

CHAPTER II

FABRICS—FACTS FOR CONSUMERS

IN order to become wise and intelligent buyers, not only of fabrics, but of ready-to-wear garments as well, purchasers should have a practical knowledge of the textile field. They should know, first, the names and general characteristics and qualities of the fibers used in the manufacture of the cloths of which their garments are made; second, the methods of production and preparation of these fibers for manufacturing purposes; third, enough of the processes of weaving the cloth to be interested in the value and effect of the different weaves; fourth, the adulteration of fibers practised by the manufacturers to the detriment of the cloth and the deception of the consumer; fifth, the names, prices and widths of staple materials, and such findings as tapes, braids, etc., and the general uses to which they may be put; sixth, the condition of the laborers engaged in the making of women's garments, that sympathy and interest may be stirred to help in the betterment of these conditions.

It is scarcely within the province of this book to enter into a historic or scientific discussion of textiles. Abundance of good material on this subject is to be found in the numerous texts listed in the bibliography. It is the purpose of the writer, however, to review briefly the points mentioned above, with emphasis on the acquisition of the knowledge of the names and characteristics of materials and findings used in the construction of garments.

All cloth of whatsoever kind, whether used for under- or outer-garments, is made by the interlacing (or weaving) in some fashion, of yarns, made by the twisting of one or more kinds of fiber. The four fibers most commonly used in the manufacture of cloth, are cotton, linen, wool, and silk. These are classified in two general groups, vegetable and animal fibers. The value of a fiber in the weaving process depends upon the following qualities: length, strength, elasticity, and curl.

FIBERS AND THEIR PRODUCTION

Cotton fiber from which cotton cloth is made, is the soft, white, downy substance, or seed hairs, which enclose the seeds of the cotton plant, within the pod or "boll" until ripened (Fig. 1). Under the microscope it shows a flat ribbon-like fiber with thick edges and

a slight twist at intervals throughout its length, which varies from one to two inches. The twist gives it elasticity and makes it valuable for spinning. It has a single cell, the walls of which are thick and covered with vegetable wax and oil. Cotton has some elasticity; its

FIG. 1

FIG. 2

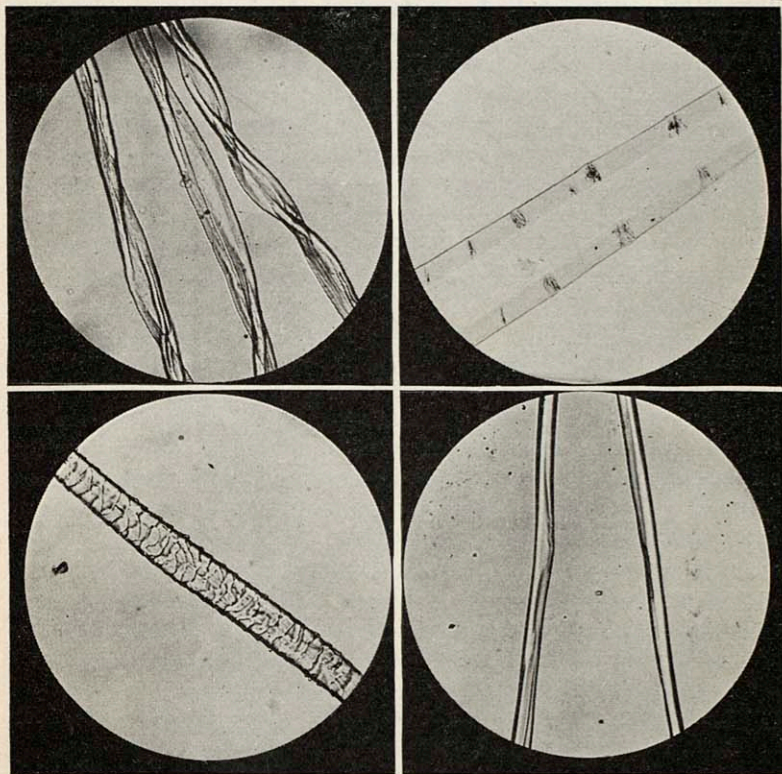


FIG. 3

FIG. 4

- FIG. 1.—Cotton fiber, magnified. (U. S. Dept. of Agriculture.)
 FIG. 2.—Flax fiber, magnified. (U. S. Dept. of Agriculture.)
 FIG. 3.—Wool fiber, magnified. (U. S. Dept. of Agriculture.)
 FIG. 4.—Silk fiber, magnified. (U. S. Dept. of Agriculture.)

hygroscopic or absorbent quality is 5 to 8 per cent, but it can, in moist atmospheres, absorb more than this. It has less luster than linen, even when mercerized. The surface of cotton cloth is fuzzy. Cotton is not quite as good a conductor of heat as linen, but being

much less costly to manufacture, is more generally used for clothing.

Cotton fiber passes through many processes in preparation for weaving into cloth. When the bolls have ripened and opened, the cotton is picked and sent to be "ginned," that is, to have the seeds removed. This is done by machinery. The cotton is then packed into bales, covered with heavy bagging and bound with iron wire hoops; these bales weigh 500 pounds. The bales are then compressed and shipped to the factories where the cotton is to be spun into yarn, preparatory to weaving into cloth. When the bales are opened, the cotton is found not only tangled from long compression but is also full of dirt, bits of leaves, seeds and pods. It is cleaned by machinery which removes the bits of leaves and seeds. Other machinery smooths out the fibers and lays them parallel to each other; as they come from these machines they are drawn into a thick strand called a sliver. If very fine yarn is to be made, a similar process is gone through which removes all short fibers, causing much waste and therefore increasing the cost of the woven fabric. The slivers of cotton are then put into other machines which draw them into thinner strands and at the same time put in a twist, which renders it possible to make greater attenuations. These twisted strands are wound on large bobbins placed in other machines which draw the strands out into fine threads, put in a twist and wind them again on spindles. The yarn is afterwards unwound from the spindles, wound into hanks, and bleached, then dyed. The bleaching is done by chemical processes. Cotton fiber does not take dyes easily, therefore it is necessary to treat it with some chemical preparation in order to make it take and hold the dye. It is dyed both in the yarn and cloth, and colors are sometimes printed on the cloth. Cotton fiber having no luster of its own, is often treated by a chemical process called mercerization, which not only renders the fiber stronger, but adds a luster not unlike that of linen.

Flax fiber, of which linen cloth is woven, is a bast fiber which lies just under the outer bark of the flax plant. Under the microscope it appears to be a cylindrical fiber, with pointed ends, cellular in structure, with lines or cracks crossing at intervals along its length (Fig. 2). The fibers vary from 12 to 36 inches in length. They have a high luster, are stronger than cotton fiber, but have no twist, and are not elastic. Flax fiber has an absorbent quality of 5 to 8 per cent, but may reach 20 per cent. It is the best conductor of heat of the four fibers.

The preparation of flax fiber for weaving involves many tedious processes. The plants grow to a height of 20 inches to 40 inches. The time for pulling, which must be done by hand, is indicated by the changing of leaves from green to brown. The plants are pulled up by the roots in clear, dry weather. The seeds and leaves are next removed and the plants tied in bundles, and the process of fermentation begun, which separates the bast fibers from the other portions of the stems. This is called "retting" and is done by letting the bundles lie in the grass in dew and sun for a longer or shorter period, sometimes two weeks. It is also retted in pools of stagnant water, in streams of running water or by the use of chemicals. After retting, the plants are dried; then the woody parts are crushed and broken away from the rest of the stem by machinery. A process called "hackling" is used to remove all woody parts from the fiber. Short and long fibers are separated in this process, the tow or short fibers being used for coarse yarns, the line or long fibers for fine. The fibers are then drawn out into a thick strand like the cotton and a slight twist put into it. This short strand or roving, as it is called, is then spun into yarn. Flax fibers also require moisture for the spinning. The warp threads must be harder twisted than the woof.

Linen is bleached in the cloth or yarn, mostly the former. This is a long process because of the nature of the fiber. The bleaching is done by dew and sun, and also by the use of chemicals. By the latter method, unless most carefully done, the fiber may be injured. Linen does not take dye easily; it is more difficult than cotton to dye and does not retain the color well.

Wool fibers, from which woolen and worsted cloths are made, is the coat or covering of the sheep. A single wool fiber is a hair, fine and curly, varying in length from 1 inch to 8 inches. Examined under the microscope, it is seen to have scales or serrations with pointed edges, which stand out from the fiber (Fig. 3). These scales open when warm and moist, somewhat as a pine cone does, and the edges interlock. Then as they cool, they draw together and dry, not opening again. This holds the fibers close together, causing shrinkage in the cloth and aiding in the felting process.

Wool fiber is very soft, elastic and varies greatly in strength. It is a poor conductor of heat, therefore is desirable for clothing; it has a greater affinity for dye than any other fiber. Its luster varies with its structure, *e.g.*, mohair having few scales, is very lustrous. the absorbent quality of wool is 8 to 14 per cent, but may reach 30 to

50 per cent. Wool fibers are more expensive than fibers of linen, not only in the initial cost of production, but by reason of the various weaves and finishes necessary to produce certain types of fabrics.

Wool is sheared from the sheep either by hand or machine. These shearings are called "fleeces." The fleeces are packed and shipped to the mills. The wool is first opened and sorted because the portions from the different parts of the sheep vary in quality. The wool being very dirty, is then scoured thoroughly and carefully dried; this process does not remove the burrs, seeds, and leaves, which are taken out by machinery or the use of chemicals, in which latter case the wool must be washed again to remove both chemicals and pieces of burrs. Other processes follow; blending, or the addition and mixing of other kinds of wool fiber in raw or manufactured state, or mixtures of other fibers for the purpose of securing good colors or reducing the cost of production, and then oiling to keep the fiber soft during the remaining processes, because the many washings have taken away most of the natural oil. These processes vary according as one or the other of two kinds of yarns, woolen or worsted, is to be prepared for spinning. The first is used for such materials as broadcloth, kersey, or flannel, while the second is used for serges, men's suiting, covert cloths and diagonals. More processes are involved in the preparation of worsted than woolen yarns: in woolen yarn, carding alone is employed, while in worsted yarn many processes are employed, carding, gilling, combing, all of which have one purpose, thoroughly to parallelize the fibers in order to produce an even, close, twisted, lustrous yarn. Woolen yarns are softer and more elastic than worsted.

