

TEXTILES OR TEXTILE FABRICS

Textiles or Textile Fabrics. Stuffs made by the weaving together of threads of any sort, so as to produce a material with a nearly solid surface. A fishing-net or the like is not a textile fabric because the cords which compose it are not woven together, but cross one another at equally distant intervals and are strongly knotted at those points. But mosquito-netting is a textile, although very open, because the threads are merely held by their own friction. On the other hand, if a basket is made by weaving together strips of wood or bamboo, such a material is hardly called a textile, but this merely because of its totally different usage. The cane seat of a chair is as truly woven as a piece of muslin or silk.

Textiles in the usual sense are made of the twisted fibres spun into thread of flax or linen, cotton, hemp, jute, silk or wool. The simplest weaving is that which produces our common cotton and linen cloth; that is to say, the threads are merely woven together, one up and one down, and all in the same manner, except that at the edge on either side of the piece what is called a selvage is produced to prevent the raveling out of the threads. From this to the most complicated fabric like brocade the differences are almost infinite, and it is only with the most elaborate diagrams and the fullest explanations that the process of weaving a figured *broché* silk or a velvet with patterns of pile upon pile can be explained. Carpet weaving (see *CARPET*) differs somewhat from ordinary textiles, and tapestry (q.v.) differs yet more, and is often excluded from textile fabrics altogether.

The general nature of a loom is that the threads of the warp are divided into two sets, one of which is thrown upward, while the other is thrown down, and at the same moment a shuttle carrying a thread of the woof is driven through between the two sets of warp threads. The next movement of the loom reverses the two sets of warp threads, throwing the upper one down and the lower one up, compressing and drawing tight the woof thread into the loops which show on the surface of the stuff and go to form the surface, and the shuttle is driven through again in the opposite direction. The constant repetition of this forward and backward movement of the shuttle gives a strip of woven fabric which continually grows broader: and as each movement of the shuttle is made, an appliance drives the last thread of the woof back against the others, so that this growing strip of woven stuff is kept at a uniform state of firmness and solidity. It is in this way that the simplest fabrics of linens and cottons are made. If it be desired to produce a somewhat more elaborate weave, such as a twilled material, this is done by raising two threads of the warp and dropping one; or by raising three threads of the warp and

dropping one, and so on. In this way, as is evident, the threads of the woof are seen lying in loops or what seem to be stitches longer than those of the simplest weave, and these longer loops arrange themselves in a steplike diagonal across the woof of the stuff. It is clear that, by the increasing complication of such alternate liftings and lowerings of the warp threads, more patterns may be made. If, then, the threads of the woof are of a different color from those of the warp, there is produced a surface whose general color is half way between the two colors of warp and woof. If we take a step further in complexity and use three or four warp threads say, of red, while the rest remain white, and do the same thing with the woof threads, we produce stripes three or four threads wide; and where these stripes cross one another there will be a little square of the solid color of the three or four threads, while the stripes elsewhere remain of the half-way tint alluded to. Again if three threads of different colors are passed by the shuttle at one time the threads of the warp also being grouped in threes there will result a simple alternating pattern, which is often very attractive. Indeed, much of the primitive designing of early races is based upon such very simple productions of the loom; for it seems that the mind of man is never tired of a pattern produced by up and down, in and out, in their different combinations. In the most complicated pattern of a brocade, such as the Japanese send us occasionally, in which a row of dragons will alternate with a row of representations of "the sacred pearl" with its flames, and those again with a row of kylins or other fabulous monsters, all being interspersed with elaborate leafage, open flowers of the camellia and bursting fruits of the pomegranate, the same being reproduced in many colors — even in such a complex pattern it is readily seen that these figures are arranged in regular sequence, and that the colors are introduced in a definite and unalterable succession. Thus a blue thread of the woof may not appear more than once in each flower, of a certain row across a piece of stuff, and this appearance of the blue thread may be for a loop of a quarter of an inch long only, while all the rest of that blue thread is found to be hanging loose behind the finished fabric. Again this blue thread may not appear at all in six or seven inches of the length of the stuff, and then it may supply a wholly different detail of the pattern. Still that blue loop in the design as seen from the front or "right side" is found in each one of the flowers or animals which form the cross row of the pattern; and in the next row of similar flowers or animals (which may be two feet away in the length of the piece) this blue thread may be replaced by a crimson one, which will also appear at exactly the same intervals and at exactly the same point in each one of the flowers, or of a unit of design. It is interesting to take a piece of very rich fabric with an elaborate pattern and to examine it with a view to just such peculiarities of weave. Anyone who has watched a simple loom at work and has mastered the process may then understand in great measure the workings of the far more elaborate loom of the silk weaver, who is producing patterned fabrics.

In such weaving of patterns it is here assumed that the threads are dyed before the

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weaving is begun. The matter of printing colors upon calico, thin silk or the like, is entirely apart from the consideration of textile fabric. Printing is done from blocks with color, almost exactly as if the material receiving the pattern were paper instead of a woven stuff.

