in the

pattern are arranged, these repeating on such a principle as to give a stiff and "set" appearance to the pattern.

It is made in various dimensions, according to the style of fabric being manufactured. The size of the black check in lining and shawl textures ranges from eight to forty-eight threads, but in suitings and other materials it is frequently not more than six or four threads, and the spaces of grey and white proportionately reduced.

Taking the order of the shades to be 16 threads of black, 8 threads of white, 16 threads of black, and 8 threads of grey,

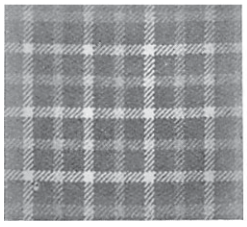


FIG. 25.

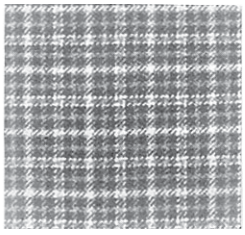


FIG. 26.

then one method of modifying this base practised with good results is (Fig. 26)—

6	threads of	black.	
4	„	grey.	= 16 black.
6	„	black.	
2	„	grey.	
4	„	white.	= 8 white.
2	„	grey.	
6	„	black.	
4	„	grey.	= 16 black.
6	„	black.	
2	„	white.	
4	„	grey.	= 8 grey.
2	„	white.	

The centre of each of the squares of black would, by this means, be occupied with a square of four threads of grey, while the square of white would be outlined with skeleton checks of grey, and that of grey with skeleton checks of white. When this

system of alteration is adopted, a pattern fairly diversified in construction is the result.

117. *Compound Checking in Three Shades.*—Fig. 27 forms a neat principle of checking in three shades in which several series of small squares of colour are combined. The manner in which the small checks are grouped, obviates the stiff cast which characterizes some forms of checking. It will be observed that the several shades do not occur in uniform quantities. White is the main element, alternating with both black and grey; then comes black, of which there are three sets of checks, but only

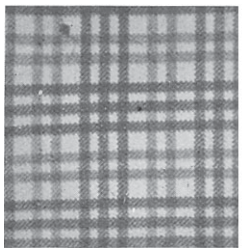


FIG. 27.

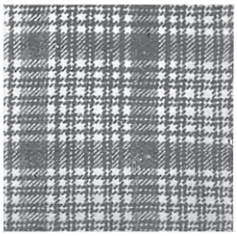


FIG. 28.

two sets of grey. To produce the pattern, the yarns are grouped as indicated below:—

8	threads	of black.	16	threads	of white.
8	„	white.	8	„	grey.
8	„	black.	8	„	white.
8	„	white.	8	„	grey.
8	„	black.	16	„	white.

The white not only produces minute checks, but also four large squares in each repeat of the design.

This base may be varied. One alteration consists in dividing the large squares of white with fine lines of black; another modification practised changes the single square of white, intervening the checks of grey, into black; while a third system of alteration bisects each of the checks of black with outline squares of white; then a fourth principle (Fig. 28) combines these several methods of utilizing this form, making a pattern constituted thus:—

3	threads of	black.	4	threads of	black.
2	„	white.	6	„	white.
3	„	black.	8	„	grey.
8	„	white.	8	„	black.
3	„	black.	8	„	grey.
2	„	white.	6	„	white.
3	„	black.	4	„	black.
6	„	white.	6	„	white.

Repeat.

If this last scheme is employed, the cast of the pattern undergoes considerable change, and is characterized by much variation of checking and intermingling of shades. By adopting three tones or tints of one colour, such as brown, olive green, or slate, this

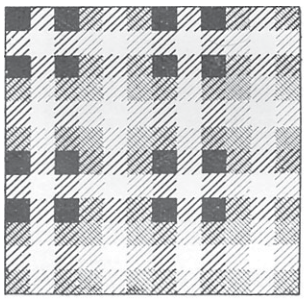


FIG. 29.

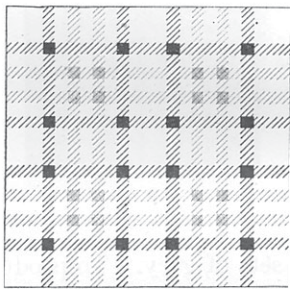


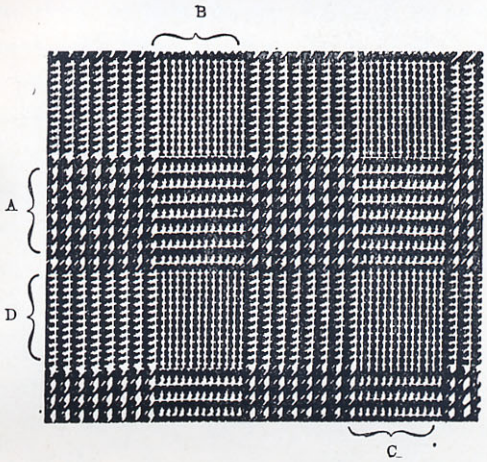
FIG. 30.

mode of checking is capable of being used in the construction of effective patterns for mantling, dress, and other fancy fabrics.

118. *Counter-change Check in Three Shades.*—The succeeding example (Fig. 29) is made up of equal quantities of black and grey and of a smaller portion of white. The checks of white are so introduced as to separate the four squares of black and also the four squares of grey, so that the white yarns form a comparatively large over-check. Both the black and grey threads, on the other hand, each compose two sets of checks working within one another. It is a base developed in cotton, worsted, and woollen yarns. One suitable plan of blending the shades is —8 threads of black, 8 threads of white, 8 threads of black, 8 threads of grey, 8 threads of white, and 8 threads of grey.

The style is susceptive of considerable elaboration. For example, the white check may be embellished with an over-check

1



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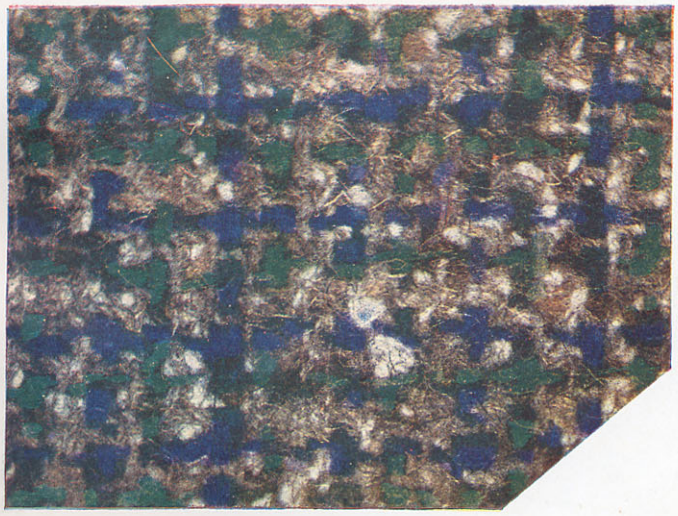


3

Plate XIX

CHECK STYLES

1. Pattern in Maroon and Green
2. Compound Check
3. Small Interchanging check (Fancy Yarns)

of black, the black squares with outlinings of white, and the grey with skeleton checkings of black or white.

119. *Interchanging Check.*—Three-shade checks on this base are illustrated in Fig. 30 and No. 3, Plate XIX. On examining Fig. 30, it will be seen that a group of small squares of black surround four similarly-sized checks of grey and nine of white. The grey and black checks interlace with each other. The principal shade in this pattern, white, is so arranged as to yield both small and large checks. It is a style which may range from a pattern of a fraction of an inch in suitings to six or eight inches in dress materials and shawl textures. When the following quantities are used, the base may be modified:—

12	threads of	white.	6	threads of	white.
6	„	black.	6	„	grey.
6	„	white.	6	„	white.
6	„	grey.	6	„	black.

Various systems may be practised in dividing up the twelve threads of white. To begin with, this group of ends may be changed to 2 threads of grey, 8 threads of white, and 2 threads of grey; or the four threads in the centre of the twelve may consist of 2 grey and 2 black; while a third variation would change the white square into 4 threads of white, 4 threads of black or grey, and 4 threads of white. If other changes of this base are required, the small squares of white should each be bisected with two threads of black, the checks of grey with two threads of white, and the checks of black with two threads of grey.

An application of this principle to costume fabrics is given in No. 3, Plate XIX. Three colours are used, light brown or fawn, green, and blue, the blue and green interchanging with each other. The brown is an intermediate shade, checking with both the green and blue. The warping and wefting are as follows:—

Light brown or fawn . . .	4	2
Green	–	2
Blue	2	–

If the number of threads of each colour were doubled, some modifications could be applied: the eight threads of brown could

be bisected with an additional colour, and some further alteration made in developing both the green and blue sections.

120. *Counter-change with Over-check.*—Fig. 31 is a pronounced check form. It is mostly used in tartan patterns for cotton, fine worsted, and woollen-yarn dress fabrics. More variety of effect may be introduced into it by subdividing the main squares of black and white. Each of the spaces of white is in this instance split up by minute squares of black and lines of grey; and the squares of black by minute squares of white in addition to the lines of grey in the illustration. This form of check is often made in very large patterns, some four or five inches in size, and in strongly contrasting colours, for which it is, by arrangement, well adapted.

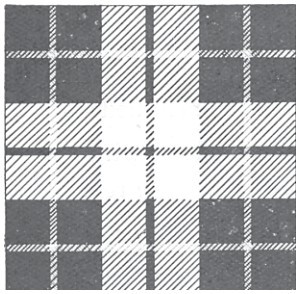


FIG. 31.

It ought to be observed that all the examples described may be subjected to numerous modifications in sectional parts of the colouring, besides those quoted and analyzed. With a view of making it evident how the schemes of checking alluded to, are elaborated in practice, it has been shown to what an extent patterns of a check description are susceptive of variation in the loom. The principles of constructing these have been elucidated, and the chief forms of checking have been treated of.

SHADED AND IRREGULAR CHECKS.

121. *Shaded Check in Black and White in the Cassimere Twill.*—In the construction of shaded checks either two or more colours may be employed. With these, and a proper method of grouping the yarns, a pattern may be produced of a shaded character. The weave used, if the order of shade arrangement is diversified, must be of a simple type. An example will demonstrate the principle of developing this useful description of woven design. It is given in Fig. 32, and is a shade in black and white, the cassimere twill being the weave used in constructing the fabric. There are several features of this pattern which may be considered. Obviously it is a compound check,

combining both the ordinary and shaded schemes of checking. A set of common checks of a shepherd plaid type surround the shaded check proper. The shaded effect consists of three factors, which may be separately examined. In the square spaces, in which white is the main element, a light shade is acquired by gradually decreasing the quantity of black and increasing the quantity of white yarns until a perfect edging of white is acquired. Next there are lines of a deeper shade, due to the threads used in the composition of the principal check crossing those which occur in the shaded white checkings; and lastly, there is the broken square of black, which decreases by degrees in intensity from the centre to its respective edges. Though the shading as a whole is not uniformly continued, for there is a somewhat sudden change from dark to light shading, yet at this juncture the effect obtained is softly toned. Mellowness of gradation is an important element of the pattern.

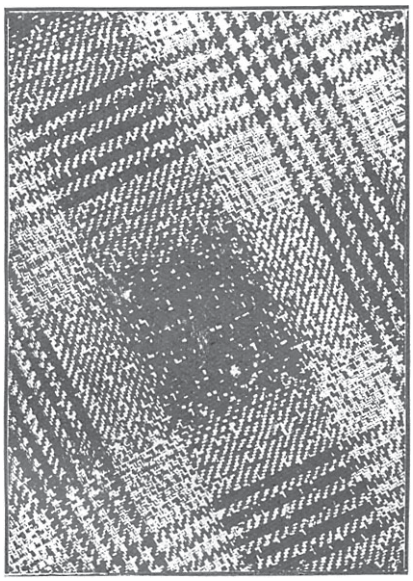


FIG. 32.

The irregular manner in which the white and black yarns appear, like specks on the surface of the fabric, arises from the employment of a print thread in which these shades alternate in lengths of about $\frac{3}{8}$ths of an inch. Solid black and white threads alone would not yield the intermingled effect so prominent in this style. They would produce a much stiffer and more uniform result. If this system of checking should be applied to woollen and worsted or cotton goods, twist yarns may be employed in place of the printed threads. These, in all species of designing, give more intermingled patterns than self-coloured yarns, and for this reason are useful in the production of shaded effects.

The plan of colouring this example is rather complicated, running as follows:—

4 threads of black.
4 „ white. } For 36 threads.

6 threads of white.
1 thread of print yarn. } Repeat. *A.*

5 threads of white.
1 thread of print yarn. } Repeat.

4 threads of white.
1 thread of print yarn. } Repeat.

3 threads of white.
1 thread of print yarn. } Repeat.

2 threads of white.
1 thread of print yarn. } Repeat.

1 „ white.
1 „ print yarn. } Repeat.

8 threads of print yarn. →→ *B.*

1 thread of black.
1 „ print yarn. } For 6 threads. *C.*

2 threads of black.
1 thread of print yarn. } Repeat.

3 threads of black.
1 thread of print yarn. } Repeat.

6 threads of black. →→ *D.*

1 thread of print yarn.
3 threads of black. } Repeat.

1 thread of print yarn.
2 threads of black. } Repeat.

1 thread of print yarn.
1 „ black. } For 6 threads.

8 threads of print yarn. *E.*

1 thread of white.
1 „ print yarn. } Repeat.

2 threads of white.
1 thread of print yarn. } Repeat.

3 threads of white.
1 thread of print yarn. } Repeat.

4 threads of white.
1 thread of print yarn. } Repeat.
5 threads of white.
1 thread of print yarn. } Repeat.
6 threads of white. } Repeat.
1 thread of print yarn. } *E.*

The light shade, which composes the squares consisting mainly of white, is formed by the threads included within *A* and *B*. This will be seen on examining the plan of colouring. At *A* there are six parts of white to one part of black and white print yarn; but at *B* there is a small quantity of print yarn only—the toning from extreme white to a complete mixture of black and white having been gradually effected by the intervening groups of shades. From *C* to *D* the dark shade is produced. Not containing as many changes as the light shade, it is more decided in composition. Practically this shade commences at *B*, which connects it with the adjoining gradated square of white and black. At *C*, however, the first move to black begins, for here black and print yarns are equally mixed. The number of black threads now increases until Section *D* is reached, when it begins to diminish, ultimately shading off to a group of print threads as indicated at *E*. From this stage the white shade is renewed, and continues to the end of the pattern.

Apart from its value as a principle of shading, this style is extremely suggestive of what may be accomplished by grouping two shades in woven fabrics of a simple or common twill class.

122. *Shaded Checks in Two Colours due to using Designs Composed of Various Weaves.*—These patterns are in some respects simpler to produce than the preceding class of check. There is no diversity of shade arrangement in such styles, the warp and weft being solid colours throughout. Now in an ordinary twill such colouring would not give any form of check, so that this is quite a distinct principle of checking. It is one that is applied to worsted, silk, and cotton, but not to woollen textures to any large extent. The combination of weaves necessary is not so well adapted for development in woollen, as in the other classes of threads named. Colouring being simple, the design is correspondingly intricate. If this is well con-

structed it will yield a shaded pattern, though the warp and weft yarns be of precisely the same colour, size, and quality. When this sort of shade is formed, a better effect is produced in such yarns as worsted and silk. Cotton or woollen threads would not give the same effect in designs arranged on the principle of a gradual movement from a maximum warp to a minimum weft flush, and inversely, as in Figs. 33 and 34. The essential of shading consists in diversity of tinting. A brown,

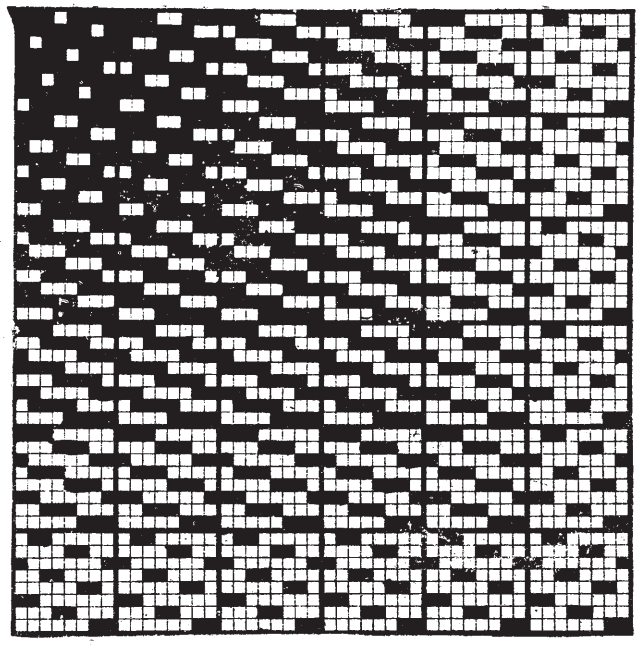


FIG. 33.

or any other shade, is producible if several colours of brown of variable depths are combined, but not otherwise. What in this instance is impracticable from a colour standpoint, is feasible by a suitable arrangement of weaves. The shade that may thus be produced is not, of course, so clear and pronounced as that due to a diversity of colouring, for it simply results from the difference in effect of the flushes of warp and weft yarns composing the pattern. As there is some visible distinction in the brightness of the floats of warp and weft respectively, if the weaves constituting the design are arranged on such a principle

as to tone one into the other, they produce an effect of a shaded type. According to the example furnished, one set of weaves which combines admirably on this method is that derived from a sateen base. But these are not the only weaves used, many varieties of twills being employed for similar purposes; but sateens give the most uniform shades of any class of weaves that can be utilized. On referring to Figs. 33 and 34, it will be seen that the weaves differ from each other in the extent to

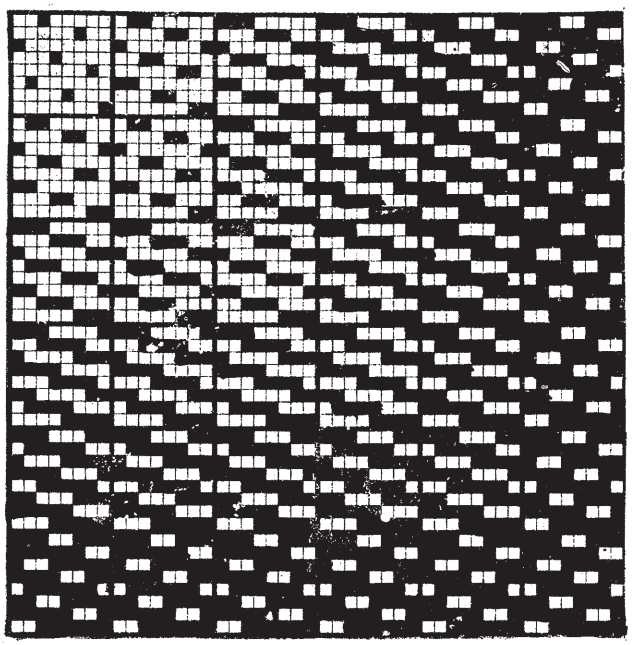


FIG. 34.

which they flush the warp and weft yarns on the face of the texture. To construct a shaded pattern of this kind, commence with the extreme warp-flush weave, adjoining which place the weave most closely approaching it in structure; the diminution in warp and the increase in weft flush continuing from one weave to another, until the extreme or maximum weft flush is attained. In such a scale of shades, the extreme warp- and weft-flush weaves represent opposite ends of the shade, the weaves intervening completing the gradation or toning of the pattern. The form or outline of the check is first decided upon, and then the

weaves combined according to the dark or light effect required in the various parts of the design.