Silk fiber is a secretion emitted by the silk worm in the formation of a cocoon, in which the worm encloses itself before its transformation into a chrysalis. It is the strangest of the four fibers, is smooth and structureless, but very elastic (Fig. 4). Silk fiber may be reeled from cocoons in length from 400 to 1300 yards. It has a greater affinity for dyes than cotton or linen, and takes the highest luster of the four fibers. It is a poor conductor of heat; its absorbent qualities are 10 per cent to 17 per cent, and may reach 30 per cent.

Silk fiber necessitates great care in the rearing and feeding of the worm and the reeling of the silk. The fiber is ejected by the worm at a certain stage in its growth, from two small openings below the mouth, but it is united in one thread by a gummy liquid which hardens as soon as it is exposed to the air. The worm attaches this

fiber to a branch, and by a motion of its head, throws the thread in irregular loops, somewhat like a figure eight. At first, it can be seen through the gauzy thread, but later is lost to view. It continues working until the cocoon is completed with the worm inside. The cocoons are then gathered and heated to destroy the chrysalis; then sorted, and those whose color, fineness and luster agree, are kept together. Before reeling the silk, the cocoons are dropped into hot water to loosen the gum which has held the fibers. All silk unfit for reeling is wound off, and then, with a brush, the reeler finds a continuous end from each cocoon. These he passes through an agate ring, twists them with a fiber coming from another ring, separates them again, and passes them through another ring to the reel, where they are wound into a skein. This silk is harsh, due to the gum which still adheres to it. The bundles of these skeins as sent to the manufacturer are called books. The further preparation of the silk at the factory is called throwing. Several strands of silk have already been twisted in making the skein, but the strand is not yet strong enough for weaving. The raw silk is wound from the skeins on to bobbins, and then cleaned so as to rid it of knots or irregularities. The threads from several bobbins are then united to form one, which is spun to give it the necessary twist. Two kinds of threads are made: organzine, used for warp, two threads twisted in opposite directions, then together, but twisted so tight that the luster is lost. Tram is the filling thread in silk cloth, made of two or more threads having no twist, which are put together and twisted enough to hold for the weaving process. The silk is then cleaned, that is, boiled off to remove all the gum; but washed in a warm solution, if only part of the gum is to be removed. The silk is chemically bleached if all the coloring matter is to be removed. The waste silk which cannot be reeled is washed, then carded and spun in a thread; it is called spun silk, in contradistinction to the other. Experimentation has resulted in the production of substitutes for silk of varying values. Silk is given color either by yarn or piece dyeing or by printing.

WEAVING

Weaving is the process of interlacing threads by which cloth is made. Two sets of threads are used, called: 1. Warp, and 2. Woof or filling; the weaving is accomplished by a machine called a loom, of which there are two kinds, 1. Hand, and 2. Power loom.

Definitions.—*Warp*, lengthwise threads, which carry throughout the length of a piece of cloth.

Woof, or filling, the crosswise thread, carried back and forth across sets of the lengthwise threads.

Parts of a Loom.—*Frame*, which holds the *Warp Beam* at the back of the loom; upon the warp beam the warp threads are wound before the weaving begins and unwound as the weaving proceeds.

Harness.—Two or more *Heddles* hung from the beam at the top of the loom frame, each heddle composed of two slats of wood between which are stretched loops of cord or wire called *Healds*, each one tied in the middle so as to leave a small hole or eye called the *Mail Eye*, through which a warp thread passes on its way to the *Reed*. Each heddle supports a certain set of warp threads, which may be raised or lowered by it.

Reed, a series of vertical wires in a frame set in the *Batten* or *Lathe*, which hangs from the top of the frame. *Batten* or *Lathe*, a frame of wood which hangs from the top of the loom frame, holds the reed and is used to beat the woof or filling into place.

Cloth Beam.—A roller at the front of the loom upon which the woven cloth is wound up as it is made.

Treadles, strips of wood below the loom, attached to the heddles, operated by the feet to raise or lower the sets of warp threads.

Shuttle, a boat-shaped piece of wood which holds the bobbin upon which is wound the woof thread; used to pass the woof back and forth between the warp thread.

Setting Up the Loom.—The *Warp Threads*, sufficient in number for the width of the cloth to be woven, and as long as the finished cloth is to be, are wound evenly on the *Warp Beam*; the end of each warp thread is passed through a *Mail Eye* or *Heald*, then between the wires of the *Reed*, the ends drawn over and fastened on the *Cloth Beam*. When the warp threads are passed through the heddles, if plain weaving is to be done, only two heddles will be necessary, therefore every other thread, *e.g.*, 1, 3, 5, 7, etc., will be passed through heddle No. 1, and the alternate ones, 2, 4, 6, 8, etc., through heddle No. 2; then when the heddles are attached, each to a separate treadle, by pressing down with the foot on one treadle, all the uneven-numbered threads in the warp will be raised, and the even numbers will be depressed, thus making an opening between the sets of threads, called a *Shed*, through which the woof can be passed, by means of the *Shuttle*, containing a *Bobbin* or *Reel* of the filling yarn. When the other treadle is pressed upon, the even numbers will be raised, and the uneven drawn down, making a new shed, through

which the woof is passed back again. Each time the woof is carried through it is called a *Pick*; the *Batten* or *Lathe* is drawn firmly forward against it, to push the pick into place; then the *Shed* is changed and another *Pick* is made.

Selvedge.—Every time the woof goes back and forth, it passes around the outer warp thread, thus forming the *Selvedge* on each side of the cloth.

Fancy Weaves.—For fancy weaving more heddles and sometimes more treadles are necessary, so that different arrangements of warp threads may be raised or lowered in order to produce a more or less fancy effect. This is done by tying certain combinations of heddles and treadles together, when one or more treadles are pressed down, certain heddles will be raised, others lowered, and all warp threads passing through each of the heddles must *work together* each time.

Hand Looms are usually built of wood and are worked by foot power on the treadles, the shuttle is thrown back and forth by hand, and the battening up of the filling is done by hand.

Power Loom.—The framework, etc., of this loom are usually made of cast iron, some few parts may be of wood. The motive power is water or steam, or, in modern looms, direct connected electric motors, and the harness is operated from below.

The above, known as “*Harness Looms*,” are necessarily limited as to the number of patterns which can be carried out on them. But there is a machine called the “*Jacquard Loom*” upon which an almost unlimited variety of pattern may be carried out, *e.g.*, brocaded silks, ribbons, and linen (damask). *Jacquard Loom* is not a correct expression, however, as the loom or weaving method of putting in the filling and battening up is the same as in all looms, but the shedding mechanism is different. Instead of a harness composed of heddles, each of which controls the same threads each time, and is operated from below, the *Jacquard* attachment is above the loom, each heald hangs independent of all others, and can be operated independently, or in combinations with any others called for by the design being carried out. Each heald is attached to a vertical wire which has a hook on its upper end by which it hangs on a bar, but can be easily displaced or thrown off. Each wire passes up through an eye in one of a group of horizontal needles. At one end these needles, which work horizontally, enter a spring box which keeps them constantly pressed forward. At the opposite ends the needles

pass through and project beyond the "needle board," where they come in contact with a four-sided cylinder placed at right angles to the ends of the needles—each one-quarter revolution of the cylinder brings one of its side in contact with the needle ends. Over this cylinder pass cards with holes cut in them at each place where a needle end comes in contact with it. If holes are cut for *all* needles, they will all pass through and all the vertical wire hooks will be held in position to be lifted by the bar on which they are hung. Thus *all* warp threads will be *lifted* and no shed made, but if the places on the card for some needles remain blank or uncut, it will readily be seen that those needles will be held back, their vertical wire hooks thrown off the bar and so not lifted. Therefore, all these warp threads will remain down and a shed be made. So, for every shed of one repeat of a pattern, there will have to be a different card; these are laced together so that they pass in regular order over the cylinder.

Designs for Weaving.—The weaver on a hand loom and the one who sets up the power loom (harness or "Jacquard") must have some guide or design to follow so that the warp threads may be threaded through the proper heald and the proper heddles on the "harness" loom, and the cards for the "Jacquard" properly cut and operated for each pick of the filling. For this purpose, designs are worked out on paper which is divided by heavy lines into blocks of eight rows or squares each way. Each vertical row of squares represents one warp end and each horizontal row of squares one pick of the filling; when working the design, if it is desired to show that warp end 1 passes over pick 1, a mark is made in the lower left hand square of the block, to indicate that warp 1 is on top, the next square above is blank, showing that warp end 1 is beneath pick 2, and so on; wherever it is desired to show that a certain warp is on top of a certain pick, a mark is made in the square where these cross and a blank square indicates that pick is on top, warp underneath.

Weave may be divided into three fundamental classes—plain, or tabby, twill, and satin. Plain or tabby weave is the simplest that can be used, and is made by passing the filling over each alternate warp end, *i.e.*, 1, 3, 5, 7, etc., in the first pick and under the others, 2, 4, 6, 8; the next pick will be exactly the opposite, passing over ends 2, 4, 6, 8 and under ends 1, 3, 5, 7; the third pick is the same as the first and the fourth the same as the second, and so on, thus making a plain weave (Fig. 5A).