The simplest weave made in this way with colored threads is gingham; the name of which comes from the East, probably from India, with the invention of the weave itself. Checks, plaids and stripes are the natural patterns of gingham, but it is also practicable to produce various zig-zags and frets, and the stripes themselves may be variegated by patterns on their surface. Weaves of Persian and Chinese origin with threads softer and more woolly than European twisted cotton threads, are sometimes very attractive in color effect, woven exactly as gingham is woven.

Damask linen, such as is used for tablecloths and napkins, is peculiar in that the pattern is an elaborate twilled fabric in which the twill is arranged to make a pattern—often even of flowers and leaves. These patterns are seen merely by the difference of reflection of light upon the threads of the linen; for those threads which lie parallel in one direction seem brilliant from a given point of view, while those lying in the other direction look dusky. A change of the position of the beholder reverses this effect of light and dark. Moreover it is common that the same pattern is seen in reverse on the other side of the fabric. There is nothing to prevent damask linen being woven with dyed threads in parts of the composition, and occasionally tablecloths of such material come into fashion.

Brocade, a term generally used for very splendid material means primarily a stuff—composed in part of threads which lie on the surface of the finished stuff (French *brochés*), appearing where the particular color is needed and disappearing again as explained in the paragraph above. A brocade may be composed of threads all of one color. Thus the silks called *damassé* (French *Damassés*, or *Damassées*) have perhaps a pattern of dark green leaves relieved in shining threads upon a background of exactly the same dye, but looking different because of the different and less glistening character of the threads; this being caused not by the silk being differently spun, but because of the different treatment of the thread in the loom, the long loops lying flat and loosely, and reflecting the light in a different way from the hard pulled threads of the background.

Satin is a material with a silken surface of unusual and uniform glossiness, which is produced by alternately "raising and depressing four yarns of the warp across the whole of which the weft is thrown by the shuttle." It will be noted that this is a modification of twilling, and the threads of satin are seen to lie in the same way as those of a twilled cotton. It is evident that such a surface is capable of many modifications. Thus there are some fabrics of silk and wool, or silk and cotton, in which the silk threads are thrown to the surface, lying in very narrow stripes or bands, which show glossy on the background, which also show only in very narrow stripes between the others. These fabrics take different names from year to year.

Again, there are Eastern brocades in which the background is composed entirely of the warp threads in a satin weave of one color; while the flowers of the pattern are made up entirely of the woof threads and these in many colors with gold.

There remains to be mentioned those weaves in which the warp threads only are seen in the finished stuff. The most common form of this is ordinary ribbed silk, in which the warp threads form loops (silks called *gros-grain* and by other special names), giving a rib running across the stuff. Thus a silk in longitudinal stripes of darker and lighter green, buff and brown, has all its woof threads of a dull brown; while the warp threads of the four colors named form visible ribs in which the colors are alternated in a very elaborate fashion, so that one stripe is made up of a small check in two colors, another is plain and solid, of one color; and in all this the only effect of the dark woof is to modify slightly the hues of the stripes by showing between the warp threads.

Velvet is made by carrying the threads of the warp over a rod called a needle, so as to produce a series of ridges or "ribs," much as in the last paragraph; and then cutting all these ridges by a sharp instrument passed in as the "needle" is withdrawn. This cutting leaves the threads standing up to form the nap or pile, but they are left of different lengths or heights, and therefore the whole surface is most carefully sheared and sometimes this shearing is helped by singeing. Fustian, velveteen and corduroy are made by the same process. Plush is a material of the same character, and produced in nearly the same way. When the ribbed surface is left without being cut, the term "uncut velvet" is used. This may be used for a part of the surface, while other parts are fully cut and brought to the smooth surface common to velvet. In this way most elaborate patterns are produced—figures being in the velvet pile upon the ground of uncut velvet. Again this may be carried further in producing what is called "pile upon pile" velvet, in which the pile of one part of the pattern is relieved upon the shorter pile of another part of the pattern and this again upon the uncut background. It is evident that such stuffs are of great cost. The beauty of the pattern may also be enhanced by the use of different colors. Thus the velvets of Genoa and of Venice of the 17th century and modern copies of the same may have a general surface or background of a satin-like texture, upon which the flowers and leaves of the pattern are raised in uncut velvet in ridges made of projecting loops, and upon this again is relieved a pattern of cut velvet, smooth and uniform in surface; both these surfaces, the uncut and the cut velvet, being woven with three, four or five colors, the threads being dyed beforehand in dark and light green, crimson, buff and the like. The resulting pattern will be of extraordinary richness, effective at a distance and also near at hand. Such pieces made in Venice at the close of the 19th century would cost about 60 francs a yard when woven 20 inches wide.