This style of checking is determined by the system of arranging the weaves used, and not, as in the previous examples, by changing the scheme of colouring; hence this species of shaded check is extremely simple to produce, so far as the blending of colours is concerned.

A further application of this principle of weave shading in combination with a difference in the depths of colouring in the warp and weft is that developed in figured fabrics, of which

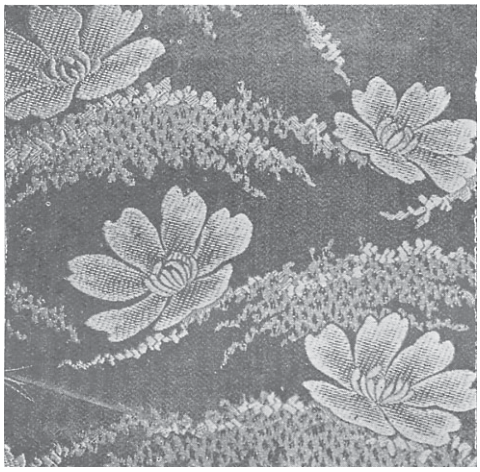


FIG. 35.

Fig. 35 is an example and Fig. 35A a section of the complete design. There are other weaves forming sections of the figuring, but they would give a pronounced warp or weft colour effect: that is to say, should the warp be a light or pale heliotrope, and the weft dark heliotrope, there would be perfect shading from the dark to light in the floral parts, but in other sections, marked in ⊡'s and □'s, either a solid warp or weft colour would appear on the face of the fabric. The principle imparts definition to the colours used, and also to the integral parts of the design.

123. *Irregular and Mixture Checks.* — The styles of this checking, on account of their neat and subdued character, are produced in many classes of woollen and worsted fabrics. Two typical examples will be considered—Nos. 1 and 3, Plate XX.

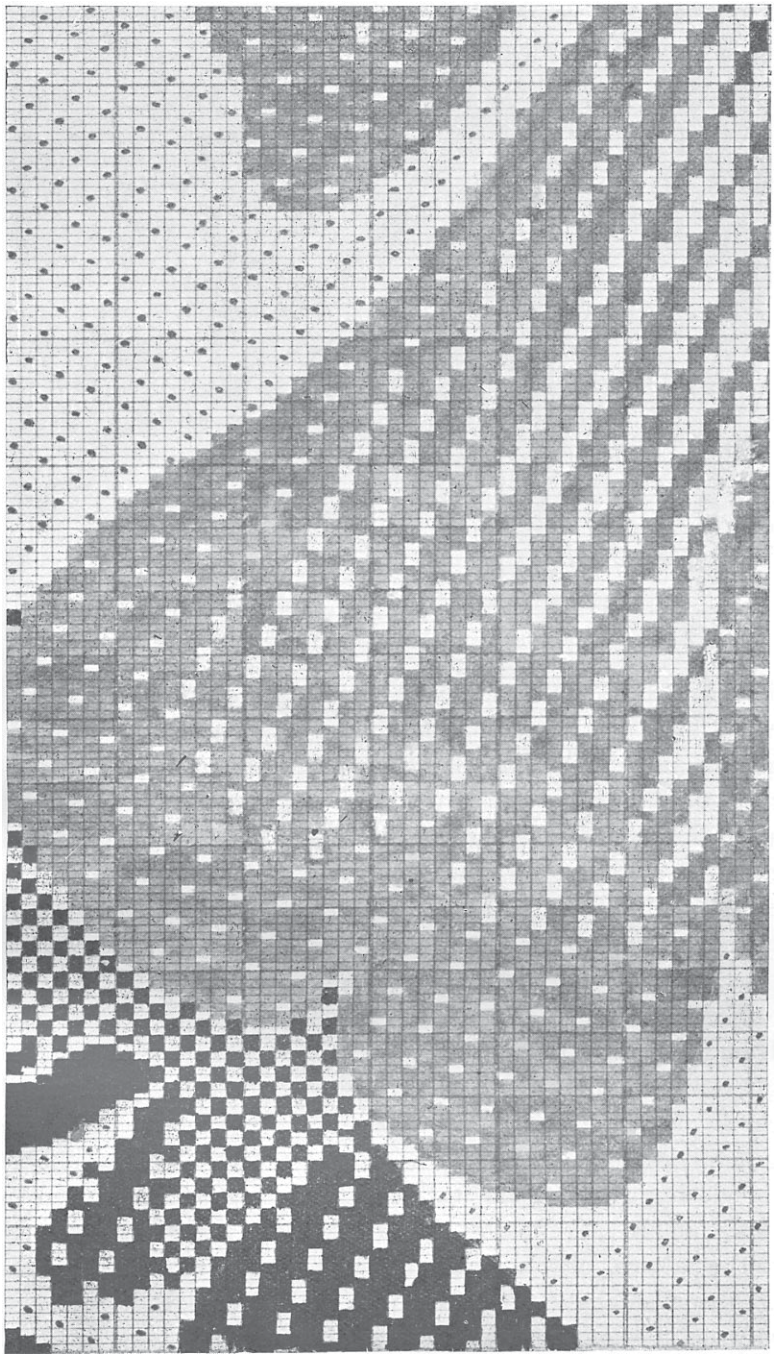


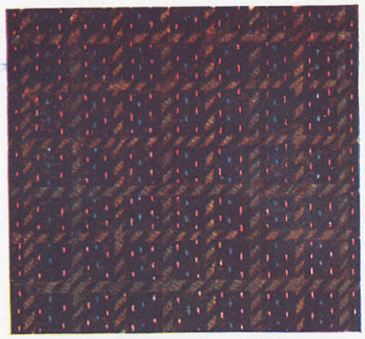
FIG. 35A.

No. 1 is an intermingled check in five colours, and possesses a black ground, the order of warp colouring being:—

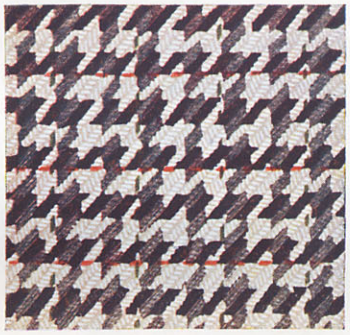
3 threads of black.
1 thread of black and scarlet twist.
2 threads of black.
1 thread of black and green twist.
2 threads of black.
1 thread of black and scarlet twist.
3 threads of black.
2 threads of olive green.
3 threads of black.
1 thread of black and scarlet twist.
2 threads of black.
1 thread of black and green twist.
2 threads of black.
1 thread of black and scarlet twist.
2 threads of black.
3 threads of olive brown.

The method of wefting is much simpler than that of warping, consisting of 12 picks of black, 2 picks of olive brown, 12 picks of black, and 2 picks of olive green. The pattern is a combination of outline checks, enhanced with spotting threads of scarlet and black, and green and black twists. There is a skeleton check of olive green interlacing with a similar check of olive brown. The intensity of the two leading fancy colours ought in such patterns to be the same, as they should both be equally prominent in the texture.

Next, as to the twist yarn or mixture check—No. 3, Plate XX. Here the pattern is composed of green and olive twist. On the intermingled mixture ground formed by these threads, is a small check of maroon. This hue forms a mellow contrast with the general colouring of the fabric. Twist yarns are chiefly suitable for yielding the rich and mellow indistinctness of effect seen in this example. The maroon is a solid colour and gives character to the pattern. For costume fabrics this scheme of checking, in both woollen and worsted fabrics, is well adapted, as it combines softness of colouring with neatness of pattern.



1



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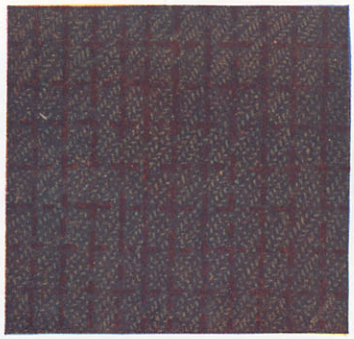

3

Plate XX

CHECK STYLES

1 and 3. Intermingled Effects
2. Broken Check

124. *Fancy Broken Check.*—This is a species of check in which the plan of wefting differs from that of grouping the warp colours, the object being to produce à check-like effect more or less irregular in composition. No. 2, Plate XX., is one form of this sort of checking. A pattern composed of small checks is here obtained, analysis of the colourings showing the warp and weft to consist of different shades. Thus, while the order of warping is 5 threads of light fawn, 1 thread of green, 4 threads of slate, 5 threads of light fawn, and 5 threads of slate; the weft is 4 picks of black, 1 pick of scarlet, 5 picks of bluish grey, 5 picks of black, and 5 picks of bluish grey. The contrast between the warp and weft shades defines the weave, which, if the warp and weft colourings had been alike, would, in some parts of the pattern, have been indistinct.

The point to be observed in this type of colouring, is to employ shades of similar intensities in both warp and weft; thus, in this example, the slate is almost as prominent in the woven fabric as the black, the light fawn as the bluish grey, and the green as the scarlet. It is only by securing this balance of hues that harmonious colourings are producible in broken check patterns. Should any particular colour be stronger in character than others, it destroys some of the elements of the pattern. This principle of cross checking is also applied to various classes of striped fabrics, in which it is desirable to partially subdue the continuity of the warp colourings.

125. *Examples in the Colouring of Tartans.*—These may be defined as squares of colour varying in size and arrangement, and are, strictly, an elaborate scheme of check design entirely in colouring. One interesting feature of these plaids is that the colours are usually of the same depth or degree of intensity, as illustrated by the Erskine plaid, a compound of bright scarlet and green. These two contrasting and complementary hues form a good checking. It is not, however, always the case that complementary colours are blended; for instance, the Montgomery tartan is composed of green and blue, two colours which, if not of the proper hue and intensity, would produce an incongruous pattern. Hence, here, as in many other plaids, it is a question of using the correct depth and hue of colour.

Tartans illustrate the hues which combine harmoniously, and also the quantities or areas in which bright colours unite in a satisfactory manner.

As illustrations of this, the Macdonald and Hunting Menzies may be compared. In both, exactly the same colours are used, with entirely different effects. The Macdonald, in consequence of the large quantity of scarlet entering into its composition, is a bright plaid; whereas the Menzies is much softer and mellower in appearance. The larger the variety of colours, the more interesting the result in the pattern. If, for instance, the Duke of Rothesay, a three-colour tartan, is compared with the Hay, a five-colour one, the value of the larger number of hues in multiplying the diversity of colouring will be understood. Both are satisfactory compounds of coloured yarns, but the superior richness of the Hay is apparent. In each, red, green, and white are used, with the addition of black and yellow in the Hay. The Rothesay has a large square of red, divided with stripes of white, whereas in the Hay a similar space of red is subdivided with stripes of white, black, and green. In the Rothesay the green sections are crossed with lines of red; but in the Hay, with lines of yellow and red, forming a check rich in colouring.

126. *Types of Tartans.* — Tartans may be classified as follows:—

1. Plaids in two colours.
2. Plaids in three colours.
3. Plaids in four colours.
4. Plaids in five colours.
5. Plaids in six and seven colours.

It is difficult, on account of the varied colouring, to classify them according to hue; but the above subdivision comprises all the tartans, and makes it feasible to deal with them in a natural order, or in accordance with their colour composition.

127. *Two-Colour Plaids.*—Amongst the most important of the two-colour tartans are the Menzies, Douglas, Montgomery, Macdonald, and the Erskine. The Menzies is produced in red and white; red and black, black and white, and red and green, the last being termed the Hunting Menzies.

The black and white Menzies, in its original form, is illustrated

in Fig. 36, the order of shades in both warp and weft being as follows :—

Black . .	96	12	24	6	6	24	12
White . .	16	16	8	36	8	16	16

It is a forcible scheme of checking which may be developed on various lines. Two changes which affect the appearance of the check are given. In the first (Fig. 37) the largest quantity of one colour—the 96 of black—has been modified :—

4 black.
4 white. } For 16.
64 black.

4 white.
4 black. } For 16.

This slightly subdues the form of the check, which would be

FIG. 36.

FIG. 37.

more apparent if the lines added were of a different colour from the rest of the pattern. The second change to form an over-checking is applied to the 12 threads of black in the centre of the squares of white :—

1 black.
1 white. } For 4.
4 black.

1 white.
1 black. } For 4.

Again, by having the odd threads in a bright colour, the tone of the pattern would be improved.

Another example, namely, the Montgomery (Fig. 38), with the derivations obtainable on this base, may be considered. It is composed of a peculiar hue of grass green and blue. The blue, however, by its softness and warmth of hue, arising from its

purplish tone, makes a subdued contrast with the green. The colours being about equal in intensity, are combined in similar quantities. In a smaller checking, with the blue slightly predominating, this plaid would make a good lining style, especially in mantles where the face of the cloth may be a warm colour, such as deep fawn. The warping and wefting for Fig. 38 are:—

Green (black)	.	.	144	16	16
Blue (grey)	.	.	48	48	48

In Figs. 39 and 40, two simple changes, showing how the

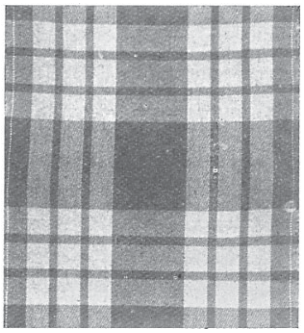

FIG. 38.

FIG. 39.

pattern may be altered in appearance, are given. In the former, the centre 48 threads of blue have been subdivided into

20 threads of blue (grey),
8 „ green (black),
20 „ blue (grey),

whilst in the latter, the 16 threads have been changed to

6 threads of green (black),
4 „ blue (grey),
6 „ green (black).

The check should be further modified in the large square of 144 threads of green, working either from the edges to the centre, or *vice versâ*, one scheme being as follows:—

Green (black)	.	.	24	16	8	16	24
Blue (grey)	.	.	8	20	20	8	–

The Grey Douglas is an effective pattern in black and grey yarns. As a basis of checking, it is simple in arrangement, and of such a character as to be capable of numerous modifications.

FIG. 40.

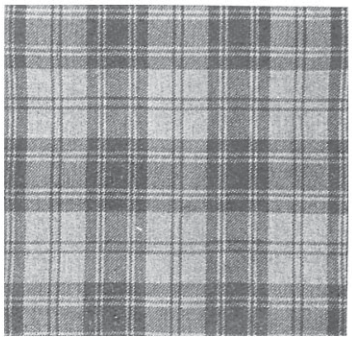

FIG. 41.

In fine yarns and close setting, it might be used for dress materials, in worsted yarns for linings, and in woollen yarns for rugs and shawls: in thick and soft spun yarns, it would be also

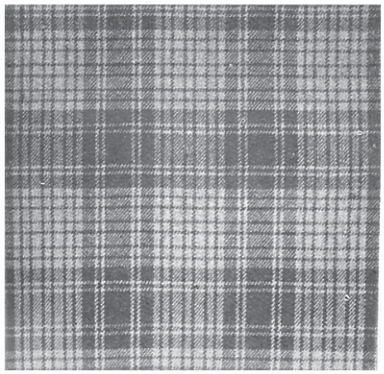

FIG. 42.