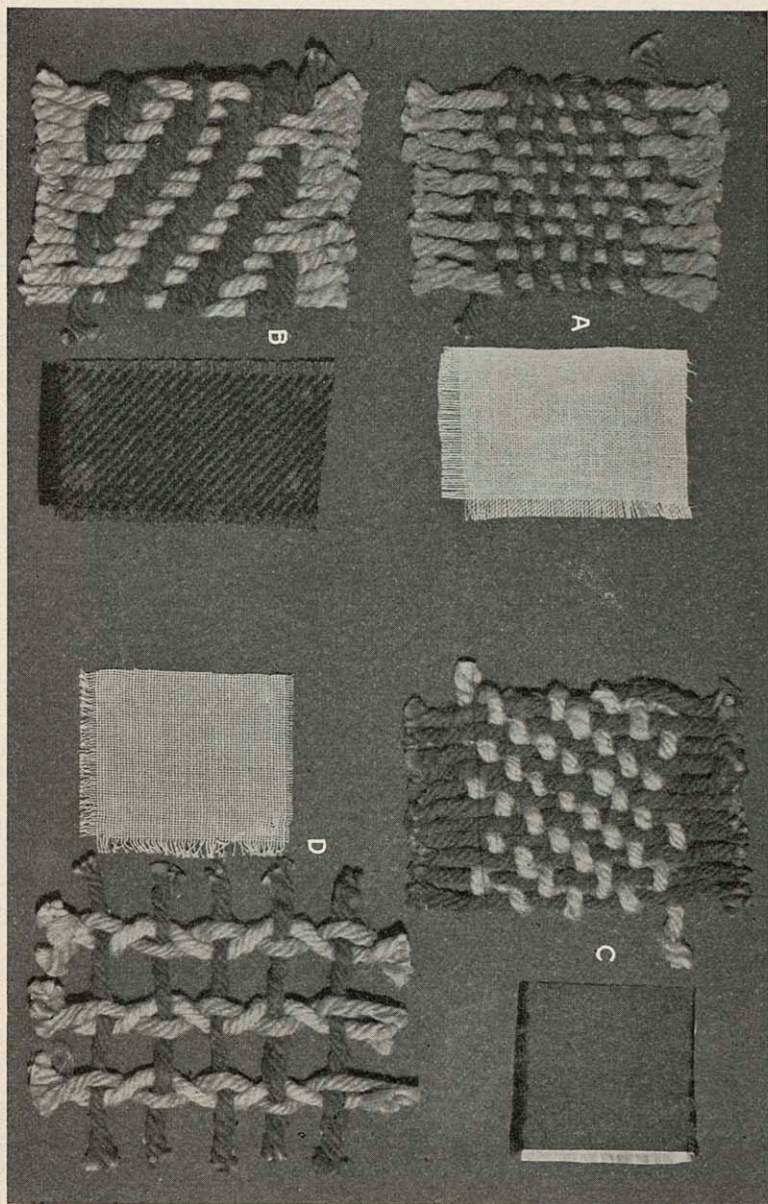


FIG. 5.—Methods of interlacing yarns to produce simple weaves; A, Plain; B, Twill; C, Satin; D, Leno or Gauze.

Twill weave gives a diagonal or twill line on the right side. Simple twill is made by passing the first pick of filling over warp 1 and under 2 and 3; over 4, under 5 and 6, etc., the second pick passes under 1, over 2; under 3 and 4, over 5; under 6 and 7, etc., the third pick passes under 1 and 2, over 3; under 4 and 5, over 6; under 7 and 8, etc. (Fig. 5B). Thus it will be seen that the filling passes under two warp ends, over one and under two, and that in each pick it passes over one warp in advance of where it passed over in the last pick, thus making a diagonal line through the cloth, and by passing always *under* two warp ends, more of the filling shows on right side than on wrong, as the latter is uppermost in the loom.

Satin weave is made by passing the filling over a number (from four to ten or twelve) of warp ends and under one, over a number and under one, etc. In the next pick the filling will not advance regularly when passing under the warp as in twill weave, but irregularly. For example, in the second pick, the filling may pass under the fourth warp—in the third pick under the second warp—in the fourth pick under the fifth warp, etc. (Fig. 5C). This gives the smooth warp surface of satin and does not show a definite line.

If the method is reversed by passing the filling *under* a number of warp threads and *over one*, thus giving a filling surface, it is called "Sateen Weave"; this is generally used only for cotton materials and the "Satin Weave" for silk and wool.

Leno or gauze weave is a fancy weave obtained by twisting or crossing each successive pair of warp ends between each two picks of filling. By this means, each warp end is always either on top or under every filling; for example, warp 1 is over pick 1 and warp 2 is under pick 1, then warp 2 crosses over warp 1 and passes under pick 2 while warp 1 passes over pick 2, they cross as before between picks and repeat; an additional mechanism is necessary on the loom to accomplish the crossing of the warp ends. This makes an open or gauzy weave as in marquisette or grenadines, and may be combined in stripes with plain or satin weave, or varied in many ways (Fig. 5D).

Pile weaves, used for velvets, plushes, corduroy, Turkish towels, etc., is obtained by using two sets of warp threads, one for the ground or back of the material and one for the pile, which is looser than the ground warp and is worked by the loom in such a way as to be brought to the surface in loops of even length, which in the case of velvet and plush are cut through the center, thus making a thick,

brush-like surface which entirely covers the ground. In corduroy, filling threads are used to form the loops; for Turkish towels the loops are formed by warp threads on both sides of the cloth and remain uncut.

EFFECT OF WEAVE, FINISH AND COLOR DESIGN UPON THE COST OF GARMENTS

1. *Surface Treatment.*—The attractive glossy surface of broadcloth and kindred fabrics is obtained after the cloth has been woven,



FIG. 6.—Silk brocade showing up and down in design, produced by weave.

by means of additional processes which greatly add to the cost of its manufacture. After weaving, the cloth goes through a lengthy fulling process, which so mats the fibers that they will never ravel.



FIG. 7.—Chiffon Brocade, illustrating waste of material in width when matching pattern of design.

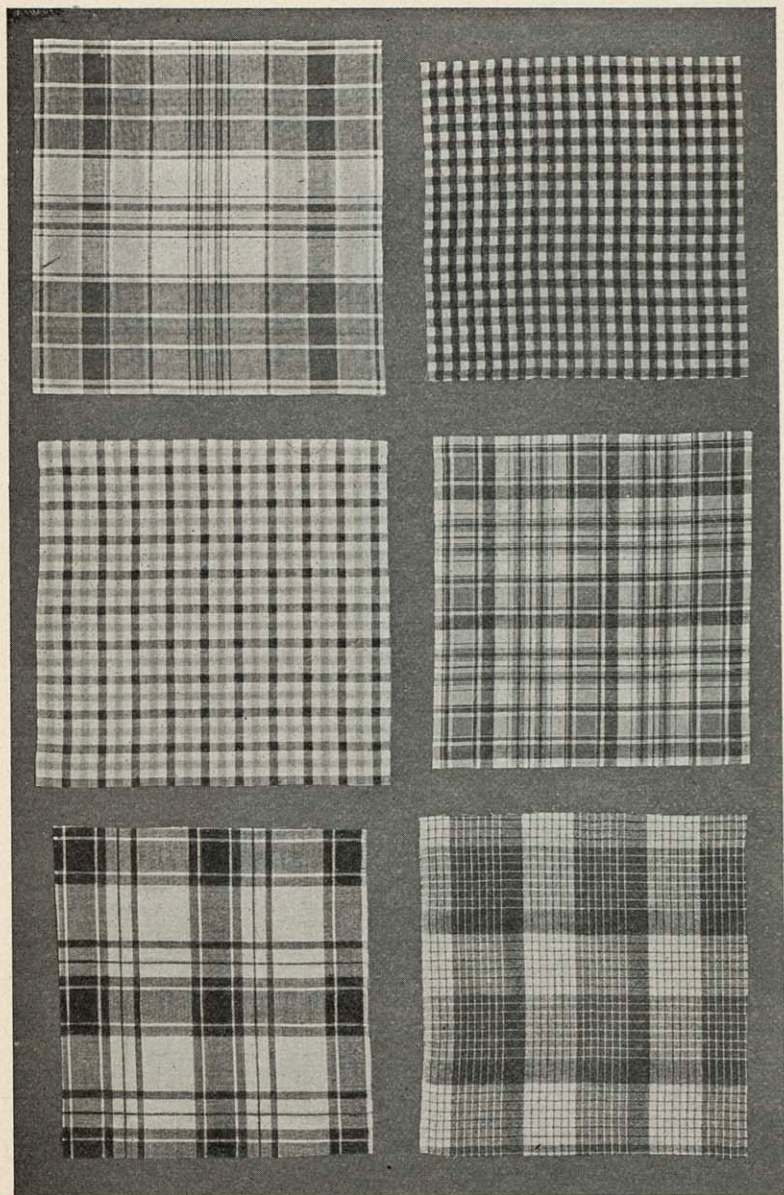


FIG. 8.—Plaids showing an even repeat right and left, and up and down in woven design.

The cloth is then napped, or roughed up, and sheared close, to give an even surface; it is then wetted, steamed, calendered, and pressed between hot rollers to make it lustrous. These repeated processes increase the cost of the fabric to the consumer.

2. Pattern in weaves, in self or other colors, may increase the cost of garments above that of plain materials. Figures, such as are found in brocades, swisses, etc., often produce an up and down, or right and left to the pattern, and by reason of their size, may waste considerable material in matching the pattern when seaming the parts of the gown (Figs. 6 and 7).