The further elaboration of decorative weaving by the introduction of other materials than those of twisted threads, is also of importance. Thus "gold thread," as it is called, is commonly made of silver wire gilded and then pulled out, or

“drawn,” the silver and gold together, until it is very fine. This is apt to tarnish, the extremely thin gold disappearing with wear, and the silver not having the power of resisting impurities in the air. To avoid this, where a permanently metallic effect is desired, gold paper is used by the Orientals, the paper being sometimes brown, as it shows on the reverse side of the stuff, and the gilded surface showing on the right side. The less expensive Japanese brocaded silks are often woven in this way. On the other hand, the tarnishing of the metallic gold thread often adds a special charm to the effect of ancient stuffs.

As textile fabrics have been used by all men more advanced than the most degraded savages, the history of textiles is of infinite extent. Even textiles of decorative purpose, those woven in a somewhat complicated way, are of unknown antiquity. Decorative stuffs have been found in Egyptian tombs of very early epochs. The tombs of the lost races of South America have been found to contain beautiful weaves. The earliest painted vases found in Egypt show boats with sails, and although some of these sails were perhaps of skin, there are others in which the evident purpose has been to show a woven material. Western Asia has always been the home of the most beautiful designs in weaving, for at a very early time the people of the great plain through which the Tigris and the Euphrates run were producing fabrics with the most varied and splendid patterns. This tendency to use the Asiatic feeling for color decoration in work with the loom took two different forms in later times. The carpets and rugs woven with pile were brought from Syria into Europe at least as early as the 8th century A.D., and at a later time they were somewhat common in Europe, as is clear from the earlier Italian paintings, in which rugs of unmistakably Eastern design are seen to cover the foot-stool or the throne of a sacred personage. Other heavy stuffs used in the West for floor cloths and also for door and window curtains under the general name of *kelim*, are woven without pile, the patterns being therefore much simpler, akin to those described above in connection with gingham and especially with twilled materials. Brocades of different kinds, and also solidly woven, very durable silk stuffs made with threads dyed of different colors, but woven in such minute patterns that the thread nowhere shows as *broché* on the surface, have been made for so many hundred years that the time of their introduction is hardly ascertained. Cotton stuffs woven in a similar fashion with very pretty effects of simple patterns are but little imported to Europe, but their use in the East adds a great charm to the popular costume. Finally the printing of cotton cloths with wood blocks has been practised for centuries, the pattern being admirably drawn and composed and the colors always interesting except where the effect of European commerce has been, first, to substitute the cheaper chemical dyes of Europe for the more permanent and more beautiful dyes of the East, and, secondly, to debase the color design through the orders given by the agents of Western importing houses. The growth of a beautiful textile industry in Europe and the United States is made difficult by the rapid changes of fashion

which themselves are brought about by the great desire of large manufacturers to produce the material and the effect which will attract buyers. This tendency is aggravated by the unwillingness of the great dealers to keep in stock fabrics which are out of fashion, because they are very numerous, because a considerable stock of any one would be a troublesome thing to house and to show on occasion, and because “it costs too much to sell” goods that are not in constant demand. Everyone knows how often the material which at a certain time he found to be exactly what he needed cannot possibly be obtained a few years later.

The greater number of the books devoted to this subject are collections of plates, often in color, and beautifully printed. These, however, give merely the design, while the nature of the stuff can only be guessed. It is rare that any discussion of the fabric or of the manufacture accompanies the plates. The best of these books is Fischbach's ‘Ornamente der Gewebe.’ The works on Costume (q.v.) often contain much of the same material. For eastern carpets, Lessing's ‘Alt Orientalische Teppichmuster’ (Berlin 1877) gives a number of fine designs collected from paintings of the Renaissance. Vincent Robinson's ‘Eastern Carpets’ (London 1882), and the second series of the same (London 1883), present a number of admirable specimens belonging to the owner, who is a dealer on a large scale and also a collector on his own account. The colored prints are from excellent original drawings. Several books on Eastern rugs have been published during the last few years, of which we name Mumford's ‘Oriental Rugs’ (New York 1900). There is a magnificent work, which gives the Oriental carpets in the Austrian imperial collection. The beautiful stuffs known to have been used during the Middle Ages are treated by Francisque-Michel in ‘Recherches sur Le Commerce,’ etc., ‘Des Etoffes de Soie,’ etc. (2 vols. Paris 1852), and by Dr. Daniel Rock, in ‘Textile Fabrics,’ the South Kensington illustrated catalogue (London 1870). The same author has supplied the ‘South Kensington Handbook’ (London 1876). Fr. Bock's ‘Geschichte der Liturgischen Gewänder des Mittelalters’ (Bonn 1859-71) is the standard work on the subject of church ceremonial garments, constantly cited by all writers. One of the most valuable works for the student of the technical side of textiles is ‘The Draper's Dictionary,’ by William S. Beck (London n.d.), and the modern fabrics in common use are intelligently treated by Caulfield and Saward in the ‘Dictionary of Needlework’ (London 1885), and also by Lady M. Alford in ‘Needlework as an Art’ (London 1886). See WEAVING.

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