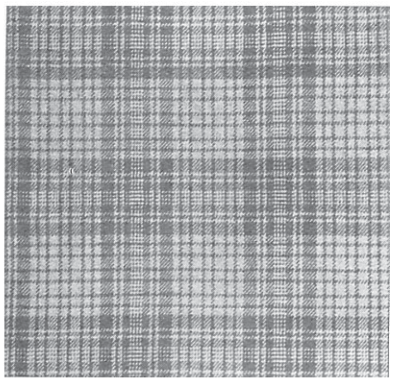

FIG. 43.

suitable for travelling rugs. A standard form of this tartan is sketched in Fig. 41, the warp and weft being:—

Black . .	–	4	4	16	4	32	4	16
Grey . . .	36	8	36	4	4	4	4	–

Figs. 42 and 43 give some idea of the diversity of style obtain-

able by extending the colouring. The form of this check makes it desirable, in combining other colours than black and grey, that there should only be a small degree of contrast between the shades, the best patterns resulting when the colours are of the same hue.

When the plaid is developed on the lines illustrated in Figs. 42 and 43, it suffers somewhat in simplicity of character, but still makes an excellent pattern for linings, and in fine yarns for dress materials. The broken-up effects in these two checkings admit of more pronounced colour contrasts than are feasible in colouring Fig. 41. The sub-division of the various sections of 36 threads of grey has been acquired thus:—

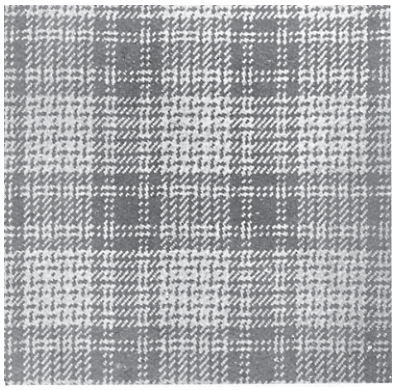

FIG. 44.

8 threads of grey.
4 „ black.
8 „ grey.
4 „ black.
12 „ grey.

Fig. 43 results from dividing the 32 threads of black:—

8 black.
1 grey. } For 16.
1 black. }
8 black.

By changing the weave from 4- to 6-end twill, a very different colour effect is obtained, as shown in Fig. 44.

128. *Three-Colour Tartans.*—These form an important variety, and may be considered under two heads,—the bright plaids, of which the Gow, MacLeod, Duke of Rothesay, Cuninghame, Brodie, Wallace, MacQueen, Crawford, Hamilton, Ross, MacIntosh, Maxwell, Dunbar, Skene, and Mathieson are examples; and the dark plaids, including the Clergy, Hunting Mathieson, Keith, Hunting MacLean, MacArthur, and Elliot.

The following are the orders of colouring for the MacQueen, the Hamilton, and the Maxwell:—

MacQueen (Fig. 45).

Black (black) . .	8	8	8	64	64
Red (grey) . . .	28	28	28	–	28
Yellow (white) . .	–	–	–	6	–

Two modifications of this tartan are given in Figs. 46 and 47, and show how the base is adapted for detailed checking.

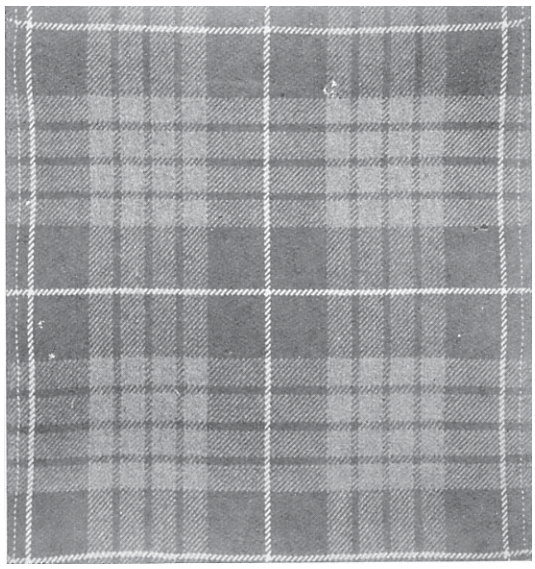

Fig. 45.

Hamilton (Fig. 48).

Scarlet (medium grey) . .	60	60	16	16
White (white)	12	–	–	–
Blue (black)	–	36	36	36

Maxwell (Fig. 49).

Scarlet (medium grey) . .	54	8	54	12	12	12
Green (light grey) . .	4	4	–	28	28	–
Indigo blue (black) . .	–	–	12	–	–	12

These tartans are examples of colouring in which red or scarlet is the most important colour employed.

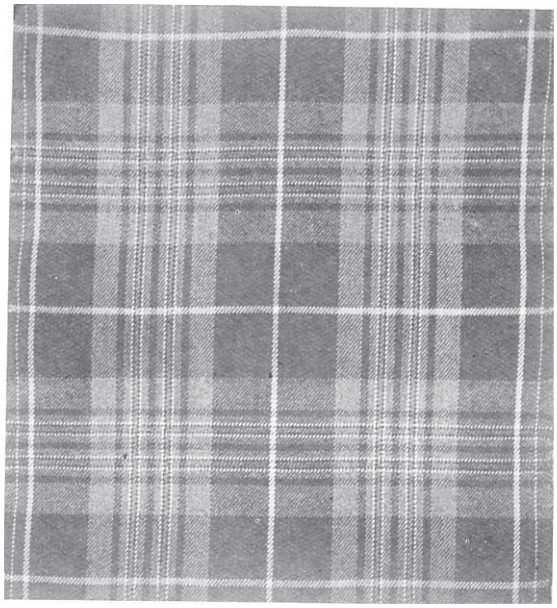

FIG. 46.

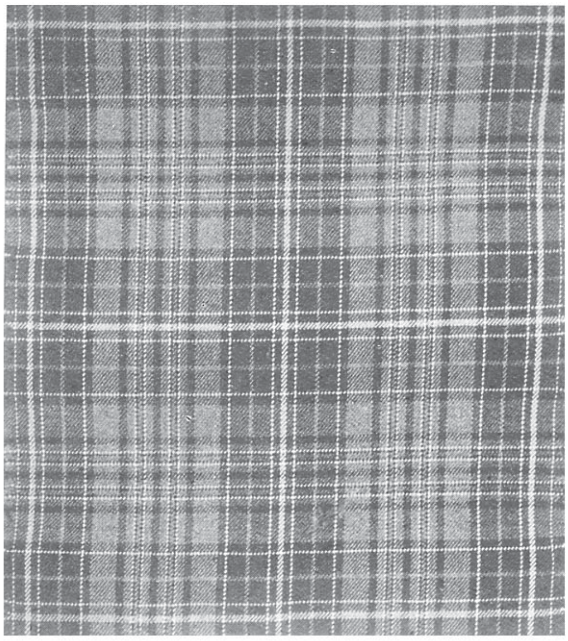

FIG. 47.

Fig. 50, the Elliot, is not of this class, for it is composed of blue, brown, and a small band of scarlet, the red being used to give cheerfulness of tone. The order of colouring is:—

Blue (grey) . . .	216	32	32
Brown (black) . . .	64	–	64
Scarlet (white) . . .	–	12	–

It is a simple check, yet is exactly of that type which is capable of interesting development by modification.

129. *Four-Colour Plaids.*—Three of the most interesting tartans of this class, whether produced in neutral shades or

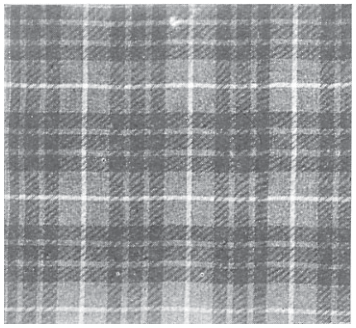

Fig. 48.

Fig. 49.

in the original colourings, are the MacKinnon, Dundas, and Fraser. They have few elements in common, as comparisons of Figs. 51, 54, and 57—the plaids in the unmodified forms—distinctly show. The MacKinnon in particular is characterized by simplicity of form and scheme of colouring; the Dundas is a heavier base; and the Fraser full of details and of shade contrasts. They are also dissimilar in colour qualities. The MacKinnon and Dundas are both dark plaids, the former being composed of brown, green, scarlet, and white, and the latter of black, green, scarlet, and blue. The Fraser is an admirable compound of scarlet, black, green, and white. The following are the orders of colouring for the respective tartans, with their modifications:—

THE MACKINNON (Fig. 51).

Brown = black . . .	64	64	–	64	64	–
Green = medium grey .	12	64	64	–	64	64
Scarlet = light grey . .	–	8	–	–	8	–
White = white . . .	–	–	–	8	–	–

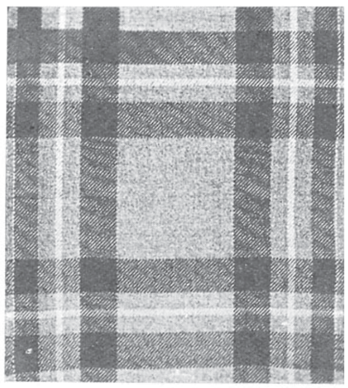

FIG. 50.

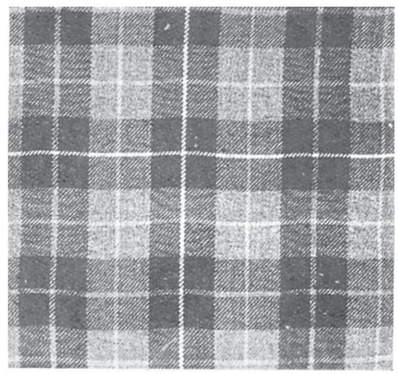

FIG. 51.

MACKINNON—FIRST MODIFICATION (Fig. 52).

	24			30										
Medium grey . .	–	–	–	–	–	12	Repeat A	64	64	Repeat A	–	Repeat A	64	64
Light grey . .	–	–	–	–	–	–		8	–		–		8	–
Black . . .	6	2	10	6	2	–		–	–		–		–	–
White . . .	2	2	–	2	2	–		–	–		8		–	–
	A													

MACKINNON—SECOND MODIFICATION (Fig. 53).

	24			30																			
Medium grey .	–	–	–	–	–	12	Repeat A	12	4	4	4	4	4	12	–	Repeat B	Repeat A	–	Repeat A	Repeat B	–	Repeat B
Light grey .	–	–	–	–	–	–		–	–	–	–	–	–	–	8			–			8	
Black . .	6	2	10	6	2	–		–	–	2	2	–	–	–	–			–			–	
White . .	2	2	–	2	2	–		4	4	–	–	4	4	–	–			8			–	
	A							B														

Both these changes result in the formation of excellent plaids for travelling rugs. The check given in Fig. 53 would be difficult to improve upon by combining four shades.

THE DUNDAS (Fig. 54).

Black = black . . .	40	8	40	–	8	–		
Blue = medium grey . .	40	40	–	–	–	–		
Green = light grey . .	–	–	64	8	8	64		
Scarlet = white . . .	–	–	12	–	12	–		

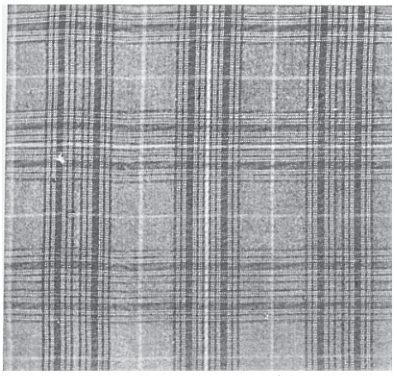

FIG. 52.

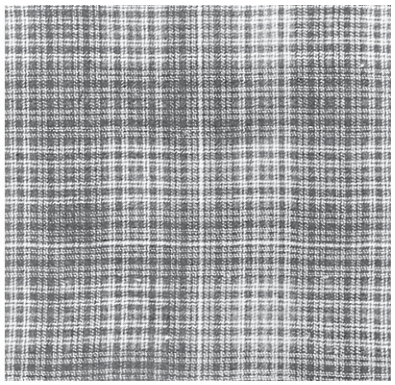

FIG. 53.

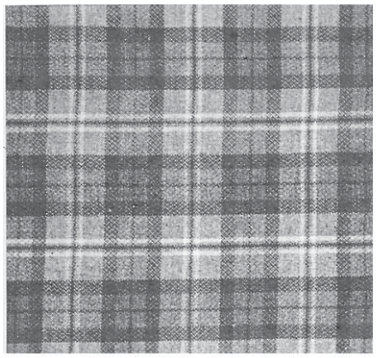

FIG. 54.

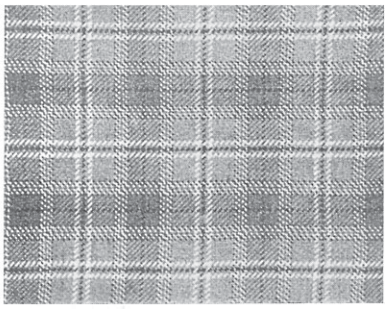

FIG. 55.

DUNDAS—FIRST MODIFICATION (Fig. 55).

Black .	4	4	–	4	4	–	8	Repeat A	–	–	8	–
White .	4	4	4	4	–	–	–		–	12	–	12
Med. grey .	–	8	–	–	–	40	40		–	–	–	–
Light grey .	–	–	–	–	–	–	–		64	8	8	64
	A											

Dundas—Second Modification (Fig. 56).

Black	.	4	4	–	4	4	–	8	Repeat A	–	2	–	–	–	2	–	8	–	Repeat B
White	.	4	4	4	4	–	–	–		–	–	4	4	4	–	12	–	12	
Med. grey		–	8	–	–	–	40	40		–	–	–	–	–	–	–	–	–	
Light grey		–	–	–	–	–	–	–		10	10	4	4	10	10	8	8	–	
				A								B							

The Fraser (Fig. 57).

Green	= mid grey	.	.	24	–	–	24	–
Scarlet	= light grey	.	.	12	12	12	48	48
Blue	= black	.	.	24	24	–	–	–
White	= white	.	.	–	–	–	12	–

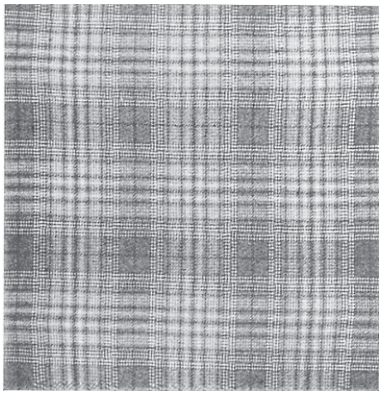

Fig. 56.

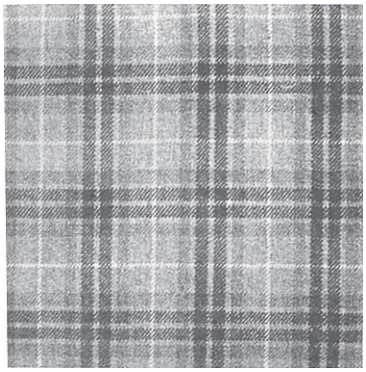

Fig. 57.

Fraser—First Modification (Fig. 58).

Light grey	.	.	8	6	6	8	–	Repeat A	–	12	12	12
Black	.	.	4	–	4	–	–		–	24	24	–
White	.	.	–	12	–	–	12		–	–	–	–
Mid grey	.	.	–	–	–	–	–		24	–	–	24
			A									

Fraser—Second Modification (Fig. 59).

Light grey	.	.	8	6	6	8	–	Repeat A	–	–	–	–	12	12	12	Repeat A
Black	.	.	4	–	4	–	–		–	–	–	–	24	24	–	
White	.	.	–	12	–	–	12		–	4	4	4	–	–	–	
Mid grey	.	.	–	–	–	–	–		4	4	4	–	–	–	–	
			A						B							

130. *Five, Six, and Seven-Colour Plaids.*—These are much more limited in variety, but the following may be given as examples:—

CLAN ALPIN (FIVE-COLOUR).

Black . . .	–	–	32	32	–	–	6	–	–
Indigo blue . .	32	–	–	–	32	8	–	8	–
Green . . .	–	–	6	–	8	36	36	–	8
Yellow . . .	–	6	–	–	–	–	–	–	–
White . , .	–	–	–	6	–	–	–	–	–

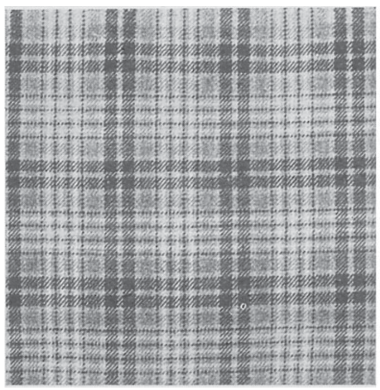

FIG. 58.

FIG. 59.

ROYAL STUART (SIX-COLOUR).

Black .	–	20	–	10	–	10	–	–	8	–	–	–	8	–	–	10	–	10	–	20	–	–
Blue .	16	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16	–
Green .	–	–	–	–	–	–	40	–	–	–	–	–	–	–	40	–	–	–	–	–	–	–
Scarlet .	–	–	–	–	–	–	–	20	–	8	–	8	–	20	–	–	–	–	–	–	–	220
Yellow .	–	–	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	–	–	–
White .	–	–	–	–	8	–	–	–	–	–	8	–	–	–	–	–	8	–	–	–	–	–

MACLEAN (SEVEN-COLOUR).