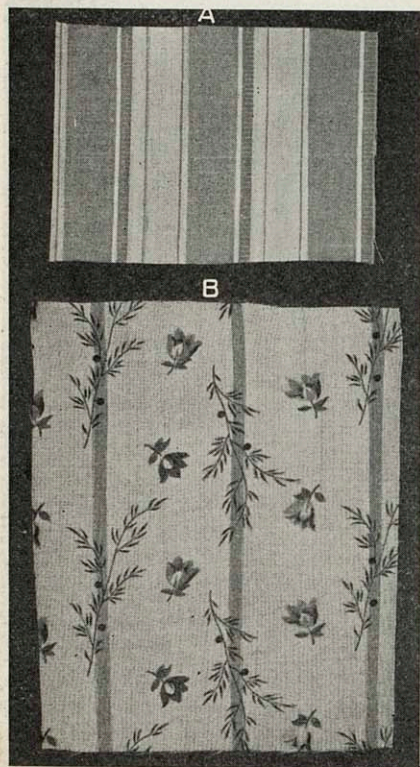


FIG. 9.—A, Striped gingham showing a left and right pattern in woven design; B, Challis showing an up and down pattern in printed design.

The use of colored yarns to produce pattern in weave, as in stripes and plaids, may necessitate the purchase of additional material by reason of the size of the pattern, or because of its uneven repeat of color and line, producing an up and down or right and left. Unless the design for such be carefully chosen one's figure may appear one-sided, to remedy which, the gown would need to be made with one-half wrong side out, which is not possible except with fine ginghams or similar fabrics (Figs. 8 and 9).

3. Pattern in printed design may produce the same results as above. Percales, lawns, dimities, and challis, in flowered patterns, are always more or less in vogue; in these the repeat of the pattern is sometimes irregular. If the pattern is small, it is not always noticeable, nor will it cause waste in cutting (Fig. 9B), but in large patterns this is not the case.

4. Color, such as produced in "changeable" silks, frequently necessitates cutting a garment as though the cloth had an up and down. Reversal of the pieces in cutting may make a complete change in the color. Some surface finishes, as in fine Henrietta, will show a difference in color if cut so as to reverse the pieces in a garment.

ADULTERATION

Tests for Adulteration.—Fabrics made of pure fiber, especially of wool, silk, or linen, are very expensive because of the cost of production. Consumers have demanded less expensive materials than formerly, therefore the manufacturers have found it necessary to reduce the cost of production by some one of several ways. A certain amount or kind of adulteration does not always affect the wearing quality of the fabric, but advantage has sometimes been taken of the buyer by the failure of the manufacturer to label the products honestly. Oftentimes, however, inferior stuffs are sold under the name and at the price of those of pure fiber. Consumers should become alert to the breaking down of this system of deception. They must learn the characteristics of the fibers, the method of adulteration, and ways and means of detecting the same. The constant improvements in the processes of manufacturing make it difficult, even for the expert, to determine whether materials are what is claimed for them. Consumers should learn to know the difference between staple fibers and cloths, both in appearance and the sensation produced by rubbing between the finger-tips. Staple cloths are those whose names, characteristics, and wearing qualities are generally known. To be able to recognize one well-known cloth, made from each of the four principal fibers, will greatly aid one in classification of other fabrics.

Methods of Adulteration.—*Sizing.*—Cotton cloth is adulterated by the use of starch or clay, which fills up the spaces between threads, making cloth appear closer and firmer than it really is; this adulteration also adds weight, which aids in the deception. A certain amount of sizing is necessary to make the cloth firm for commercial handling, but a greater quantity than is necessary is frequently used.

To detect sizing: In very thin materials, hold up to the light to see the starch; in heavier materials, brisk rubbing between the hands, will remove it, showing up the loosely woven threads. With some kinds of sizing, it will be necessary to wash or boil the fabric, to remove it. Linen is sometimes adulterated in the same way.

Addition or Substitution of Other Fibers.—Linen is also adulterated sometimes by adding cotton fibers to the linen, or by an entire substitution of cotton for linen fibres, the lustrous effect of linen being produced on the cotton cloth by means of calendering or being passed between hot rollers. The safest test for a mixture of cotton and linen fiber is the use of the microscope for testing the fibre, but microscopes are expensive. A simple test for the entire substitution of cotton for linen is to place a drop of olive oil upon the fabric; the oil makes the linen material more transparent than cotton. Another simple test is to break the threads; cotton breaks with a tufted, fuzzy end, linen with an uneven, pointed end.

Wool is also adulterated by the addition of cotton; sometimes a spun cotton yarn and a spun woolen yarn may be mixed, or cotton yarn may be used in the warp when weaving woolen material. Again, a microscopical test of the fiber is the surest means of detection. Burning may be employed; ravel a bit of the cloth and burn a warp and a filling thread—a cotton thread burns quickly and with flame, wool chars slowly, without flame, and smells like burning hair. A woolen material which has cotton in it will become more wrinkled when wet than “all wool.” Shoddy or made-over wool is also added to new wool to give an “all wool” fabric at a lower price; this is made of discarded woolen rags, made over into fiber and re-spun; this gives a shorter fiber than new wool, and when mixed with new wool can be detected by ravelling out a thread, when the short, broken fiber can be seen. Shoddy is sometimes woven alone into cloth, which, while comparatively good, is not so handsome and does not wear as well as new wool.

Cotton is not always considered an adulterant when mixed with wool, as in the case of mohair and alpaca, which usually have a cotton warp—these are not sold for “all wool” and do not command an “all wool” price.

Silk is sometimes woven with cotton, plain or mercerized, but cannot be spun with it. The burning test will apply here. Silk burns much like wool and leaves a small amount of crisp ash. Mercerized cotton is sometimes passed as silk under the name of pongée, tussah, or rajah. Silk is often adulterated by weighting or leading with metallic salts of tin or other metal which, when used in large quantities, soon causes the silk to cut. This is best detected by burning. The ash of weighted silk retains the original shape of thread or fabric and drops to pieces at a touch.

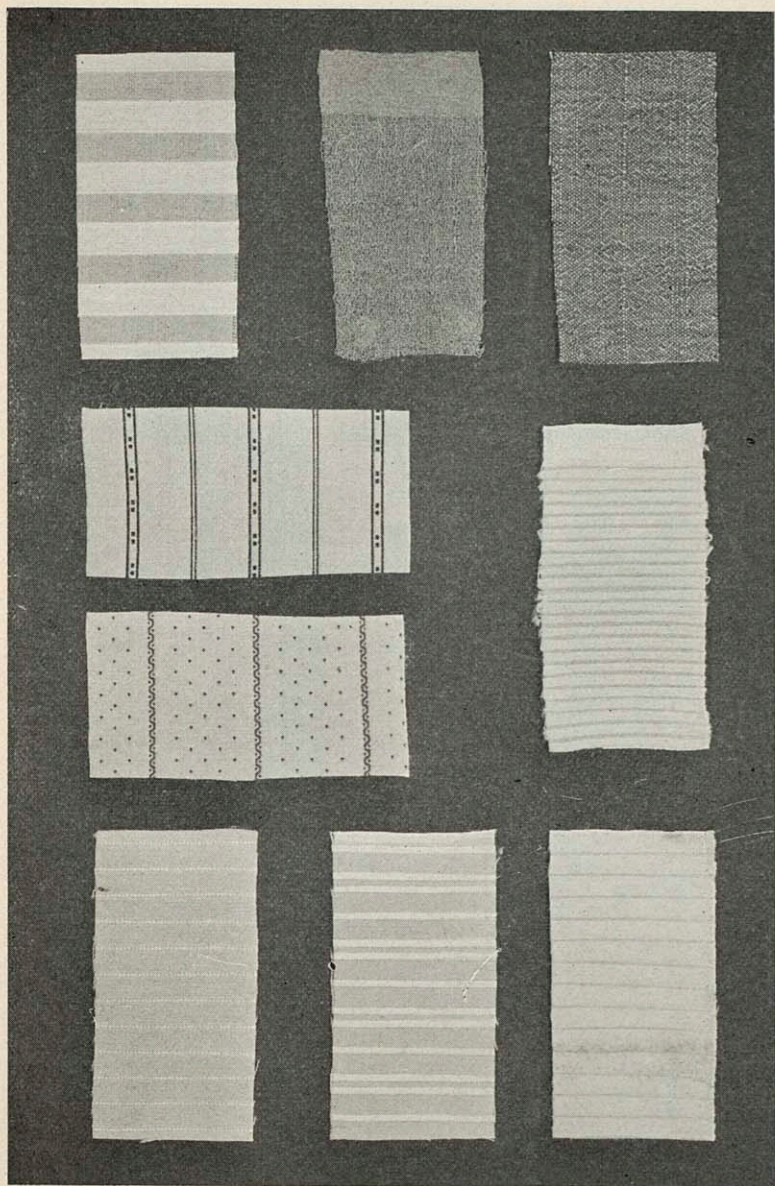


FIG. 10.—Cotton fabrics suitable for wash dresses, skirts and shirt waists.
Upper row (left to right), gingham, domestic crêpe and Japanese crêpe.
Second row (left to right) percale (striped), and corduroy.
Lower row (left to right), heavy madras (2), and pique (1).

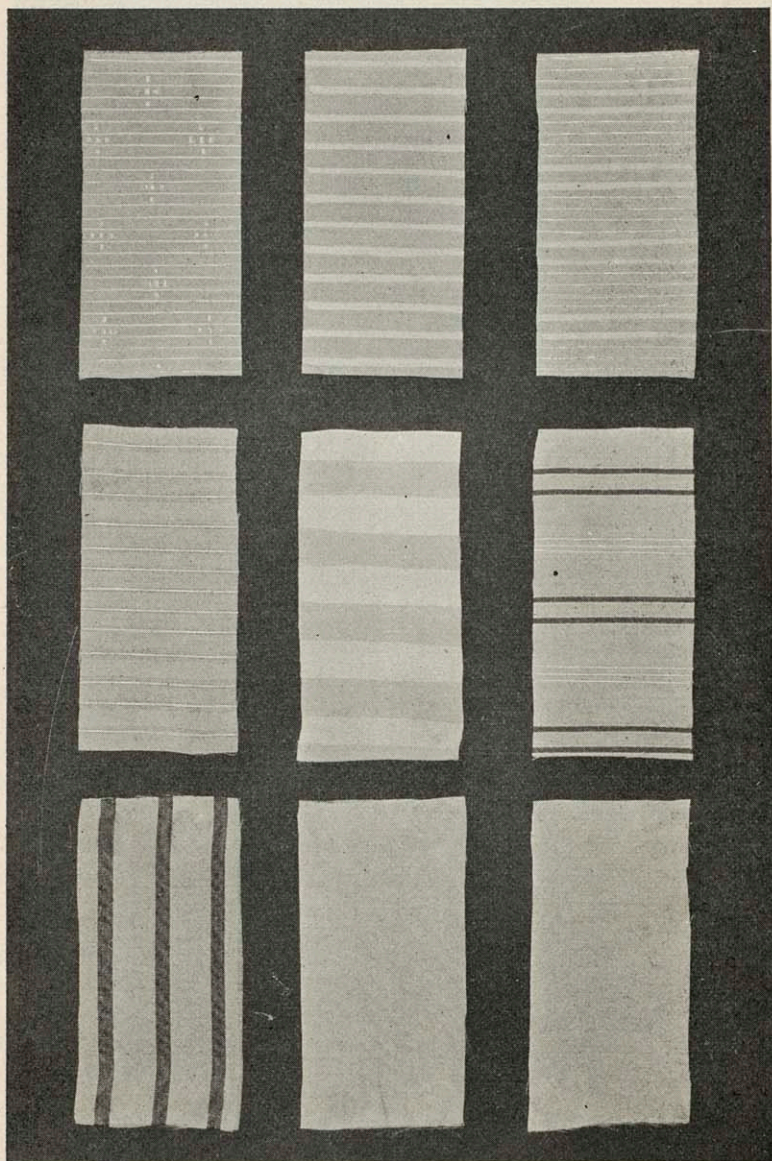


FIG. 11.—*Two upper rows, striped madras shirtings. Lower row, striped and plain habutai silk, and silk broadcloth shirtings.*

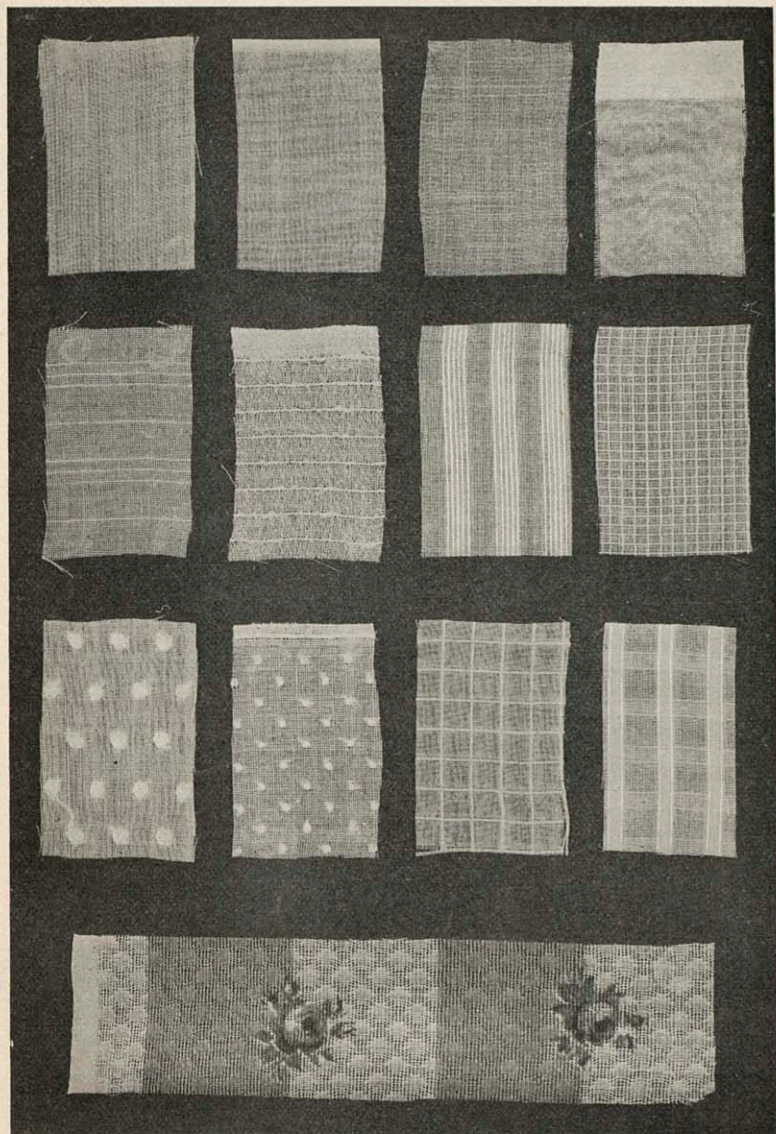


FIG. 12.—Cotton fabrics suitable for lingerie blouses and dresses.

Upper row (left to right), batiste (mercerized) Persian lawn, handkerchief linen, and voile
Second row, striped crêpes (2), and striped and checked dimity.
Third row, embroidered Swiss (2), and flaxon (2).
Lower row, fancy flowered voile.

STAPLE MATERIALS

This table lists materials which are used in the construction of under- and outer-garments, classified as to, fiber, weave, price, width, and description. Standard materials in general use are shown in Figs. 10, 11, 12, 13, 14, and 15.

Name	Fiber	Weave	Width Inches	Price	Appearance and Use
Albatross.....	Wool	Plain	38-40	\$.75-\$1.00	A soft crêpe like wool; suitable for light weight school or simple afternoon dresses.
Armure.....	Silk	Armure	36-40	\$1.50	Soft, semi-lustrous, heavy silk; beautiful weave. Dresses.
Basket Cloth.....	Wool	Basket	45-50	\$1.00-\$2.50	Soft wool, loose woven cloth. Used for dresses and skirts.
Batiste.....	Cotton Wool	Plain Plain	32-45 45	\$.35-\$1.00 \$1.00-\$2.00	Fine sheer material, used for lingerie waists and summer dresses. Also light weight wool dresses.
Bedford Cord.....	Wool	Plain	48-54	\$1.50	Corded wool, cord running lengthwise of cloth; used for dresses.
Bengaline.....	Silk	Cord	22-36	\$2.00	Heavy corded silk. Afternoon coats, etc.
Bouclé.....	Hair or wool				Woven into cloth to produce a curled surface.
Brilliantine.....	Cotton or silk warp hair filling	Linen	45-54	\$1.00-\$2.00	Glossy, hard surface. Used for suits, skirts, and petticoats.
Broadcloth.....	Wool	Plain or twill	50-60	\$2.00-\$5.00	Smooth-faced cloth, high gloss. Suits, coats, dresses.
Brocade.....	Cotton Linen Silk Satin Wool	Figure	27 36 27-40 27-40 45	\$.50 \$1.00 \$2.00-\$5.00 \$2.00-\$5.00 \$1.50-\$4.00	Pattern in self or contrasting color raised on the cloth.
Calico.....	Cotton	Plain	25	\$.07	Inexpensive printed cloth; used for aprons, suit covers, etc.
Cambric.....	Cotton	Plain	25-36	\$.06-\$.30	Fine cotton fabric used for undergarments. Coarser weaves used for patterns.
Cashmere.....	Wool	Twill	42-45	\$.75-\$1.50	Soft, fine twilled woolen material. Dresses. Usually in plain colors.
Challis.....	Wool or cotton and wool	Plain	32	\$.65-\$1.00	Fine wool material, suitable for afternoon dresses. Plain colors or figured.

Chambray.....	Cotton	Plain	32	\$.12½-\$.25	Light weight cotton cloth; always woven with one color in warp, and white filling; white selvedge. School or house dresses.
Cheese Cloth.....	Cotton	Plain	36	\$.08-\$.12	Loosely woven fabric of medium fine thread, used for dust cloths, patterns and covers.
Cheviot.....	Wool or worsted	Plain or twill	50-54	\$ 1.00-\$ 3.00	Coarse, heavy woolen cloth; suitable for suits, storm- or top-coats.
Chiffon.....	Silk	Plain	45	\$.75-\$ 1.00	Thin, gauzy fabric for waists, sleeves, collars, etc.
Chiffon Cloth.....	Silk	Plain	45	\$ 1.00-\$ 1.50	Soft thin gauzy fabric, heavier in weight and more durable than the chiffon.
China silk.....	Silk	Plain	32-36	\$.75-\$ 1.25	Waists, etc.
Chintz.....	Cotton	Plain	36	\$.25-\$.50	Thin glossy silk, used for linings.
Corduroy.....	Cotton	Pile	27	\$ 1.00-\$ 2.00	Fine medium heavy cotton stuff; usually figured; used for dresses, etc.
Corsica.....	Silk and cotton	Plain	36	\$ 1.00-\$ 1.50	Corded cotton fabric. Used for school suits, dresses, etc.
Covert.....	Wool	Twill	50-54	\$ 2.00-\$ 4.00	Lining silk of fine grade.
Crash.....	Linen	Plain	30-45	\$ 1.00-\$ 1.50	Fine twilled material; wears like iron.
Cravennette.....	Wool	Twill	50-56	\$ 2.00-\$ 3.00	Coarse, heavy linen, good for skirts, suits, etc.
Crêpe.....	Cotton Silk Wool	Plain	32-36	\$.18-\$ 1.00 \$ 1.50-\$ 4.00	Light weight wool material; good school suits; can be rain-proofed.
Crêpe de Chine.....	Silk	Plain	38-40 40-45	\$ 1.00-\$ 1.50-\$ 4.00	Crinkled surface. Used for undergarments, waists, dresses.
Crêpe Georgette.....	Silk	Plain	40	\$ 1.50-\$ 2.00	Semi-luster; crêpe surface. Dresses, blouses, and in light weight undergarments.
Crêpe Meteor.....	Silk	.....	40-45	\$ 1.50-\$ 4.00	Blouses, sleeves, dresses, etc.
Diagonal.....	Wool	Twill	45-56	\$ 1.50	Luster; smooth surface. Dresses, evening gowns.
Dimity.....	Cotton	.....	32	\$.25-\$.35	Cloth of heavy or medium heavy weight; suits, coats. Striped or cross-barred, plain or figured. Dresses, kimonos, waists.