Black .	–	6	–	6	–	12	–	–	–	12	–	6	–	6	–	–	–	–	6	–	–	–
Indigo .	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Green .	36	–	–	–	–	–	–	–	–	–	–	–	–	–	36	–	–	–	–	–	–	–
Scarlet .	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	56	–	8	–	8	–	56
Yellow .	–	–	–	–	4	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–
White .	–	–	6	–	–	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–
Lavender	–	–	–	–	–	–	6	–	6	–	–	–	–	–	–	–	6	–	–	–	6	–

In the exposition of tartans given, it has been shown that this scheme of colouring is not only useful in the production of the original plaids, but that it may be subjected to almost an endless

series of modifications. Many of these, as well as the plaids themselves, when developed in subdued colourings, are suitable for styles in dress and mantle fabrics. In recent years they have also been developed in the foundation of plush and other textures. They are specially suitable for such textures, inasmuch as the contiguity of the figuring formed in velvet or loop pile destroys any stiffness of character which lines of colour, cutting each other at right angles—as in all check patterns—must more or less possess. To the student of colour contrast and harmony these patterns are interesting and suggestive. They are illustrative, not only of how bright colours may be blended without yielding patterns in which the contrasts are displeasing, but also of the quantities of the colours which give the most harmonious composition. As they are distinctly textile colourings, and are the product of weaving, they possess qualities which are not to be found in any other type of colouring. The field which has been covered has by no means been fully explored. There are many possibilities in this branch of textile work which can only be analyzed by systematic experiments conducted in the loom.

CHAPTER VIII.

SIMPLE COLOURINGS.

131. Simple and Compound Colourings—132. Regular Simple Colourings —133. One-and-One and Two-and-Two Systems—134. Figured Styles in Common Weaves and One-and-One Colouring—135. Utility of the One-and-One Principle in Figured Textiles—136. One-and-One and Two-and-Two Colourings in Fancy Weaves—137. Three-and-Three Colouring—138. Four-and-Four Arrangement—139. Four-and-Four Method applied to Fancy Weaves —140. Six-and-Six and Eight-and-Eight Schemes—141. Six-and-Six Colouring in Various Crossings—142. Three-Odd-Thread Arrangement—143. Various Three-Shade Patterns—144. Simple Colourings composed of Four Shades— 145. Irregular Simple Colourings—146. Irregular Simple Patterns in Two Shades—147. "Irregulars" composed of Three Shades—148. "Irregulars" composed of Four Shades—149. Cross-weftings.

131. *Simple and Compound Colourings.*—As in Weave Design there are two important types of pattern—such as effects resulting from the use of one crossing, and effects due to combining several crossings—so the styles obtained by blending fancy shades are also of two kinds, and may be designated Simples and Compounds. Both classes are divisible into Regular and Irregular orders of colourings. In the Regular order of Simple colourings, the colour elements are of equal quantities and systematically alternate; but in Compounds, the shades may occur in various quantities and be irregularly distributed. If, for example, a pattern were arranged—

2 threads of black,	2 threads of blue,
2 „ brown,	2 „ slate,

it would be a Simple colouring, because it is composed of similar numbers of each sort of yarns, and the respective shades regularly succeed each other. The same shades could be made to form an Irregular Simple pattern in two ways: first, by diversi-

fying the plan of the colours in such a manner as to allow any one or more shades to intervene the other shades, as follows:—

2	threads of	black,	2	threads of	blue,
2	„	brown,	2	„	brown,
2	„	black,	2	„	slate;

and second, by retaining the original order of succession of shades, but by varying the quantities in which they occur, as illustrated below:—

8	threads of	black,	4	threads of	blue,
6	„	brown,	2	„	slate.

Here are two types of Irregular and Simple colourings, viz., those in which the shades are grouped in similar quantities but are irregularly combined, and those in which the shades obtain in different proportions, though following in regular order.

To convert the same group of shades into a Compound colouring, it is only necessary to combine two or more systems of blending the yarns, as follows:—

	For	4	threads of black.
16	threads.	4	„ brown.
	For	2	threads of blue.
16	threads.	2	„ slate.

From this example it will be observed, that in making a Regular Compound at least two systems of elementary colouring are combined: in this instance, the four-and-four and the two-and-two methods have been selected. Compounds necessarily give more diversified styles of pattern than Simples; but unless the effects of the latter have been studied, the arrangement and composition of Compounds cannot be fully understood. Simple colourings are the elements of all Compounds. In order to obtain well-balanced effects in designs consisting of various weaves, the construction and woven result of each weave have to be considered, and only such makes united as will yield symmetrical patterns and regularly-built fabrics; and similar laws determine the association of shades as determine the combination of weaves.

132. *Regular Simple Colourings.* — The principal forms of Elementary Simple Colourings are comprised in the three classes given in the table appended:—

TABLE IX.

REGULAR SIMPLE COLOURINGS.

CLASS A.—COMPOSED OF TWO SHADES.

I. Scheme.	*II. Scheme.*
1 thread of black.	2 threads of black.
1 „ white.	2 „ white.
III. Scheme.	*IV. Scheme.*
3 threads of black.	4 threads of black.
3 „ white.	4 „ white.

CLASS B.—COMPOSED OF THREE SHADES.

I. Scheme.	*II. Scheme.*
1 thread of black.	2 threads of black.
1 „ grey.	2 „ grey.
1 „ white.	2 „ white.
III. Scheme.	*IV. Scheme.*
3 threads of black.	4 threads of black.
3 „ grey.	4 „ grey.
3 „ white.	4 „ white.

CLASS C.—COMPOSED OF FOUR SHADES.

I. Scheme.	*II. Scheme.*
1 thread of black.	2 threads of black.
1 „ medium grey.	2 „ medium grey.
1 „ light grey.	2 „ light grey.
1 „ white.	2 „ white.
III. Scheme.	*IV. Scheme.*
3 threads of black.	4 threads of black.
3 „ medium grey.	4 „ medium grey.
3 „ light grey.	4 „ light grey.
3 „ white.	4 „ white.

It is not needful to increase the number of these examples, for it will be observed that in each scheme of the several classes given,

the order of colouring is identical, but that the quantities of the shades are systematically enlarged. In fine fabrics, the number of threads of each colour might be increased; but in these examples, the bases of all styles of Elementary and Compound Colourings are enumerated. On this account they will be considered separately, and the effects of the various systems in the woven fabric will be fully analyzed and described.

133. *One-and-One and Two-and-Two Colourings.* — These are the most elementary arrangements of shades. They give different effects, according to the weave in which they are developed. The one-and-one system is applied chiefly to plain and twilled weaves, in which it constitutes two styles of patterns very extensively produced in ordinary fancies. First, in the plain make, it forms the hairline stripe sketched in Fig. 5C; and

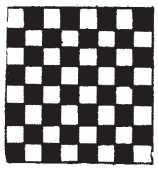

FIG. 60.

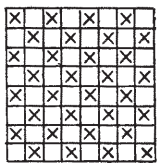

FIG. 60A.

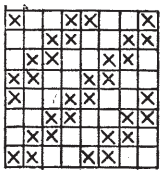

FIG. 61.

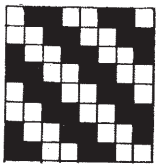

FIG. 61A.

in the cassimere twill, the step-diagonal effect sketched in Fig. 5F. Both are useful textural styles. In cottons, silks, and fancy woollens and worsteds, this order of threads can be made to produce patterns of some intricacy of composition by simply employing in one instance the two plain makes given in Figs. 60 and 60A, and in the other instance the two twills given in Figs. 61 and 61A. Should the plain weaves be combined, say, in such a manner as to make a stripe, and this design woven in the one-and-one system of colouring, the woven result would consist of a band of lines of the respective colours running longitudinally in the fabric, and of a band of transverse lines of the same shades. This is a principle which is capable of being utilized in the construction of elaborately figured designs.

When the weaves supplied in Figs. 61 and 61A are combined, and the resultant design woven in this order of shades, in such sections of the fabric as Fig. 61A occurs, the pattern produced consists of small step effects twilling to the right, but in the

sections composed of Fig. 61, of similar effects twilling to the left; hence, by combining these in the form of stripes, checks, or figures, woven patterns are obtainable diversified in aspect and arrangement.

Next, as to the two-and-two system (Class A, Scheme II., of Simple Colourings) of combining shades. This is another plan of grouping colours for certain elementary crossings. Its effects in the $\frac{2}{2}$ twill and the mat or celtic are typical of the general style of pattern obtainable.

The results produced in the twill are those in Figs. 62, 62A, and 62B. The different effects are due to the employment of distinct wefts. Thus, in Fig. 62 the weft is grey, in Fig. 62A white, and in Fig. 62B the same as the warp, or two picks of grey and two picks of white. When the grey weft is used, a

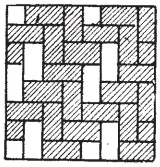

FIG. 62.

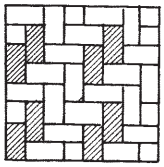

FIG. 62A.

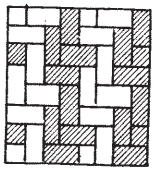

FIG. 62B.

stripe of grey adjoining an intermittent stripe of white is obtained; when white forms the weft, a small line of white adjoins a broken line of grey and white; but when a corresponding method of wefting is adopted as warping, a small broken check effect is acquired.

Changing the weave to hopsack or mat alters the patterns resultant. If the weft be black in this two-and-two colouring, and the weave four-end celtic, a style is constructed similar to that given in Fig. 63, or a pattern with a black ground on which squares of solid white are regularly distributed at uniform distances apart. Substituting white for the black weft, a texture with a white foundation and a black square spot, just the reverse of Fig. 63, is produced; whereas if the weft is the same as the warp, a style composed of solid lines of black and white, or a pattern of a hairline description, results.

These examples clearly set forth the principles of weaving in

relation to methods of colouring. Here the same order of threads —though extremely simple—in two different crossings of an elementary structure, forms quite distinct effects. In the cassimere twill more intermingled, and hence less severe patterns, are formed than in the mat or hopsack. They consist of small indefinite stripes and of a minute and irregular check. But in the mat, the same warp colouring gives a well-defined check composition, even when the wefts are all one colour, and instead of a broken check in the fabric when the weft is similar to the warp, as in the twill, a stripe of a decided arrangement is got.

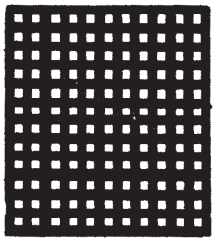

FIG. 63.

134. *Figured Styles in Common Weaves in One-and-One Colouring.*—The principles of woven effect, just elucidated, whereby a combination of plain or twilled weaves may, in the simplest arrangement of colours, be made to produce in the texture two dissimilar patterns, may be utilized in the development of figured designs. Usually these figured fabrics necessitate the adoption of various schemes of weaving and colouring in their manufacture; whereas in this type of design there is no elaboration either of weave or colour. These are particulars of construction peculiar to patterns acquired on this system.

A feature of designs of this class consists in the uniform appearance and sound wearing qualities they impart to the woven fabric. Some kinds of figured textiles are more or less loose on the surface and in structure, owing to the diversity of weave floats requisite to develop the objects or figures composing the designs. No arrangement of this sort, involving intricacy of cloth structure, is needed in gaining patterns by this scheme of weaving. The fabrics, though in some instances elaborately figured, are plain or twill throughout, according to the makes employed—hence the textures are even, firm, and neat in both appearance and construction. Effects of this order are more subdued in tone and possess a mellower aspect than figured styles due to combining various principles of weaving and colouring.

Reference to Figs. 64 and 65 will indicate, first, how the

designs are constructed; and, second, how the textural results are acquired. Fig. 64 is a small spotted design composed of two plain makes. In constructing these designs, the form of the figuring is primarily sketched out on point paper, and the weaves subsequently added. When the two makes are in contact, there must not be more than a float of three. Having worked out the design on point paper, the next matter to be arranged is the development of the ground sections in vertical, and the figured parts in transverse lines of colour, as in Fig. 65, which is

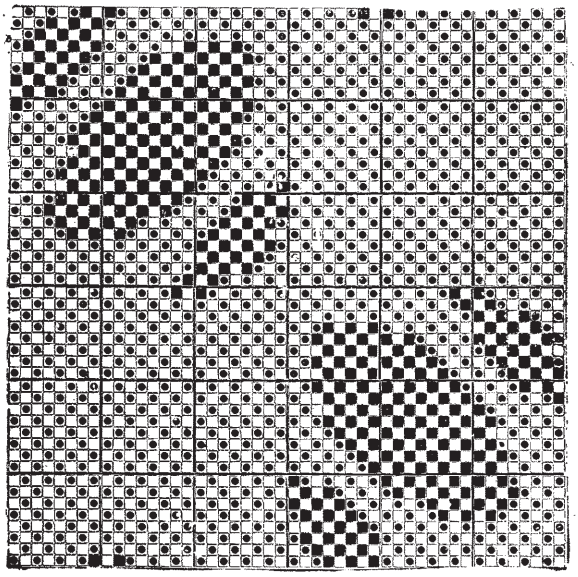

FIG. 64.

a sketch of the textural effect produced by this design. In all designs constructed on this base, it is a rule that the fancy shades in the warp and weft shall, in conjunction, be arranged to form the striped effects described. When the design given in Fig. 64 is warped and woven 1 thread black and 1 thread white, these two shades form stripes lengthways of the piece in the ground portion of the fabric, for the black picks cover the black threads *only*, and the white picks the white threads *only*, while the small figures are developed in short transverse stripes; because, in such sections, the weave in the design causes the black picks

to float over the white threads and the white picks to float over the black threads.

Now consider the effect of the same order of shades in the design composed of cassimere twills given on Plate XXI. This style illustrates the process by which the sketch furnished in Fig. 66 is transferred on to point paper and prepared for the loom. Designs for these fabrics are worked out on the same system as the preceding example. A comparison of Fig. 65 with Fig. 66 brings out several points of dissimilarity. These do not arise from any variation of the plan of colouring, but of the plan of interlacing the threads in constructing the fabric. The vertical and transverse lines of Fig. 65 are substituted by neat diagonal effects, and a pattern of more diversified outline and arrangement obtained. It has been pointed out that the thread-and-thread scheme of shades yields, in the cassimere twill, the two effects seen in Fig. 66. When the weave runs to the right, the black and white diagonal effect runs to the left, and *vice versâ*; so that in preparing the designs for the loom it has, in the first place, to be decided whether the ground or the figured sections shall be developed in the minute diagonals of shades moving to the right. Generally, it will be found that this effect is most suitable for the ground.

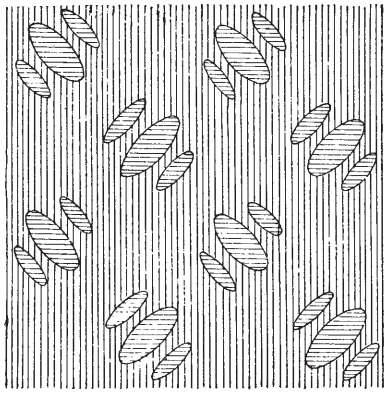

FIG. 65.

135. *Utility of the One-and One Principle in Figured Textiles.* —The scheme of textile colouring and designing analyzed in the previous paragraph is applicable to a large diversity of goods, including cotton, silk, worsted, and woollen fabrics. Styles for dress stuffs and mantlings may be produced in this manner. Cotton yarns in these designs produce very effective patterns. The compact structure of these threads develops both series of effects with a clearness and prominence that are absent from cloths composed of woollen materials. Whether the designs are

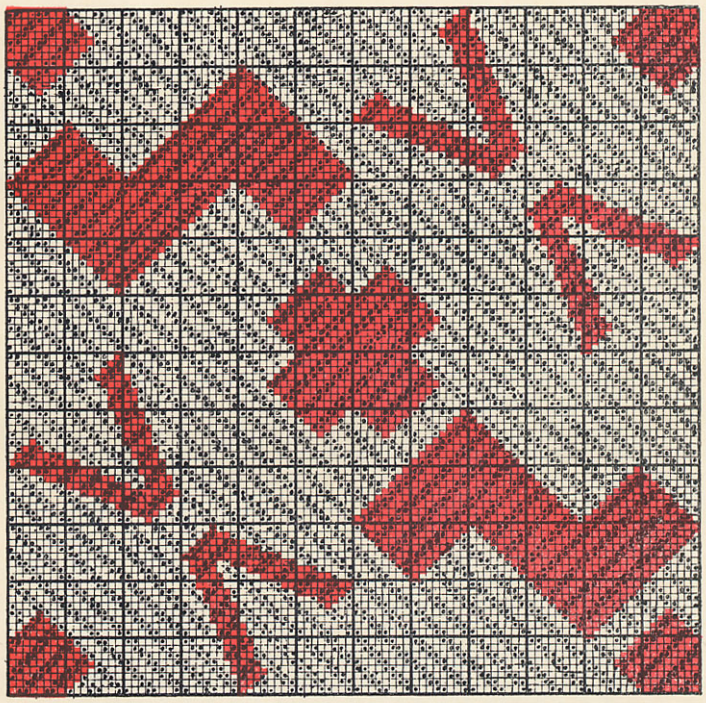

Plate XXI

FIGURING IN SIMPLE TWILLS

employed in one set of yarns or the other, schemes of colouring such as the following may be employed:—

I.	II.
1 thread of dark brown (Shade 1, Plate IV.).	1 thread of dark grey.
1 thread of medium brown (Shade 3, Plate IV.).	1 „ light „
III.	**IV.**
1 thread of medium grey.	1 thread of lilac (Tint 17, Plate VI.).
1 „ white.	1 thread of white.