STAPLE MATERIALS—Continued

Name	Fiber	Weave	Width <i>Inches</i>	Price	Appearance and Use
Drill.....	Cotton	Twill	36	\$.15-\$.20	Twill cotton cloth; middie blouses, school and play dresses, rompers.
Duck.....	Cotton	Plain	36	\$12½-\$.20	Like sail-cloth; heavy; for skirts, sport suits, middie blouses, etc.
Eolienne.....	Raw silk warp, cotton or worsted filling	.....	27-50	\$1.00	Lustrous surface, soft, but not clinging. Dresses, suits.
Eponge.....	Linen or linen and cotton	Plain	45	\$1.00-\$2.00	Rough surface, looks like wool. Dresses and suits; a 20 per cent. cotton mixture; is not crushable.
Faille.....	Silk	Cord	36	\$1.50	Surface in. light ridges; dresses, afternoon coats, trimmings.
Flannel.....	Wool or cotton and wool	Plain or twill	27-36	\$.55-\$1.00	Weave like coarse cotton; soft and warm; petticoats, house jackets, dresses, shirts.
Flannelette.....	Cotton	Plain	27	\$.08-\$.15	
Foulard.....	Silk	Twill	27-40	\$.75-\$1.50	Usually figured (flowers or conventional design). Summer dresses; good for utility; sheds dust.
Gabardine.....	Wool	Twill	50-54	\$1.50-\$3.75	Somewhat like whipcord, but soft. Suits, dresses; does not shine as quickly as serge; wears well.
Galatea.....	Cotton	Twill	32	\$.15-\$.20	Twill cotton, somewhat like drill. Does not keep white as well. Middie blouses, school dresses.
Gauze.....	Silk	G a u z e,	45	\$4.00-\$5.00	Open mesh. Dresses, curtains.
Gingham.....	Cotton	l e n o Plain	32	\$.25-\$1.00	Plain weave; pattern produced by yarn dyed thread; also plain colors—dresses, rompers, etc.
Grenadine.....	Silk	Gauze	44	\$1.50-\$3.00	Open weave, sometimes figured. Dresses (requires silk slip); good wearing qualities.

Grograin.....	Silk	Plain	22	\$1.50	Heavy, lustrous; shows rib or slight cord on surface. Dresses, wraps.
Habutai.....	Silk	Plain	32-36	\$2.00-\$3.00	Lustrous; close weave. Shirts.
Henrietta.....	Wool	Twill	38-45	\$1.00-\$2.00	Luster; soft to touch. Dresses.
Homespun.....	Wool	Plain	50-54	\$1.50-\$2.50	Coarse; heavy. Suits, separate skirts; good for hard service.
Hopsacking.....	Wool	Plain	50-54	\$1.75-\$2.00	Coarse, rough surface like bagging; suits, skirts.
Indian Head.....	Cotton	Plain	36-45	\$.15-\$.25	Coarse, heavy muslin. Skirts, dresses, rompers, middy blouses. Easily laundered and lasting wear.
India Silk.....	Silk	Plain	32-36	\$.75-\$1.50	Plain, lustrous, thin. Used for summer utility dresses and waists.
Khaki.....	Cotton	Twill	36	\$.25	Dust colored, heavy cloth. Sport and outing suits, middy blouses, school dresses, knickers, etc. Genuine khaki launders well, wears indefinitely.
Linen: handkerchief, dress, butcher's Lawn.....	Linen	Plain	36-90	\$.25-\$2.00	Lustrous; heavy, fine. Dresses, suits, rompers, blouses, interlinings.
Longcloth.....	Cotton or linen	Plain	27-36	\$.10-\$.50	Sheer, stiff (with dressing). Plain and figured. Dresses, slips, aprons.
Madras.....	Cotton	Plain	36	\$.15-\$.30	Fine, soft to touch. Undergarments and infants' wear.
Marquisette.....	Cotton	Plain and satin	27-32	\$.25-\$1.00	Usually striped; colored and white. Shirts, dresses.
Melton.....	Silk or cotton	Leno or gauze	45	\$.75-\$1.25	Open weave. Dresses, waists.
Messaline.....	Wool	Plain and twill	50-54	\$2.00-\$4.00	Thick, heavy, rough to touch. Coats.
Mohair (see Brilliantine).....	Silk	.....	36	\$1.00-\$1.50	Luster, light weight. Slips, petticoats, linings.
Moire.....	Silk	Cord	22-40	\$1.50-\$5.00	Slight cord, watered surface. Dresses, coats, wraps, waists.
	Wool	.....	45	\$2.00	

STAPLE MATERIALS—Continued

Name	Fiber	Weave	Width <i>Inches</i>	Price	Appearance and Use
Muslin.....	Cotton	Plain or twilled	36	\$.15-\$.25	White or colored, fine or coarse; skirts, dresses, middy blouses.
Nainsook.....	Cotton	Plain	36-45	\$.20-\$.50	Fine, soft. Undergarments, infants' slips, and dresses.
Nun's veiling.....	Wool	Plain	36	\$1.00-\$2.00	Light weight, plain. Dresses, summer weight.
Organdie.....	Cotton	Plain	36-72	\$.75-\$1.25	Sheer, with stiffness, which keeps it firm. Washable (some grades). Dresses, waists, collars and cuffs.
Panama.....	Wool	Plain	42-54	\$1.00-\$1.75	Medium heavy. Separate skirts, dresses.
Percale.....	Cotton	Plain	36	\$1.2 $\frac{1}{2}$ -\$.25	Plain colors, stripes and figures. Skirts, dresses, waists.
Percaline.....	Cotton	Plain	36	\$.25-\$.35	Fine, soft, strong. Waist linings and foundation skirts.
Persian lawn.....	Cotton	Plain	32-36	\$.25-\$.50	Sheer and fine. Lingerie blouses, dresses, infants' dresses.
Pique.....	Cotton	Cord	27	\$.50-\$1.00	Ribbed; white and colors. Separate skirts and dresses.
Pongée.....	Silk	Plain	27	\$.65-\$1.50	Natural colors and dyed; more or less rough and harsh. Unlimited wear; spots with water but launders well. Waists, dresses, coats, petticoats.
Poplin.....	Cotton Silk	Cord	27-32 45	\$.25 \$2.00-\$4.00	Ribbed; white and colors. Dresses, skirts, etc.
Prunella.....	Wool	Satin	45-50	\$1.50-\$3.00	Glossy surface, harsh. Skirts, dresses.
Rajah.....	Wool	Plain	48-52	\$1.00-\$2.00	Rougher than pongée; in colors. Dresses, coats.
Ratine.....	Silk	Plain	36	\$.75-\$1.50	
	Cotton	Plain	36-45	\$.50-\$1.50	Rough weave; heavy and light weight. Summer dresses and skirts.

Sateen.....	Cotton	Twill	36	\$.25-\$.50	Glossy, soft to touch. Lining for waists and skirts; petticoats.
Satin.....	Silk or silk and cotton	Satin	27-40	\$1.00-\$5.00	High gloss; soft; heavy and light. Dresses, coats, skirts.
Seersucker.....	Cotton	Plain	27-36	\$.25	Crinkled surface; with stripes. Petticoats, rompers, etc.
Serge.....	Wool, worsted, silk	Twill	48-58	\$1.00-\$3.00	Either hard or soft finish; shines easily; wears long time. Suits, skirts, dresses.
Shantung.....	Silk	Plain	36	\$.75-\$1.50	Checked; in black, or colors and white.
Shepherd's Plaid.....	Wool	Plain Twill	48-54	\$1.00-\$3.00	Skirts, suits, top-coats.
Swiss.....	Cotton	.....	32-45	\$.75-\$2.00	Open weave, sheer, usually embroidered. Lingerie blouses and dresses.
Taffeta.....	Silk	Plain	32-40	\$1.00-\$4.00	Plain colors or changeable; soft qualities. Wears well if not adulterated. Lustrous. Coats, dresses, etc.
Tricot.....	Wool, cotton, silk	Twill	.....	\$2.00-\$3.00	Twill weave, fine. Men's and women's suits.
Tweed.....	Wool	Plain	50-54	\$1.00-\$2.50	Rough surface; long wear; presses well.
Velvet.....	Silk or silk and linen or cotton	Pile	18	\$1.00-\$10.00	Suits, skirts, sport, or travelling coats. Rich and deep in tone. Dresses, coats, hats.
Velveteen.....	Cotton	Pile	27-36	\$1.00	Like velvet, not so rich; suits and dresses.
Venetian.....	Worsted or cotton warp and worsted filling	Twill	50-54	\$1.50-\$3.00	Like broadcloth; shows twill; coats, suits.
Voile.....	Worsted Cotton	Plain	38-45	\$1.50 \$.25-\$1.00	Open weave; firm in wool, very soft in cotton. Fancy suits in wool; separate skirts. Lingerie dresses and blouses in cotton.
Zibeline.....	Wool	Twill	.....	\$2.00-\$4.00	Loosely woven; glossy surface; long hairs on surface. Dresses and suits.

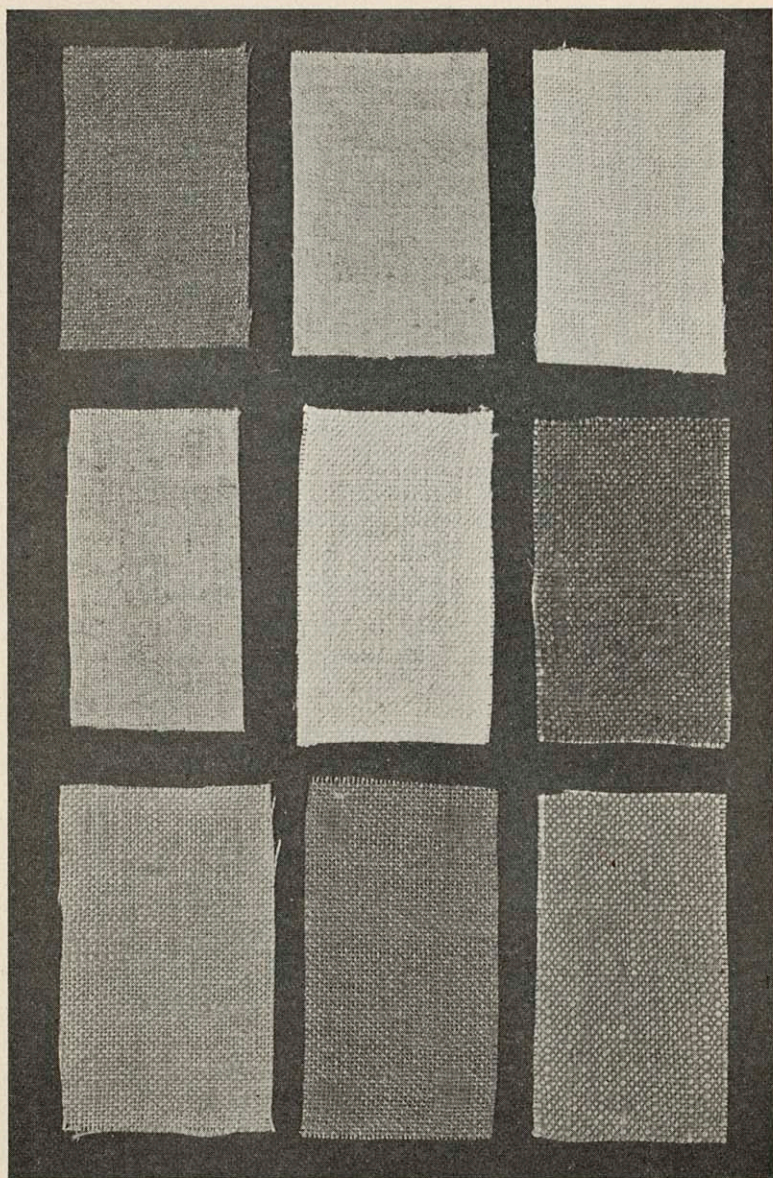


FIG. 13.—Linen fabrics suitable for skirts, coats, and dresses.

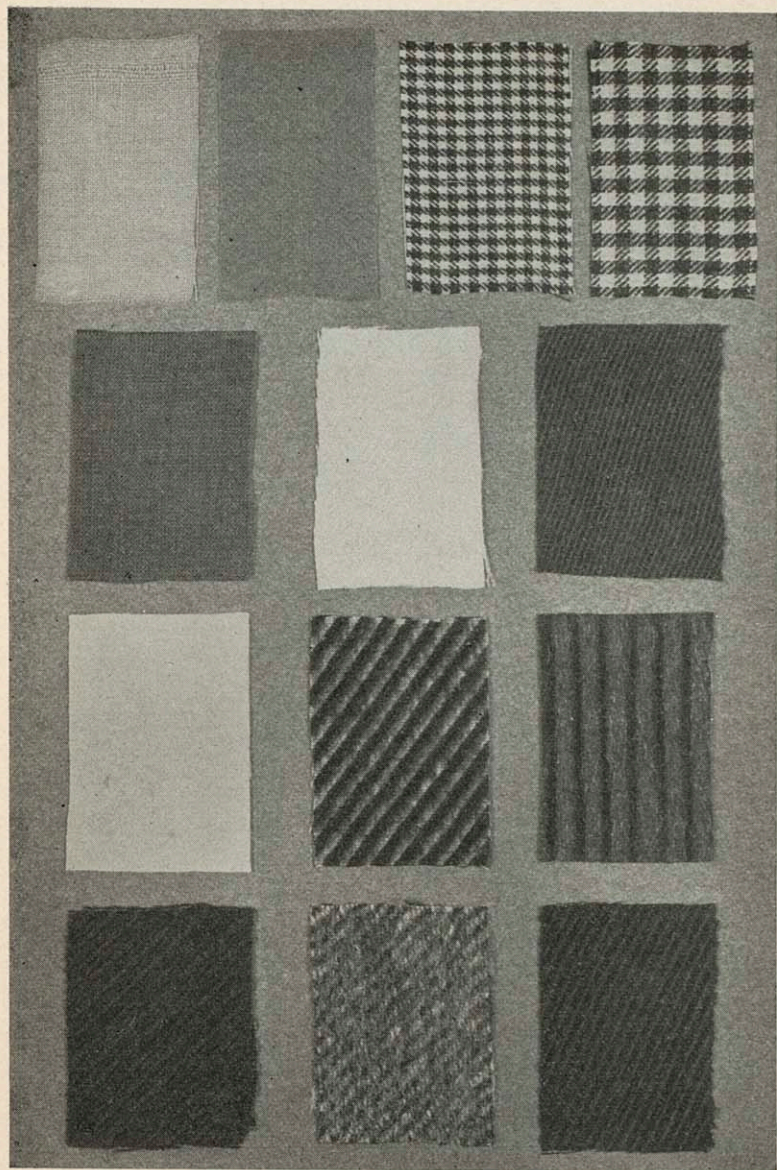


FIG. 14.—Wool fabrics suitable for skirts, dresses, and coats.
Upper row (left to right), challis, albatross, shepherd's checks.
Second row (left to right), brilliantine, serge, gabardine.
Third row (left to right), broadcloth, diagonal, and striped zibeline.
Lower row (left to right), cheviot (2) and covert cloth.

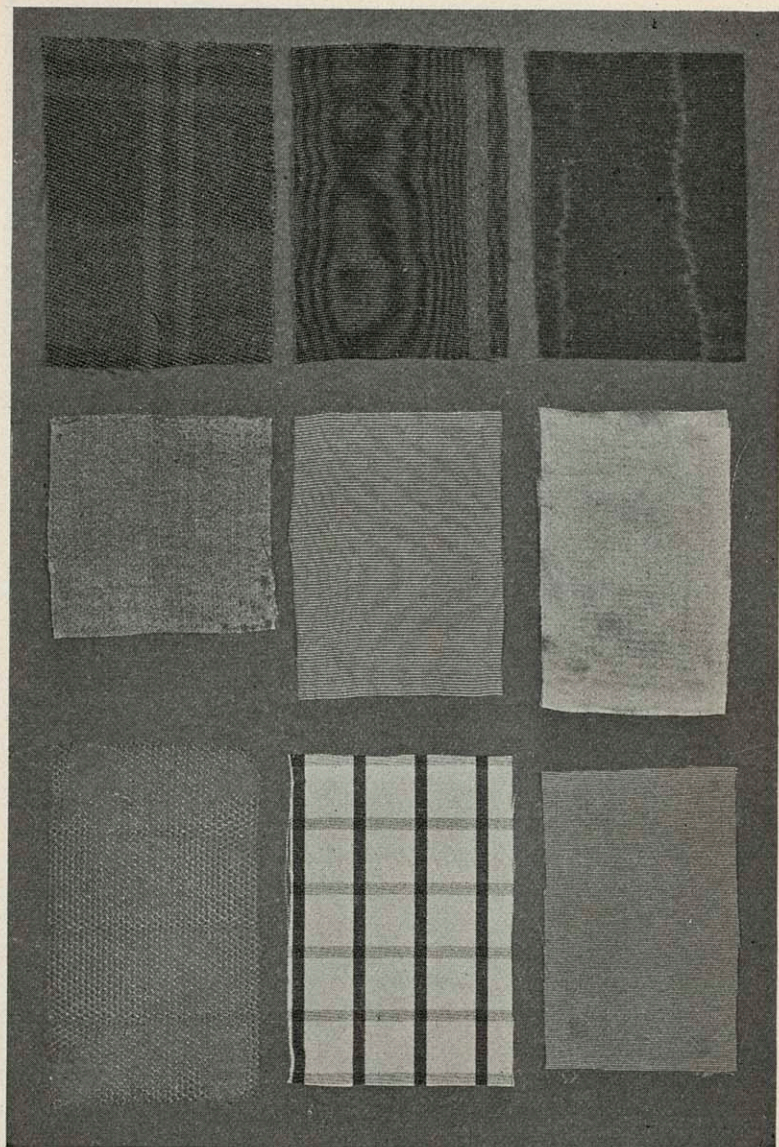


FIG. 15.—Silk fabrics suitable for dresses and wraps.

Upper row (left to right), silk serge, moiré (2).

Second row (left to right), chiffon velvet, silk poplin, and crêpe meteor.

Third row (left to right), silk net, plaid taffeta, faille.

Laces and Embroideries.—Following is a list of a few familiar laces and embroideries suitable for decoration of undergarments, lingerie blouses, dresses, etc. Prices of such have a wide range, therefore it is difficult to arrange a standard list. One can find a variety of attractive, durable edgings for very little outlay; Figs. 16, 17 and 18 show good patterns of several types of laces, and Figs. 19, 20 and 21 embroideries of several kinds. Both laces and embroideries should be chosen with regard to the kind of material which they are intended to decorate; to illustrate, very heavy lace on very light weight material will overweight the garment, which is contrary to good design.