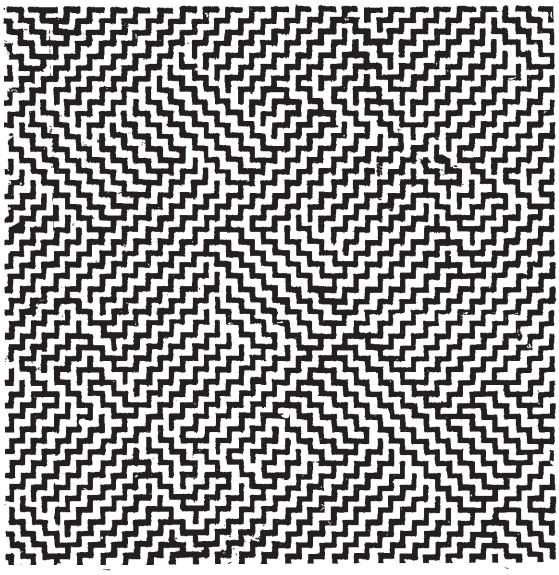

FIG. 66.

Colours slightly contrasting in hue, or merely in shade, may be used in worsted yarns; but in woollens, where the effect is not so clear or pronounced, owing to the structure of the yarn, more contrast of colouring is requisite to emphasize the figuring. Woollen fabrics coloured on this principle may be either "clear" finished or covered with fibre. It depends entirely on the type of fabric produced. If a dress texture, the best results may be obtained by developing the effect of the colours as much as

possible in the finishing processes; but if a mantling, a soft, fibrous surface enhances the mellowness and attractiveness of the patterns formed.

Of course the methods of figuring obtained by this thread-and-thread colouring are combined with other schemes of colours

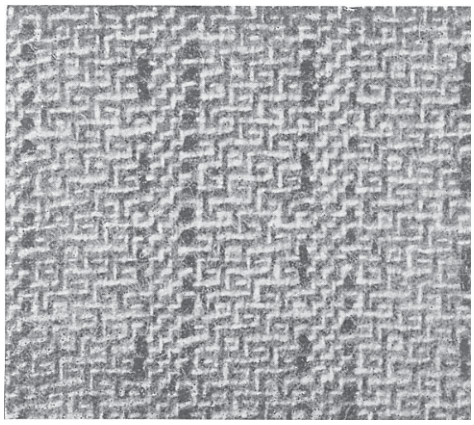

FIG. 67.

in making more elaborate patterns. For example, a band of figuring, such as is given in Fig. 66, may be arranged to adjoin a bold stripe of entirely distinct colouring, and thus a pattern produced containing much diversity of composition.

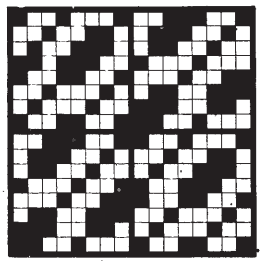

FIG. 67A.

Pattern is acquired in these and similar designs economically in the loom. No complication, either of weave or of colour, arises in their origination. By the employment of two shades and one weave —used in such a manner as to yield two varieties of style—any form of figuring is on this system producible.

136. *One-and-One and Two-and-Two Colourings in Fancy Weaves.* — Some applications of this scheme of colouring to other weaves than the plain and twill are shown in Figs. 67, 68, 69, the plans being Figs. 67A, 68A, and 69A. The only alteration in the colouring is the use, as seen, of fancy thick yarns for striping or checking. The contrast in the weaves should be noticed, and also

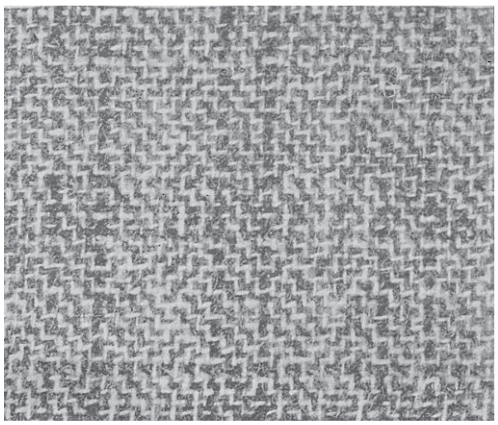

FIG. 68.

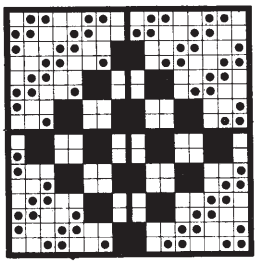

FIG. 68A.

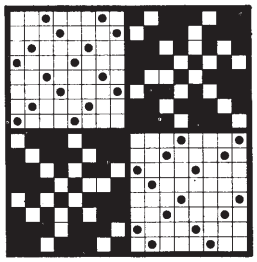

FIG. 69A.

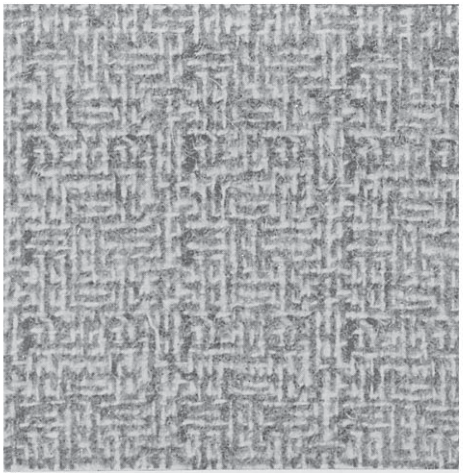

FIG. 69.

in the woven patterns. The weaves comprise (Fig. 67A) a fancy twill composed of $\frac{3}{1}$ and $\frac{1}{3}$ twills; Fig. 68A, twill and mat; and Fig. 69A, check in broken $\frac{3}{1}$ and $\frac{1}{3}$ twills. The line characteristic is noticeable in Figs. 67 and 69, being more pronounced in the latter. Fig. 68 is the most regular in style, due to the weave being composed of twill and mat.

Figured styles in two-and-two colouring are producible in the designs made on the principles given in Paragraphs 134 and 135, and also in other simple weaves similarly combined. One

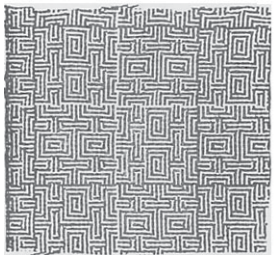

FIG. 70.

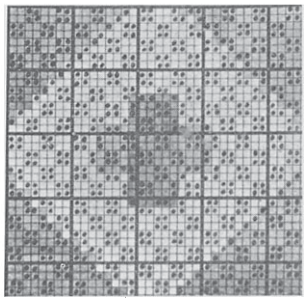

FIG. 70A.

example (Fig. 70) may be taken, woven in the $\frac{2}{2}$ mat, the sectional design being given in Fig. 70A. The order of colouring in both warp and weft is:—

Black . . .	2	For 36.
White . . .	2	
White . . .	2	For 36.
Black . . .	2	

By the change in the positions of the colouring, the key pattern is inverted and made more diversified in character.

137. *Three-and-Three Colouring.*—This method of grouping shades of warp and weft (Class A, Scheme III.) is employed in the six-end twill and its derivatives, also in twelve-shaft and other weaves.

An example of the effects in the $\frac{3}{3}$ twill in the fabric, due to three-and-three warping and various weftings practised, is

sketched in Figs. 71, 71A, and 71B. The first of these illustrations has a grey weft; Fig. 71A is woven with white, and Fig. 71B with three picks of grey and three picks of white.

138. *Four-and-Four Arrangement.* — Twill, hopsack, and other common weaves are used in producing styles in this order of colours, which is supplied in Scheme IV. of Class A of the

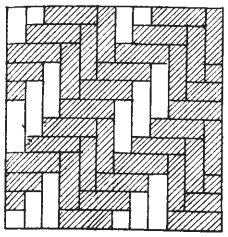

FIG. 71.

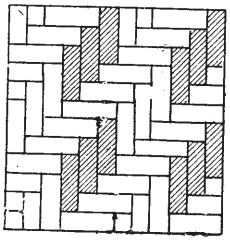

FIG. 71A.

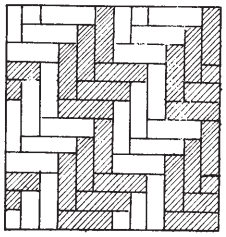

FIG. 71B.

Regular Simple Colourings. Black and white shepherd plaids are made on this base, a useful form and size of check resulting from its employment. Some of the effects got in the cassimere twill by warping four threads of grey and four threads of white,

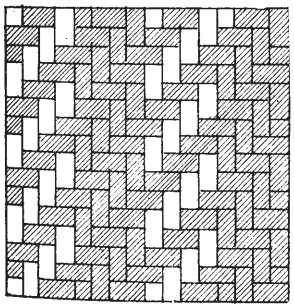

FIG. 72.

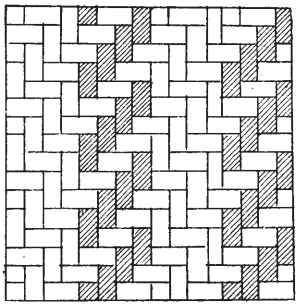

FIG. 72A.

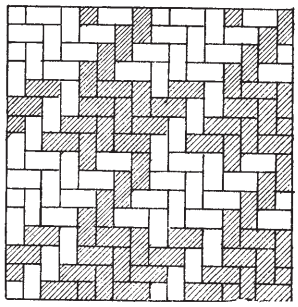

FIG. 72B.

and wefting with white and grey, and with the same order of shades as in the warp, are sketched in Figs. 72, 72A, 72B. The check style here is particularly neat. It is produced in a variety of colours for almost all kinds of fabrics. When the four-end mat weave is used, a species of star check is formed, as seen in Fig. 73. A considerable range of patterns ensues from adopting this order of colours and combining the cassimere and mat

weaves in the construction of stripe, check, and diagonal designs. Thus, supposing the last type of weave-combination were employed, then in such parts of the diagonal where the twill occurred, the shepherd plaid effect would result, but the hopsack sections would yield the star check style, so that diagonal bands of these respective patterns, regularly alternating, would extend across the fabric.

139. *Four-and-Four Method applied to Fancy Weaves.*— There are various patterns obtained in this order of threads by

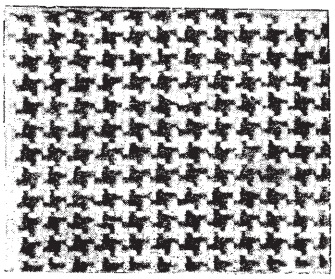

FIG. 73.

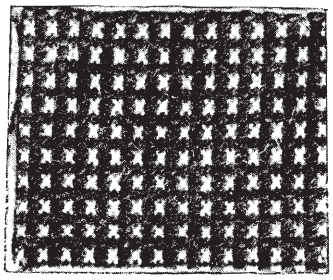

FIG. 74.

using other weaves than the twill or mat. As an illustration in these effects, Fig. 74, which has been produced in the weave given in Fig. 74A, may be examined. It is a small spotted design; the minute crosses of white, surrounded by rectangles of black, are determined in shape and dimensions by the arrangement of warp and weft flushes composing the crossing. The weft yarn of this pattern is all black. Comparing this style with that sketched in Fig. 72, which is composed of the same order of threads, it will be observed that any modification of weave alters the pattern resultant. In the weave furnished in Fig. 74A, the white threads only show on the face of the texture where the blank spaces occur; whereas, in the cassimere twill employed in the construction of the sample shown in Fig. 72B, the white warp threads float on the face of the fabric on the same system as the black picks. The pattern given in Fig. 74 indicates how, by resorting to novel schemes of weaving, the simplest methods of colouring may be made to produce distinct patterns.

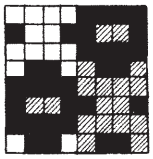

FIG. 74A.

Employment of other weaves than the twill and mat give equally satisfactory results. Such makes are, of course, multiplied in proportion to the ingenuity of the designer. The example considered is but a type of the numerous styles obtainable in this four-and-four colouring by having recourse to designs of this type.

140. *Six-and-Six and Eight-and-Eight Schemes.*—These are not given in the plan of Regular Simple orders of shades, being but extensions of Schemes III. and IV.; but they are important in practice, and must be considered as distinct principles of grouping colours. They are mainly employed when well-pronounced patterns are required in fine yarns, in which instances they yield far more effective styles than the schemes of shades from which they are derived. In both worsted and cotton dress textures and tweed mantlings, they are largely used.

Both systems are illustrated. The six-and-six plan, and the styles it gives in the six-end twill, are furnished in Figs. 75, 75A, and 75B. The same methods of weft colouring have been practised as in other sketches, showing the changes resulting from varying the weft from light to dark, and from having it exactly like the warp. Fig. 76 has been produced in the eight-shaft twill, and is composed of 8 threads of black and 8 threads of white in both warp and weft. Should such shades as the following be used in the six-end twill, more toned patterns result than those supplied in the illustrations:—

I.	II.
6 threads of slate.	6 threads of light fawn.
6 „ slate and white twist.	6 „ light fawn and white twist.

III.	IV.
6 threads of blue.	6 threads of No. 2 mixture, Plate XIII.
6 „ brown.	6 threads of No. 8 mixture, Plate XIII.

The I. and II. Schemes are for light textures. They illustrate an important method of combining shades, inasmuch as the same shade occurs in both the first and second group of six

threads in each example. Thus, in Scheme I. the second group of ends consists of slate and white twist — the slate being exactly of the same hue as that used in the first six threads. This arrangement gives neatly-toned patterns, and is suited for Simple Colourings in which the respective shades are combined in these qualities. The third group of shades is for

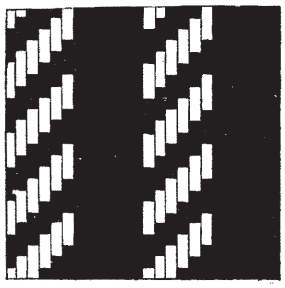

FIG. 75.

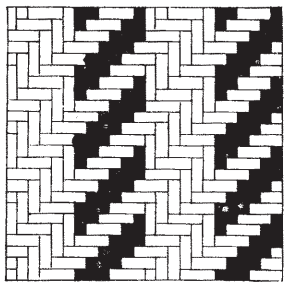

FIG. 75A.

a dark pattern. Here the contrast should not be strong; the mellower the better. It only requires to be sufficiently pronounced to develop the outlines of the checkings and the effects due to the plan of interlacing the threads. A mixture-

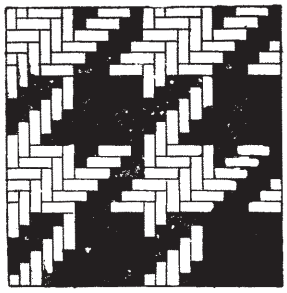

FIG. 75B.

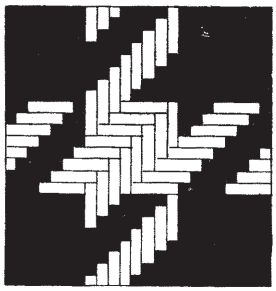

FIG. 76.

yarn example is also given in the fourth scheme of shades. Yarns of this class are useful in the manufacture of both worsteds and tweeds. The black and white shades which have been used in these illustrations—75, 75A, 75B, and 76—bring out the character of the pattern due to the structure of the weave.

141. *Six-and-Six Colourings in Various Crossings.*—Two

examples may be examined in which weave has been advantageously employed in these schemes of colouring. The first, Fig. 77, is a species of check, the patches of the two shades being differently shaped from what they are in Fig. 75B, which is a composition of the same order of shades. This arises from the structure of the weave employed. It is given in Fig. 77A,

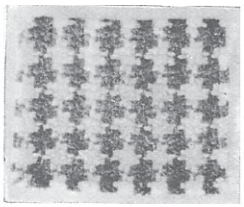

FIG. 77.

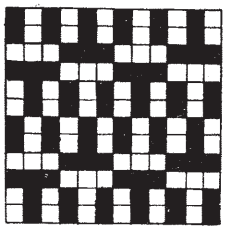

FIG. 77A.

and is a combination of warp and weft cords. The *warp* cord causes the spaces of black and white to practically run into each other in the direction of the warp, and the *weft* cord makes them continuous in the line of the weft.

The next illustration, Fig. 78, is commonly termed the star

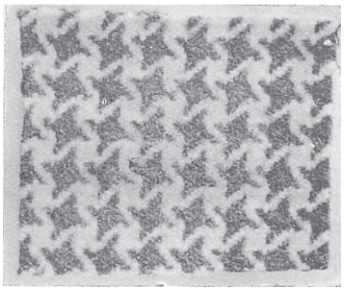

FIG. 78.

FIG. 78A.

check. It somewhat resembles Fig. 73, but the effects are more prominent and better developed. The weave used in this case is the six-end twill angled, Fig. 78A. In making the pattern, the first six picks should be black, otherwise they would not meet the interlacings in the weave on the system requisite to give this effect.

142. *Three-Odd-Thread Arrangement.*—For the plain weave,

prunelle, and six-end twills, this is one of the useful schemes of colouring. In the plain it forms, when woven with the same order of weft as warp threads, the neat style sketched in Fig. 79. When the shades are black, grey, and white, as in Scheme I.,—Class B, of the Regular Simple Colourings, — small vertical and transverse lines of these shades are formed, meeting each other at right angles. Thus, in Fig. 79, the vertical lines of black oppose the transverse lines of black, and the same arrangement obtains in regard to the grey and white lines.

FIG. 79.

Check patterns are producible in this scheme of shades by colouring as follows:—

For 18 threads.
- 1 thread of russet (No. 7, Plate III.).
- 1 „ citron (No. 8, Plate III.).
- 1 „ olive (No. 9, Plate III.).

For 18 threads.
- 1 thread of russet.
- 1 „ citron.
- 1 „ blue.

In the first eighteen threads, the effects formed are of russet, citron, and olive; but in the last eighteen, blue takes the place of the olive, so that when the style is woven with the same series of weft as warp colourings, it makes a mellow check design.

Another method of adding to the utility of this form of pattern consists in introducing into its composition an over-check of fancy shades, which may be obtained thus:—

For 19 threads.
- 1 thread of black.
- 1 „ brown.
- 1 „ black and white twist.
- 1 thread of black and blue twist.
- 1 „ black and scarlet twist.

There results from this method of grouping shades, a pattern consisting of a rectangular space of nineteen ends and picks of small effects, similar to those seen in Fig. 79, but consisting

of black, brown, and black-and-white twist, instead of black, grey, and white. In the prunelle twill, this colouring produces hairline patterns in three shades. Other stripe and check designs result from combining the warp and weft weaves, and developing in the same colouring.

The effects obtained from using this colouring in the six-end twill are more diversified in character than those producible in the plain make. They are of three distinct styles. The style of pattern now acquired depends on the method in which the respective shades meet each other in the weave. The several effects obtained, when the $\frac{3}{3}$ twill is used, are shown in Fig. 80. This has been developed in the weave

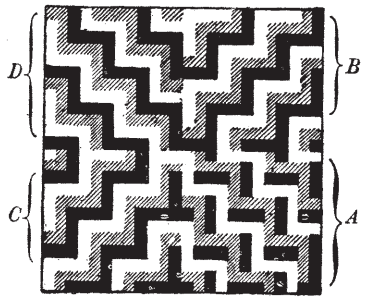

FIG. 80.

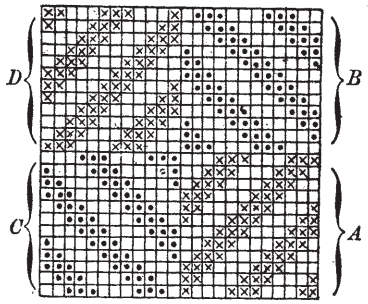

FIG. 80A.

given in Fig. 80A, which is a small check design composed of six-end twill, running in two directions. Let the sections of the woven pattern acquired in Fig. 80 be analyzed separately. It must be understood that the order of shades is the same throughout, namely, that in Scheme I. of Class B of the Regular Simple Colourings. Hence the diversification of style here noticed is a resultant of weave and not of colour combinations. The different effects acquired in Sections *A*, *B*, and *D*, show that makes of various constructions have been employed. A distinct style obtains, for instance, in Part *A* from Part *B*. In the former, lines of black are set at right angles to other lines of this shade, while the grey and white yarns form diagonals; but in *B* all the three shades run diagonally. Section *C* is practically the same as *B*, while *D*

is also similar, only twilling to the left. The parts lettered *A*, *B*, *C*, and *D* in the design, Fig. 80A, correspond to those just described. One other effect may be got in the six-end twill besides those considered in this order of threads, namely, that in which two diagonals, grey and white, twill to the left, or the opposite to what they do in *A*, and small transverse lines of black be set across similar vertical lines. If the positions of the shades were altered, the grey or the white yarns might be made to form the disconnected spots.

A further principle of colouring suggested by this illustration is, that the same plan of shades and method of weaving are capable of yielding different woven results according to

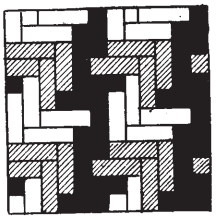

FIG. 81.

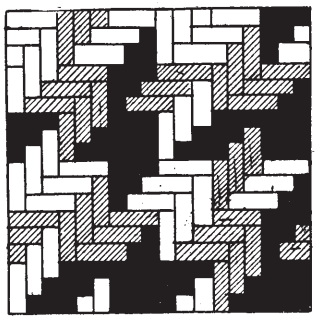

FIG. 82.

the system on which they are combined. Thus, as has just been indicated, without modifying the scheme of colours, the check design in the six-shaft twill gives the effects sketched in Fig. 80. Parts *A* and *D* are formed by one weave running to the right, yet how different they are in character! To what is the difference due? The design shows that the black threads and picks do not meet each other in the same way, for while in Part *A* of Fig. 80A the first pick is two threads down, three up, three down, three up, and one down; in Part *D* it is three up and three down, so that in reality the first pick in *A* corresponds to the fifth pick in *D*. Still, though the order of the threads is the same in both sections, the methods on which the colours are crossed in the respective parts of the texture are dissimilar, hence corresponding results cannot possibly ensue. This difference of effect, arising from

commencing colouring on certain threads and picks of the weave, increases the variety of styles obtainable in the same order of threads and principle of intertexture.

143. *Various Three-shade Patterns.*—Amongst other Simple orders of colouring composed of three shades are those given in Schemes II., III., and IV. of Class B. Each system may be developed in the six-end twill—the last system, which may be termed the three-4's, also produces standards in four-shaft weaves. Only two of these principles are illustrated, namely, the three-2's and the three-3's. It will be evident from the sketches, Figs. 81 and 82, that these patterns belong to a useful class of effects. Fig. 81 is a neat form of intermingled check. Such compounds of shades as the following may be applied:—

I.

3 threads of citron (No. 9, Plate III.).
3 „ olive (No. 1, Plate III.).
3 „ russet (No. 7, Plate III.).

II.

3 threads of dark blue (No. 7, Plate IV.).
3 „ dark olive (No. 13, Plate IV.).
3 „ dark brown (No. 1, Plate IV.).

III.

3 threads of light olive (No. 9, Plate VI.).
3 „ lilac (No. 17, Plate VI.).
3 „ fawn (No. 10, Plate VI.).

The I. and III. of these colourings are suitable for dress fabrics, but the II. is adapted for tweed suitings. This form of pattern should also be developed in mixture and twist yarns in woollen, worsted, and cotton materials.

As a result of employing this scheme of shades, three sets of checks, each formed within the other, are obtained in the fabric. By examining Fig. 81, it will be observed there is first the check of black; second, the check of grey; and third, the check of white. The character of the style due to the weave is apparent in this illustration. There is also perfect

balance of shades. This feature, which mainly results from the twill employed in the construction of the pattern, contributes to the general character of the style. Still, it will be noticed that the manner in which the black threads interlace produces a different check from that resulting from the grey or white yarns.

Fig. 82 gives a more irregular style than Fig. 81, on account of the weave being repeated three times, and the order of the shades twice, before one complete pattern is acquired. This arises from there being nine threads in the plan of shades—3 of black, 3 of grey, and 3 of white—and six threads in the weave. The pattern sketched in Fig. 82 in one particular resembles the preceding style, for the shades combined form three broken checks, but in other characteristics it is quite different. The element of black is exactly proportionate to that of grey or white, and each shade constitutes a well-defined series of minute effects, which, by repetition, bring out the check character of the style. It is a base that is improved by diversity of colouring. In combination with Fig. 81, wefted either three-2's or three-3's, it yields stripe and check designs of a broad character.

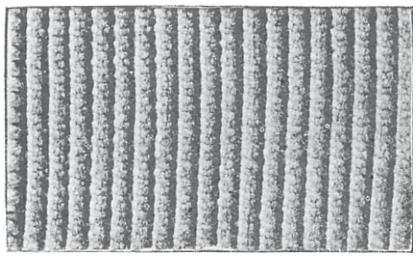

FIG. 83.

144. *Simple Colourings composed of Four Shades.*—Each of the four arrangements in Class C of Simple Colourings is illustrated. Scheme I. is given in Fig. 83. It forms a hairline stripe of four colours if produced in the swansdown weave, when the order of the wefting is 1 pick black, 1 pick dark grey, 1 pick white, and 1 pick medium grey. This style is applied to fancy woollens, and also to worsteds. It is a standard colour-base for trouserings and fabrics in which a fine line pattern is required. The same arrangement of shades in the plain weave makes a mixture effect, and in the common twill the colourings form a minute broken check.

Fig. 84 results from the II. Scheme of Colouring given in

Class C. The weave is cassimere twill, but the celtic or mat, and other weaves of a regular construction on four and eight shafts, are also used. Here are four more or less disconnected checkings of colours forming an intermingled pattern, choice in outline and soft in tone.

A more pronounced style is got when the quantities of the several shades are increased, and a weave selected of an open structure. These points are brought out in Fig. 85, in which the same arrangement of shades obtains as in Fig. 84, only the quantity of each colour is increased one-third, and the six-shaft twill substituted for the four-shaft twill. Broader effects are therefore the result. Were this sketch repeated, to show the

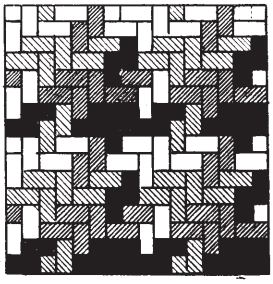

FIG. 84.

FIG. 85.

outline of the pattern more clearly, it would be observable that the black, dark grey, medium grey, and white shades all form checkings, which, in the fabric, are quite distinct from each other. As the order of shades here contains twelve threads, the six-shaft twill is one of the best weaves that can be employed for regularly and equally distributing the shades.

Eight-shaft makes being repeated three times before they meet the plan of colours, give more irregular and mingled effects.

The last example in Simple Colourings obtained by combining four shades is given in Fig. 86. It has been produced in the Mayo weave, in Fig. 86A. In common twills of more uniform interlacings, it gives a pattern of more decided markings. The Mayo weave has broken up the groups of fours into which the

colours are divided. As a consequence, the resultant style is characterized by softness and intermingled colouring. The weave effect is an important feature. Either sets of hues of different colours of the same depth, or sets of shades in one colour, may be employed in this scheme.

All the examples described in Regular Simple Colourings are of a typical character, and in practice are diversified in colouring and in weave.

145. *Irregular Simple Colourings.*—These are patterns in which the quantities of the different shades used, or the plans of colouring as to succession of colours, are not uniform. They are not so numerous as the "Regular Colourings" already considered,

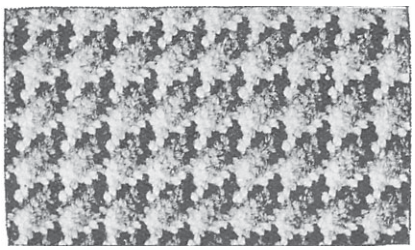

FIG. 86.

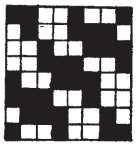

FIG. 86A.

but they are important in pattern designing. The principal of these combinations are furnished in the Table below :—

TABLE X.

IRREGULAR SIMPLE COLOURINGS.

CLASS A.—COMPOSED OF TWO SHADES.

I. Scheme.	*II. Scheme.*
2 threads of black.	4 threads of black.
1 thread of white.	1 thread of white.
III. Scheme.	*IV. Scheme.*
4 threads of black.	4 threads of black.
2 „ white.	2 „ white.
	2 „ black.
	2 „ white.

TABLE X.—*continued.*

CLASS B.—COMPOSED OF THREE SHADES.

I. Scheme.

2 threads of black.
2 „ grey.
1 thread of white.

II. Scheme.

3 threads of black.
2 „ grey.
1 thread of white.

III. Scheme.

6 threads of black.
4 „ medium grey.
2 „ white.

IV. Scheme.

6 threads of white.
2 „ grey.
2 „ black.
2 „ grey.

CLASS C.—COMPOSED OF FOUR SHADES.

I. Scheme.

3 threads of black.
2 „ dark grey.
2 „ medium grey.
1 thread of white.

II. Scheme.

4 threads of black.
3 „ dark grey.
3 „ medium grey.
2 „ white.

III. Scheme.

4 threads of black.
2 „ medium grey.
4 „ light grey.
2 „ white.

IV. Scheme.

4 threads of black.
2 „ medium grey.
2 „ light grey.
4 „ white.
2 „ light grey.
2 „ medium grey.

146. *Irregular Simple Patterns of Two Shades.*—In this class of colouring are found some useful bases for fancy textures composed of simple twills and other elementary crossings. They may be considered in the order named in the Table. The first scheme is most generally used in the prunelle twill, in which weave it gives lines lengthways or across the texture, according to whether the make is warp or weft flushed. These two twills combined in figured designs, and this order of colouring adopted, produce a style of pattern resembling that got by blending two plain makes, only one line of colour is twice the thickness of the other.

The II. Scheme finds application to five-shaft weaves. Thus, in twill, Fig. 87A, it makes the neat check style seen in Fig. 87. The same scheme is applied to cottons and fancy woollens. Some effective patterns ensue from colouring—

For 25 threads. { 4 threads of black. 1 thread of white.
For 25 threads. { 4 threads of white. 1 thread of black.

The form of the pattern resultant from this arrangement comprises a series of effects similar to Fig. 87, and then a series of effects with a white ground and black spotting.

The extent to which one thread and a slight change in the weave may alter the nature of a woven pattern is illustrated by

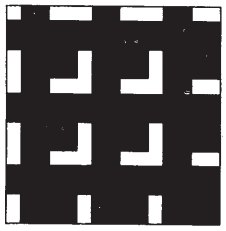

FIG. 87.

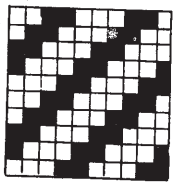

FIG. 87A.

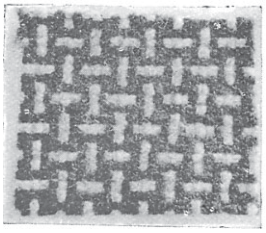

FIG. 87B.

Fig. 87B, obtained in the four-end celtic and the III. Scheme of shades in Class A. The weave and the colours are combined on such a principle, that the shade used in the smallest quantity forms short vertical and transverse lines on the surface of the texture. This, like the preceding example, is an order of colouring that is frequently varied by transposing the shades thus:—

For 24 threads. { 4 threads of black. 2 „ white.
For 24 threads. { 4 threads of white. 2 „ black.

Providing the weft is the same as the warp, a square is first formed in which the lines or spots are white, and arranged on a black ground, and then a check of black lines on a white ground. When the shades do not form strong contrasts, this base is

capable of being utilized in the production of a large variety of fancy fabrics.

A more irregular effect, Fig. 88, results from employing Scheme IV., than either Schemes II. or III. The weave, Fig. 87A, produces the mingled cast of the pattern. Shades may be employed here that give well-emphasized contrasts.

There are several other forms of these colourings, such as the following:—

(*a*)	(*b*)	(*c*)
5 threads of black.	6 threads of black.	8 threads of black.
2 „ white.	2 „ white.	3 „ white.
		2 „ black.
		3 „ white.

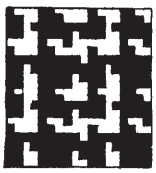

FIG. 88.

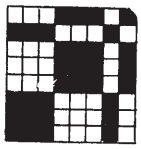

FIG. 89A.

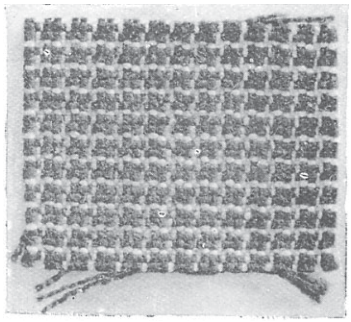

FIG. 89.

The first of these is applicable to seven- and fourteen-shaft weaves, in which it may be made to produce some characteristic effects. The second of these additional irregular two-shade colourings is mostly employed in eight-end makes of special construction. Two patterns in which it has been used are sketched in Figs. 89 and 90. It is the structure of the respective weaves that is the cause of one pattern—Fig. 89—being a minute check of a clear outline, and of the other pattern—Fig. 90—being a bird's-eye spot. In Fig. 89, the weave is a fancy mat, Fig. 89A. The white threads in both warp and weft fall on the 7th and 8th threads and picks in the weave. To these threads and picks, the check character of the pattern is due. They cause the black

yarns to be grouped together in the form of a minute irregular rectangle, and the white yarns to give the skeleton check effect. In Fig. 90A, the same threads and picks again determine the specific effect of the pattern. They so control the grouping of the yarns that the white threads produce the small spot or star. These illustrations demonstrate the principle of originating plans of weaving, which will change the pattern produced by a given set of colours in such manner as to compose distinct styles.

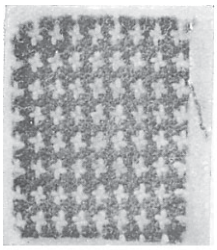

FIG. 90.

FIG. 90A.

The effect of the third arrangement given above is to form the pattern seen in Fig. 91. It is a base that frequently finds an important place in tweeds, flannels, dresses, and worsted suitings.

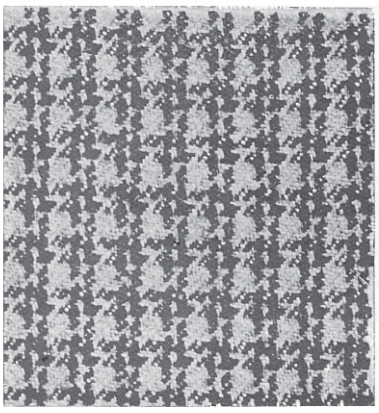

FIG. 91.

FIG. 91A.

FIG. 92.

It is a neatly-marked check. The weave employed in its construction is Fig. 91A. This scheme is developed in light, medium, and dark shades, and in self, compound, and mixture yarns. Considering that only two shades are used in its construction, it is a pattern having diversity of outline.

147. *Irregular Simples, composed of Three Shades.*—Brief descriptions need only be given of these. A small check is

obtainable by the first of these schemes. It is best adapted for weaves occupying five threads. The weave employed in making this pattern—Fig. 92—is Fig. 87A.

The II. Scheme is workable in the six-end twill, in which it yields an ordinary suiting style (Fig. 93). The shades used in

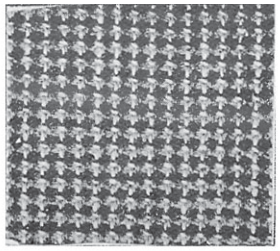

FIG. 93.

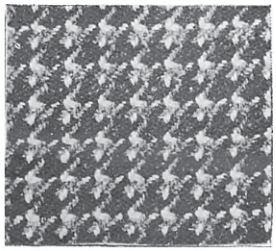

FIG. 94.

the largest proportions in this pattern should be the most subdued in tone, while the colour for the single thread should be the brightest. This arrangement has been adhered to in the illustration.

Schemes III. and IV. may be analyzed together. The former,

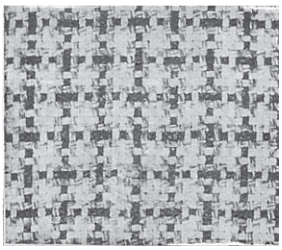

FIG. 95.

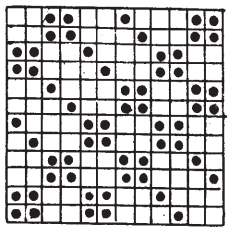

FIG. 96.

Fig. 94, has been developed in the six-end twill, and the latter, Fig. 95, in the mat or celtic. They are two typical patterns. The latter pattern appears to combine both check and figured effects, the small detached lines of black producing the figured appearance, and the grey shade, in combination with the black and white, yielding the toned check characteristic. It is applicable to all classes of simple fancies. It does not possess that distinct check cast which is so apparent in Fig. 94. This style

is really constructed on a similar principle to Fig. 93, for the respective shades gradually decrease in quantity from the beginning to the end of the pattern. All such arrangements admit of two methods of colouring. In the first place, the darkest shade may be made the principal factor, and in the second place, the

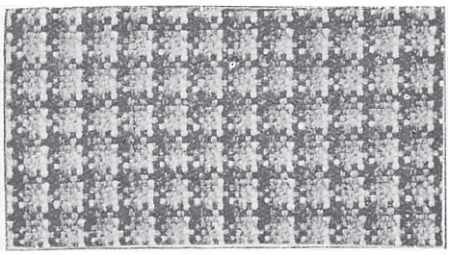

FIG. 97.

lightest shade. The intermediate colour—in this instance grey—is invariably placed in the centre in this style of colouring.

148. *"Irregulars" composed of Four Shades.*—The first of these schemes gives an effect somewhat similar to that which results from Fig. 93, only here the cassimere twill may be employed, and probably a neater pattern acquired. In certain weaves, such as Fig. 96, the Second Scheme, Class C, produces an

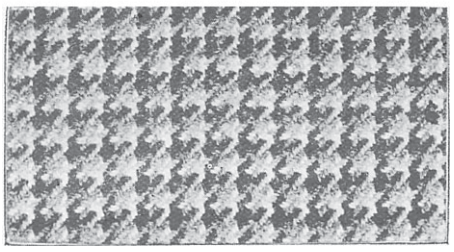

FIG. 98.

excellent type of suiting. It is illustrated in Fig. 97. If clearer effects are needed, common twills should be used, such as the six-end weave, which forms the pattern in Fig. 98. The III. Scheme yields in the Mayo a very effective pattern, as is seen in Fig. 99. Here the black yarns produce a broken line, while the other colours constitute intermingled checkings. This is a base, capable of being employed in the manufacture of various

classes of fancy textures. Scheme IV., Fig. 100, is a neat method of grouping shades for fancy checks. The pattern sketched has been produced in the sixteen-shaft diagonal (Fig. 100A), but it might also be worked in common twill and mat weaves. Such a diagonal adds, however, to the attractiveness of the intermixture

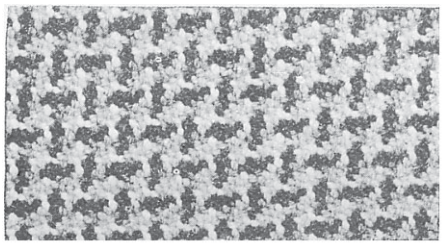

FIG. 99.

of shades. The characteristics of this example are due to the system on which the threads of warp and weft interlace. The pattern is a species of shaded check. From the tinted white to the

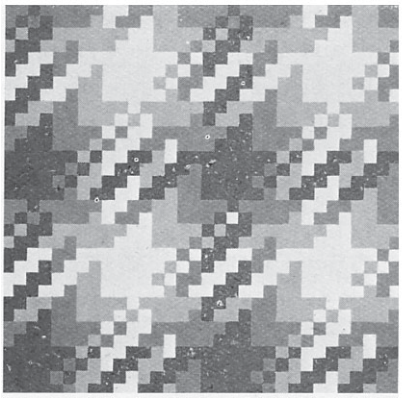

FIG. 100.

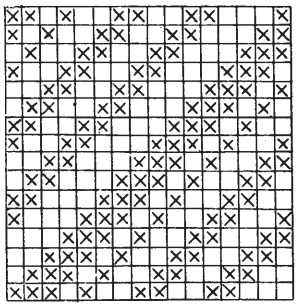

FIG. 100A.

black there is a graduated shade of greys, and in the following sets of colourings the same mellow toning would be observed.

I.			II.		
4	threads	of black.	4	threads	of black.
2	„	dark brown.	2	„	dark grey.
2	„	olive „	2	„	light „
4	„	light „	4	„	white.
2	„	olive „	2	„	light grey.
2	„	dark „	2	„	dark „

III.

4 threads of dark blue and dark grey twist.
2 „ „ „ medium grey twist.
2 „ „ „ light grey twist.
4 „ „ „ white twist.
2 „ „ „ light grey twist.
2 „ „ „ medium grey twist.

This colour-base may be applied to cotton textures and light fabrics, when the colourings should be considerably brighter than those enumerated. For variety of effect, it is one of the most important colourings included in the ordinary series of irregular elementary styles.

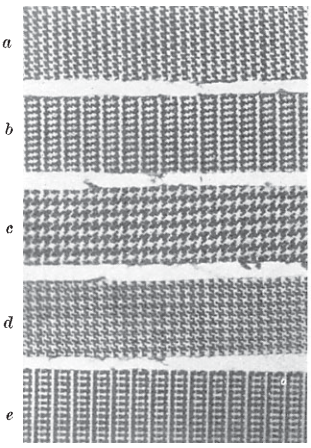

FIG. 101.

149. *Cross-Weftings.*—This term is applied to weft colouring which does not correspond with the warp colouring as to order of shades. All the Simple, and many of the Compound special Schemes of Colouring may be cross-wefted. As a result, another form of coloured pattern is obtained from that due to applying the same order of wefting as warping.

The following scheme (Fig. 101) is typical:—

Warp.

3 black. 3 white.

Wefts.

(*a*) 1 black.
1 white.
(*b*) 2 black.
2 white.
(*c*) 4 black.
4 white.
} Woven in the $\frac{2}{2}$ twill.

(*d*) 1 black.
1 white.
} In the $\frac{3}{3}$ twill.

(*e*) 2 black.
2 white.
} In the $\frac{2}{2}$ mat.

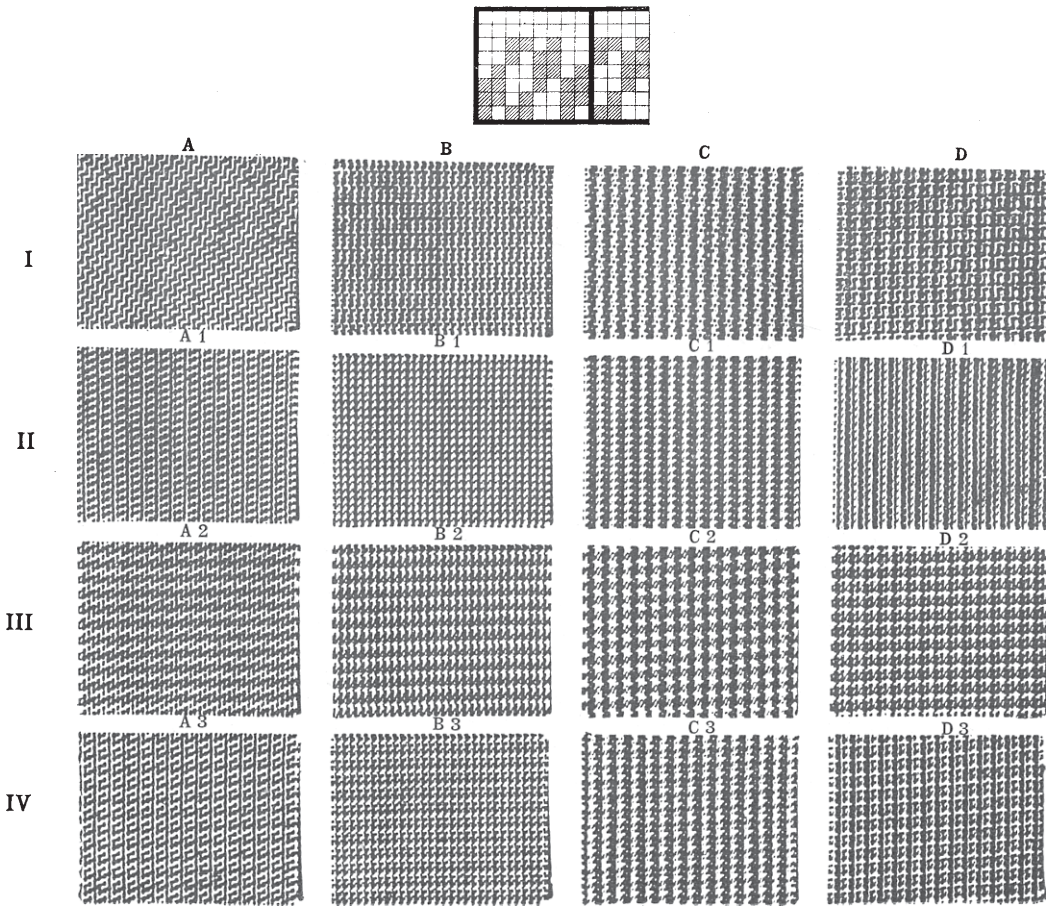

Plate XXII

STYLES DUE TO SIMPLE ORDERS OF COLOURING

On Plate XXII., some further examples of the effects of cross-wefting are illustrated. The orders of warping and wefting are as follows:—

Warping.	*Wefting.*
Series A to A3.	*Series I.*
2 dark.	Same as warp for
2 light.	Series *A* to *A3*.
Series B to B3.	*Series II.*
3 dark.	Same as warp for
3 light.	Series *B* to *B3*.
Series C to C3.	*Series III.*
6 dark.	Same as warp for
6 light.	Series *C* to *C3*.
Series D to D3.	*Series IV.*
4 dark.	Same as warp for
4 light.	Series *D* to *D3*.
2 dark.	
2 light.	

Patterns *A*, *B1*, *C2*, and *D3* are woven as warped, but other specimens are cross-wefted. Of the latter, the following are regular styles and correct pattern bases:—*A1*, *A2*, *B*, *C*, *C1*, *C3*, *D*, *D1*, and *D2*. Examples *A2*, *D2*, and *D3* are striped or lined across, showing that in extreme differences between the warping and wefting, irregular forms of pattern or effect result: *e.g.* *A2* warped 2-and-2, and wefted 6-and-6; and *D2* and *D3* warped 3-and-3, and woven 6-and-6, and 4, 4, 2, 2 respectively.

CHAPTER IX.

COMPOUND COLOURINGS.

150. Compounds—151. Compounds composed of Three Types of Elementary Colouring—152. Results of combining Simple Colourings—153. Compounds and Weave Combinations compared—154. Utility of a Practical Knowledge of the Woven Effects of Simple Colourings—155. Compound Patterns subjective to the Nature of the Fabrics Manufactured—156. Types of Compounds—157. Compounds composed of Two Simple Types—158. Patterns composed of Two Types and Three Shades—159. Styles of Four Shades containing Two Simple Types—160. Styles composed of Three Simple Types —161. Irregular Compounds.

150. *Compounds.*—As these are composed of several elementary schemes of colouring, they are generally patterns of some intricacy of composition. With only two shades it is possible to obtain varied effects in this style of woven colouring. When three or more shades are used, and several simple methods of grouping shades practised, though the weave may be of a common twill or mat description, Compound patterns may be quite elaborate in arrangement. The elaborateness of the style resultant is determined by several factors, such as the character of the types, number of the Simple Colourings combined, and the diversity of the shades employed. The simpler the schemes of colours selected, the fewer the elements of the compound, the more ordinary in cast and aspect is the pattern acquired. Still, the commonest groupings of shades, even when combined on the simplest system, form woven styles of considerable richness of composition. One example, Fig. 102, is suggestive of the characteristics of this species of textile colouring. It is the most elementary type of compound, resulting from combining Methods I. and II., supplied in Table IX., and consisting of black and white. But it is a pattern which comprises several styles of minute effects. It is divided into four rectangular spaces, *A*,

B, *C*, and *D*. Each square is formed of a different kind of textural design. Thus, in Section *A*, which is composed of two threads of black and two threads of white in both warp and weft, it will be noticed there are small irregular checkings forming vertical lines; in *B*, where the one-and-one order of warp colouring is crossed by the two-and-two order of wefting, minute figures, or spots of white, separately surrounded with black, occur; in Section *C* the same figures obtain as in *B*, only they are inverted, owing to the warp and weft colourings meeting each other in the reverse way to what they do in *B*; Section *D* consists of small step-twill effects. So there are thus, in this pattern, four textural results so associated as to form a neat check design, which is producible in woollen, worsted, silk, and cotton yarns. It may be diminished or increased in size, and modified in various ways. For example, Checks *A* and *C* may be double the size of *B* and *D*; or several striped patterns may be acquired by using Sections *C* and *D* together and Sections *A* and *B*—the spaces of each effect being determined by the class of fabric in which the style is produced. For trouserings they must be comparatively small, but for dress textures and mantlings they may be some inches in width. In such shades and tints as are appended, both the original pattern and the modifications named may be developed:—

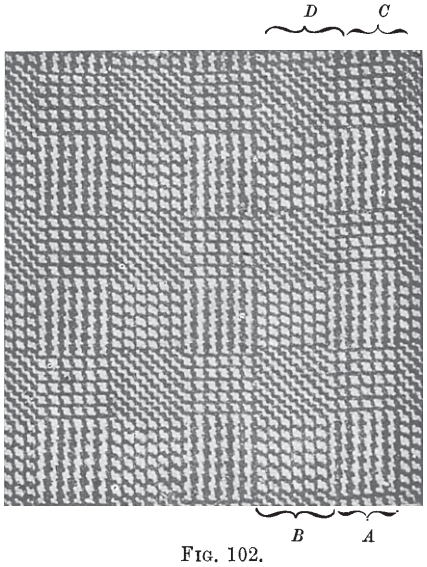

FIG. 102.

I.

For 24 threads { 1 thread of Shade 2, Pl. IV.
1 „ „ 8, „

For 24 threads { 2 threads of Shade 2, Pl. IV.
2 „ „ 8, „

II.

For 24 threads { 1 thread of Shade 7, Pl. VI.
1 „ „ 13, „
For 24 threads { 2 threads of Shade 7, Pl. VI.
2 „ „ 13, „

III.

For 24 threads { 1 thread of Tint 4, Pl. IV.
1 „ „ 4, „ VI.
For 24 threads { 2 threads of Tint 4, Pl. IV.
2 „ „ 4, „ VI.

IV.

For 24 threads { 1 thread of Tint 10, Pl. VI.
1 „ „ 16, „
For 24 threads { 2 threads of Tint 10, Pl. VI.
2 „ „ 16, „

These colourings, with the exception of No. 1, are more suitable for dress and fancy fabrics than for trousering and coating textures. They are too bright for the latter types of loom products, but are of the correct depth of colour for fancy dress and mantling fabrics.

151. *Compounds composed of Three Types of Elementary Colouring.*—In the above example in Compounds, only two schemes of colouring obtain; but in Fig. 103 three elementary systems of grouping shades have been combined, yielding a style rich in diversity of small types of design. The schemes of shades employed in this construction are the I., II., and IV. Methods in Class A of the Simple Colourings. They constitute, in the fabric, nine distinct effects. These must be closely examined, in order that the principles of pattern design involved in the formation of the Compound style may be understood. Commence with the three effects succeeding each other in Bracket *A*. First, there is a square of similar minute figuring to that noticed in *C* of Fig. 102; second, a rectangle of vertical stripes composed of neat markings; and third, a repetition of the effect seen in *D*, Fig. 102. Next, consider the types included in

Bracket *B*. The first space here is a composition of the small checks referred to in Section *A* of the former pattern; this adjoins a square filled in with vertical stripes; and then follows a space of similar dimensions, and of the same species of effects, as characterizes *B* of the preceding style. Both the *A* and *B* series of the effects comprise two types of pattern like those composing Fig. 102, but in the *C* and *E* groups five entirely distinct types of textural work are developed. Two of these—the two vertical stripes —have been alluded to. The horizontal stripes, comprised in Bracket *C*, have not been described. They are similar to the stripes seen in Bracket *E*, only they are formed across instead of lengthways of the fabric. Between the rectangular spaces of these effects there is a square of black and white plaid. It may be useful to indicate how the several effects forming this compound may be utilized on other systems than that illustrated. The space of black and white checkings may be enlarged. But it is not simply in the form of checks these sets of colourings are combinable, for they may be associated on such principles as to yield an extensive range of stripe designs. Take, for example, the series of effects included in Bracket *A*. These of themselves make a neat stripe, especially if choice colourings are selected. Parts *D*, *E*, and *F* may be varied in dimensions according to the class of texture being manufactured. About half an inch of *D*, an inch of *E*, and half an inch of *F* makes a useful base. In the shades and tints furnished for the preceding example—Fig. 102—this form of stripe produces attractive styles.

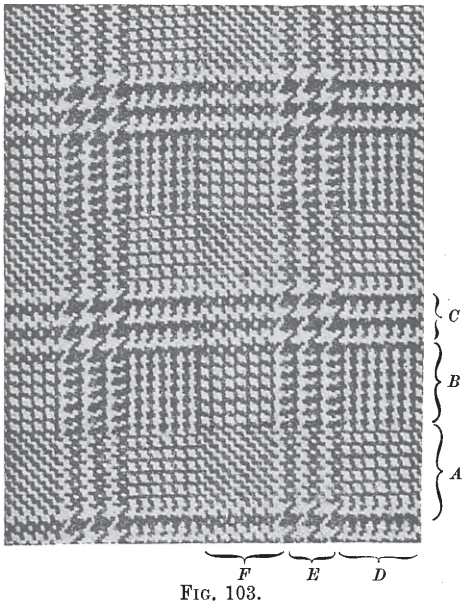

FIG. 103.

The group of types in *B* should be similarly employed as that constituting *A*. After *B* sections have been separated from the rest of the pattern they may be used thus for a dress fabric:—A band of two inches of the effect given over *F*, and bands of one inch in width of the two adjacent types. If the style is applied to trouserings, smaller quantities of each type should be employed, and some fancy twist yarns added to the shades forming the bulk of the pattern, to give freshness and diversity of colouring.

The series of broken or irregular types included in Bracket *C* may also be worked into stripes for mantlings. In woollen yarns and mellow colourings, these broad effects in bands of about an inch in width yield effective patterns. Toned browns, slates, drabs, light greys, light olives, and lavenders are appropriate colours for this kind of textiles. Mixture yarns, of which several illustrations are given below, are also applicable.

I.			II.		
*	1 thread of	No. 1, Plate XIII.	*	1 thread of	No. 6, Plate XIII.
	1 „	No. 2, Plate XIII.		1 „	No. 8, Plate XIII.
*	2 threads of	No. 1, Plate XIII.	*	2 threads of	No. 6, Plate XIII.
	2 „	No. 2, Plate XIII.		2 „	No. 8, Plate XIII.
*	4 „	No. 1, Plate XIII.	*	4 „	No. 6, Plate XIII.
	4 „	No. 2, Plate XIII.		4 „	No. 8, Plate XIII.

III.		
*	1 thread of	No. 5, Plate XIII.
	1 „	No. 7, Plate XIII.
*	2 threads of	No. 5, Plate XIII.
	2 „	No. 7, Plate XIII.
*	4 „	No. 5, Plate XIII.
	4 „	No. 7, Plate XIII.

152. *Results of Combining Simple Colourings.*—It will be obvious from these illustrations—Figs. 102 and 103—that, by combining several schemes of Simple Colouring, patterns are obtained rich in diversity of types of textural design, though the number of shades combined may be limited. This is not

* For any suitable number of threads and picks.

usually the case in Simple Colourings. If the shades in such arrangements are not numerous, the resultant effect is invariably plain; whereas, it is obvious that in Compounds, even should one weave only be employed and two shades combined, styles full of detail and minute textural patterns are producible. They represent an economical method of developing design in woven goods, for they are neither complicated in weave structure nor colour composition.

153. *Compounds and Weave Combinations compared.* — Patterns of a Compound class, being composed of two or more Simple schemes of colouring, may be compared to designs resulting from combining several small weaves or crossings. Compound colourings bear the same relation to the general classes of coloured patterns, as combined weave designs bear to the effects obtainable by diversifying the systems of crossing warp and weft yarns. Thus, the former are the resultants of combining elementary schemes of colouring, and the latter the resultants of uniting elements of weaving. Moreover, the complexity of weave compounds is proportionate to the variety of weaves combined, and the class of the elementary schemes of intertexture employed. The complex arrangement and fulness of detail of Compound Colourings are determined by the number of "Simple Orders of Colouring" entering into their composition, and by the character of the methods of colouring utilized.

When constructing weave combinations, only those weaves should be used which fit with each other correctly, and which yield a fabric regular in structure; and when forming compounds, those schemes of elementary colouring should only be combined which produce a properly balanced style.

154. *Utility of a Practical Knowledge of the Woven Effects of Simple Colourings.* — Before attempting to combine simple methods of arranging shades, in the construction of Compound patterns, the textural results of the various elementary systems of grouping colours already described should have been ascertained, if possible, by loom experiments. For the purpose of facilitating the combination of Simple Colourings, it will be found advantageous to make a collection of the woven patterns

resulting from the adoption of the Schemes given in Paragraph 149 (see Plate XXII.). The utility of such a series of woven specimens may be indicated. Supposing, for example, a pattern were required in the cassimere twill in which the two-and-two and the one-and-one schemes of colouring were to appear. Then, by consulting the woven results of these two principles of grouping yarns, some calculation could be made of the actual aspect of the pattern to be originated. This, of course, is an advantage in designing. The most effective styles are those which the designer, by the aid of his technical knowledge, has been able to partially imagine the woven effect of, when the patterns were in the theoretical form.

155. *Compound Patterns Subjective to the Nature of the Fabric Manufactured.* — Another factor which affects the selection of "Simple Colourings" in the construction of Compounds, is the class or description of fabric being produced. In some species of cotton and dress textures, bold and broad effects are required, necessitating the use of the larger types of elementary colourings; but in ordinary fabrics the neatest and smallest types are suitable. This may be regarded as a general rule, but the degree of colour contrast, and the fineness of the structure of the fabric, in some measure also modify the type of shade-arrangements most appropriate for any specific class of fabrics. It is chiefly a question of the size of the pattern required, which governs the dimensions of the various effects combined in its construction. So that, granting the class of fabric has been selected, and that its structure is known, then those Simple Colourings may be applied which will give a compound style of requisite textural composition, form, and size.

156. *Types of Compounds.* — Compounds, like Simple Colourings, may be divided into Regulars and Irregulars, which may be subdivided thus: Compounds composed of two elementary schemes of colouring, and Compounds composed of three or more elementary schemes of colouring. Each of these subdivisions includes styles of two, three, or four shades. Examples in these several classes of Compounds are supplied in the Table given below:—

TABLE XI.

COMPOUND COLOURINGS.

REGULAR COMPOUNDS—

CLASS A.—COMPOUNDS COMPOSED OF TWO SIMPLE TYPES.

I.—Styles in Two Shades.

I. Scheme.		*II. Scheme.*	
1 thread of black.	*A.*	2 threads of black.	*A.*
1 „ white.		2 „ white.	
2 threads of black.	*B.*	4 threads of black.	*B.*
2 „ white.		4 „ white.	

III. Scheme.		*IV. Scheme.*	
3 threads of black.	*A.*	4 threads of black.	*A.*
3 „ white.		4 „ white.	
6 threads of black.	*B.*	8 threads of black.	*B.*
6 „ white.		8 „ white.	

II.—Styles in Three Shades.

I. Scheme.		*II. Scheme.*	
1 thread of black.	*A.*	2 threads of black.	*A.*
1 „ grey.		2 „ grey.	
1 „ white.		2 „ white.	
2 threads of black.	*B.*	4 threads of black.	*B.*
2 „ grey.		4 „ grey.	
2 „ white.		4 „ white.	

III. Scheme.		*IV. Scheme.*	
3 threads of black.	*A.*	4 threads of black.	*A.*
3 „ grey.		4 „ grey	
3 „ white.		4 „ white.	
6 threads of black.	*B.*	8 threads of black.	*B.*
6 „ grey.		8 „ grey.	
6 „ white.		8 „ white.	

TABLE XI.—*continued.*

III.—Styles in Four Shades.

I. Scheme.

1 thread of black.		
1 „ dark grey.		*A.*
1 „ grey.		
1 „ white.		
2 threads of black.		
2 „ dark grey.		*B.*
2 „ grey.		
2 „ white.		

II. Scheme.

2 threads of black.		
2 „ dark grey.		*A.*
2 „ grey.		
2 „ white.		
4 threads of black.		
4 „ dark grey.		*B.*
4 „ grey.		
4 „ white.		

III. Scheme.

3 threads of black.		
3 „ dark grey.		*A.*
3 „ grey.		
3 „ white.		
6 threads of black.		
6 „ dark grey.		*B.*
6 „ grey.		
6 „ white.		

IV. Scheme.

4 threads of black.		
4 „ dark grey.		*A.*
4 „ grey.		
4 „ white.		
8 threads of black.		
8 „ dark grey.		*B.*
8 „ grey.		
8 „ white.		

CLASS B.—COMPOUNDS COMPOSED OF THREE SIMPLE TYPES.

I. Scheme.

Composed of Two Shades.

1 thread of black.		
1 „ white.		*A.*
2 threads of black.		
2 „ white.		*B.*
4 threads of black.		
4 „ white.		*C.*

II. Scheme.

Composed of Three Shades.

1 thread of black.		
1 „ grey.		*A.*
1 „ white.		
2 threads of black.		
2 „ grey.		*B.*
2 „ white.		
4 threads of black.		
4 „ grey.		*C.*
4 „ white.		

TABLE XI.—*continued.*

III. Scheme. Composed of Three Shades.		*IV. Scheme.* Composed of Three Shades.	
1 thread of black.		2 threads of black.	
1 „ grey.	*A.*	2 „ grey.	*A.*
1 „ white.		2 „ white.	
3 threads of black.		4 threads of black.	
3 „ grey.	*B.*	4 „ grey.	*B.*
3 „ white.		4 „ white.	
6 threads of black.		8 threads of black.	
6 „ grey.	*C.*	8 „ grey.	*C.*
6 „ white.		8 „ white.	

IRREGULAR COMPOUNDS—

I. Scheme. Composed of Two Colours.		*II. Scheme.* Composed of Two Colours.	
2 threads of black.		1 thread of black.	
1 thread of white.	*A.*	1 „ white.	*A.*
4 threads of black.		3 threads of black.	
2 „ white.	*B.*	1 thread of white.	*B.*

III. Scheme. Composed of Two Shades.		*IV. Scheme.* Composed of Three Colours.	
1 thread of black.		6 threads of black.	
1 „ grey.	*A.*	4 „ grey.	*A.*
1 „ black.		2 „ white.	
1 thread of grey.		3 threads of black.	
1 „ black.	*B.*	3 „ white.	*B.*
1 „ grey.			

NOTE.—Groups *A*, *B*, and *C* may be repeated to any number of threads of which they form a multiple.

157. *Compounds composed of Two Simple Types.* — Four examples in this class of Compounds are given in Class A of the Table. Three of them have been examined—namely, Schemes I., II., and III. The I. Scheme is analyzed in Paragraph 150,

the II. Scheme produces a common check pattern, and the III. Scheme the basket check. Scheme II. is used in worsted designing for both suiting and dress fabrics, and also in cotton yarns. Both this and the III. Scheme are worked in the mat or hopsack, as well as in the four- and six-end twills. These forms of pattern also obtain in stripes and checks. No great contrast of colours is needed, as they are effective in a textural sense. The difference between the effects of the two-and-two and the four-and-four, and the three-and-three and the six-and-six orders of colouring, is so pronounced as to make decided shade composition unnecessary. Colours of the same hue, but of various depths, are appropriate. Another useful type of colour compound for these schemes of grouping shades is illustrated below:—

	I.	II.
A.	2 threads of brown. 2 „ brown and light brown twist.	2 threads of light grey. 2 „ light grey and white twist.
B.	4 threads of brown. 4 „ brown and light brown twist.	4 threads of light grey. 4 „ light grey and white twist.

Parts *A* and *B* may be repeated two, four, or six times, according to the size of pattern required. A very mellow sort of style results from this system of colouring. The surface of the texture is one uniform tint, slightly diversified with the twist yarns, which develop the details of the pattern, due to the method of grouping the threads. This species of colouring is soft in tone and artistic in composition, being equally applicable to woollen, worsted, and cotton fabrics. In cottons, more pronounced colouring may be adopted, such shades as follow being useful: brown and slate, pink and white, and deep blue and pale lavender.

The woven effects of Scheme IV. are given in Figs. 104, 105, and 106. The weave employed in the production of these patterns is an eight-shaft twill. Whatever twill were used, providing it flushed the warp and weft equally, the general aspect of the patterns would be as here illustrated. In order to afford as clear an insight into the principles of Compound Colour-

ings as possible, the effect of changing the weft on the pattern resultant, when the system of warping is not varied, is also shown in these examples. All the three patterns have the same arrangement of warp yarns, but in Fig. 104 the weft is white; Fig. 105, black; and in Fig. 106 it is like the warp. If the weft contrasted in hue with both the shades of warp yarns, quite a new type of effect would be acquired. Supposing, for illustration, it were blue. Such an alteration would completely change the appearance of the fabric. Neither the black nor the white stripes would be solid, but the former would be half black and half blue, and the latter half white and half blue. However the weft might be varied, the form of the pattern would remain the same—that is to say, it would always consist in the stripes (Figs. 104 and 105) of four broad lines and two narrow lines, and in the check (Fig. 106) of sixteen large and sixteen small squares.

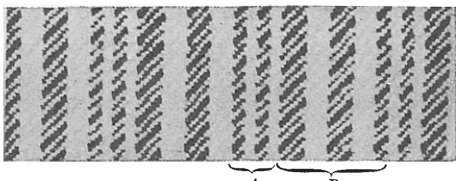

FIG. 104.

FIG. 105.

Considering that only two shades are used, the patterns are full of textural detail. The series of effects given are useful in textile designing. The stripes possess diversity of composition, and are characterized by neatness and clearness of arrangement. Seeing that the shades used are black and white, the absence of bold and stiff outlines is an interesting feature, and one that suggests the utility of the base in the development of fancy fabrics. In the check there is much variety of work. In addition to the solid squares of black and white of two sizes, there are rectangles composed of twills of black and white blended, of several dimensions and shapes.

158. *Patterns composed of Two Types and Three Shades.*—Scheme I. of Class A of the Regular Compounds, in the styles composed of three colours and of two Simple types, gives some-

what mellow and subdued effects. The patterns sketched in Figs. 107 and 108 illustrate the style of design arrangement resultant when this method of colour-grouping is adopted. The stripe pattern has a mingled appearance. Parts *A* of both the check and the stripe are composed of minute work, which neatly contrasts with the broader and more distinctly pronounced effects comprised in Section *B*. The patterns have a softer aspect and tone than if only two shades had been employed, the third shade adding diversity of colouring and freshness of the

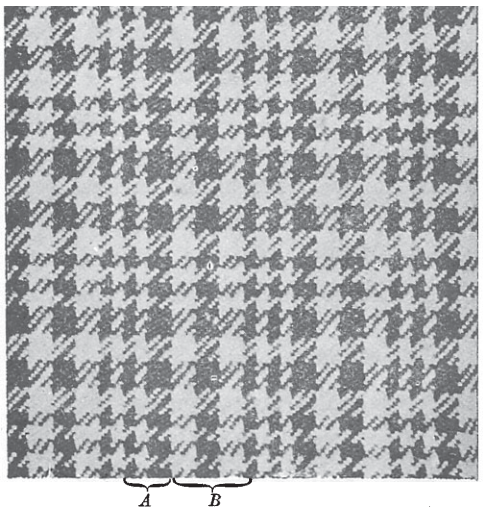

FIG. 106.

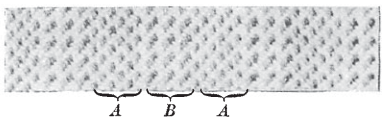

FIG. 107.

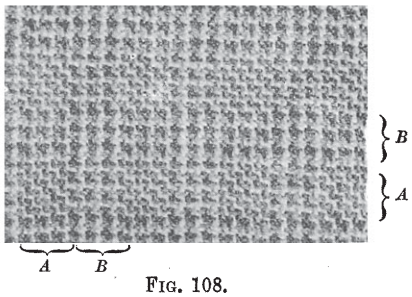

FIG. 108.

style. Fig. 107 is woven with a white weft, and Fig. 108 with exactly the same order of weft as warp shades. The two Simple schemes, forming this Compound, combine satisfactorily. The three-odd-thread grouping, constituting the *A* sections of the fabric, yields a species of textural effect which affords prominence to the small spaces of black, grey, and white composing parts *B*. There is, in these samples, congruity of effects. This is one of the main elements of a well-arranged compound. It is a feature of all descriptions of designing that the styles amalgamated should suitably develop each other, and yield a well-balanced and effective scheme of ornamentation. Even in the smallest textural effects, resulting from combining various systems of