Durability is a factor not to be overlooked. When buying laces, select those the thread of which runs *diagonally* from edge to edge, making the mesh interlock; there is a kind of lace, the thread of which only forms one-half of the mesh, the points being tied together with a weak, fine thread which does not show, but in a short time breaks down, and the lace becomes worthless.

In choosing embroideries, select those which have a background similar to the material to be used in the garment. Do not use heavy edgings on light weight materials. Embroideries are to be had with batiste, nainsook, Swiss, and soft-finished cambric backgrounds, if one wishes the heavy embroidery. Entre-deux can also be had in the materials mentioned above, and in voile also; this is very good for use on lingerie blouses made of voile. Hand-made embroideries are very expensive even in narrow edgings, but there are hand-finished embroideries, the edges of which are trimmed by hand, and which simulate the fine hand-embroideries and are less expensive.

Laces

Valenciennes, edge, insertion, and beading:

French.....	\$.10	and upwards	a yard.
German.....	.10	“	“
Cluny.....	.15	“	“
Torchon.....	.10	“	“
Filet.....	.15	“	“
Irish.....	.25	“	“
Footing, plain; point d'esprit.....	.04	“	“

Embroideries

Batiste.....	\$.25	“	“
Nainsook.....	.25	“	“
Swiss.....	.25	“	“
Soft-finished Cambric.....	.25	“	“
Embroidery beadings, same backgrounds.....	.08	“	“

FINDINGS

One should become familiar not only with the materials used in the construction of garments, but also with the numerous "findings" necessary for finishing edges, trimming, and fastening garments. The following list names those most often needed and gives approximate prices.

		<i>Fastenings</i>				
Buttons.....	{	Pearl {	Two-hole.....\$.10 and upwards a dozen.			
			Four-hole..... .10 " " " "			
			Shank..... .25 " " " "			
			Link..... .25 " " " "			
		Linen..... .12 " " " "				
		Crochet..... .10 " " " "				
Hooks and eyes....	{	Swan Bill	Hooks and eyes \$.04-.10 a card.			
		Hump				
Snap or ball-and-socket fasteners.....			\$.05 a card.			
Belting.....	{	Cotton, ribbed.....	.08-.15 a yard.			
		Silk, ribbed.....	.15 a yard.			
		Cotton, twilled.....	.03-.05 a yard.			
		Silk, twilled.....	.15 a yard.			
		Percaleine, featherbone.....	.12 " "			
		Non-elastic tape.....	.05 " "			
Tape.....	{	Linen, plain.....	.04 a piece.			
		Cotton, twilled.....	.05 " "			
		Bobbin, twilled.....	.02 " "			
Bias seam binding..	{	Lawn {	White and Colors..... .12-.15 a piece.			
		Linen {				
Prussian binding, twilled tape, silk warp, linen filling.....			.25 a piece.			
Taffeta seam binding, taffeta ribbon, 1/2 inch-3/4 inch white, colors, \$0.20 a piece.						
Thread.....	{	Cotton.....	\$.05 a spool.			
		Silk.....	.09 " "			
		Button-hole twist.....	.02 " "			
		Cotton for embroidery.....	.02-.05 a skein.			
Braids.....	{	Middy, cotton.....	.03 a yard.			
		Skirt {	Worsted	Mercerized cotton }.....	.15 a piece.	
						Cotton
		Soutache {	Worsted	Silk	Cotton }.....	.03 " "
		Trimming braid {	Silk	Worsted }.....	.05 " "	
Lace, cotton.....	.04 " "					
Collar stays.....	{					Singly.....	.01 " "
		or by	to			
		Dozen.....	.25 a dozen.			
Waist bone.....	{	Featherbone.....	.22 a yard.			
		Whalebone.....	.30 " "			

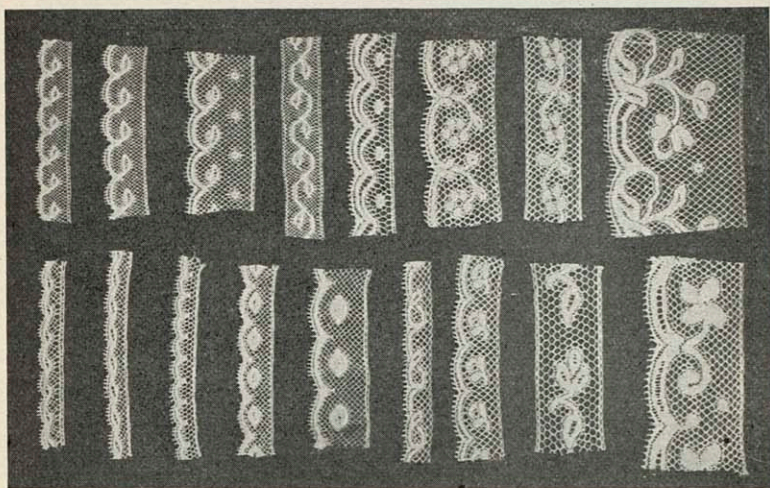


Fig. 16.—French and German Valenciennes laces, machine-made, suitable for undergarments, infants' wear, and lingerie dresses and blouses.



Fig. 17.—Cluny, torchon, and Irish laces and beadings, hand- and machine-made, suitable for undergarments and lingerie blouses.

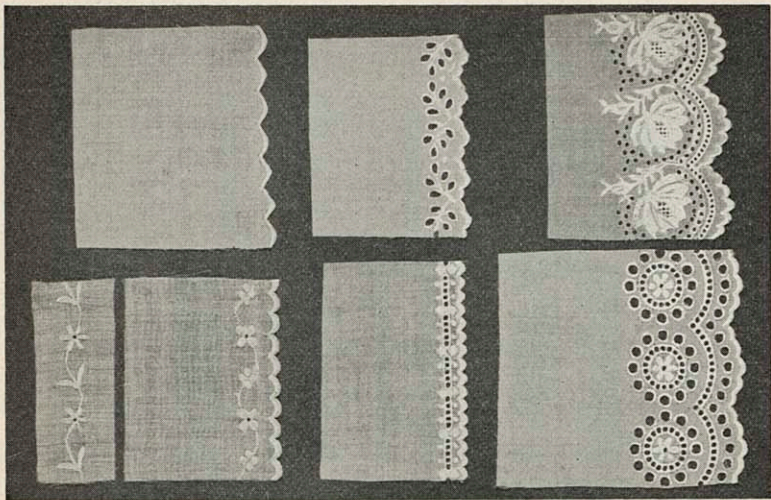


FIG. 19.—Embroidered edgings suitable for lingerie dresses and undergarments.
Upper row (left to right), hand-finished insertion and edging and hand embroidered edging.
Second row (left to right), nansook and soft finished cambric edging.
Lower row, soft finished cambric edgings.

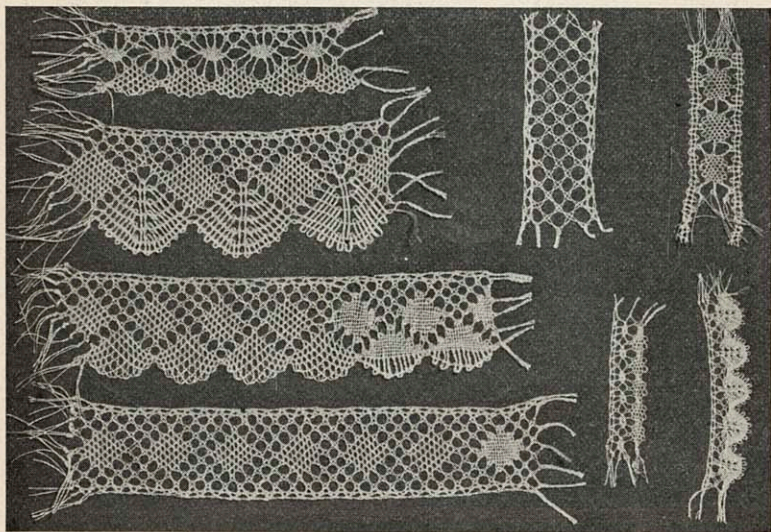


FIG. 18.—Hand-made (pillow) cluny lace.

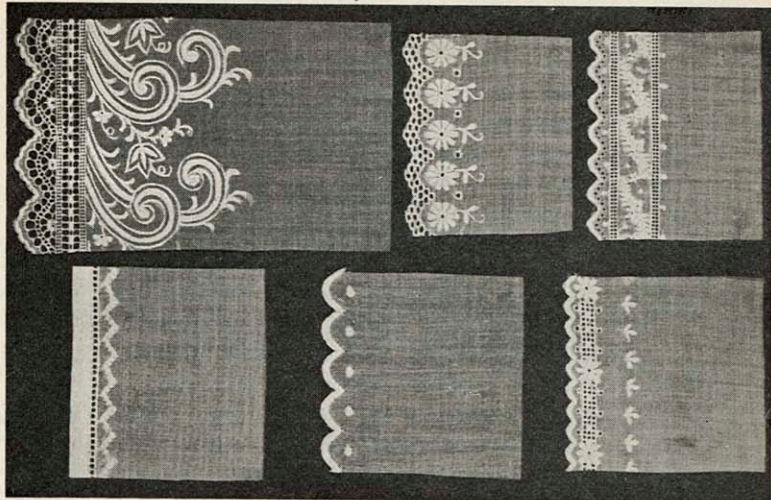


Fig. 20.—Embroidered edgings, suitable for lingerie dresses and undergarments.
Upper row (left to right), batiste and Swiss edging.
Second row (left to right), batiste and Swiss edging.
Lower row (left to right), batiste and voile edging.

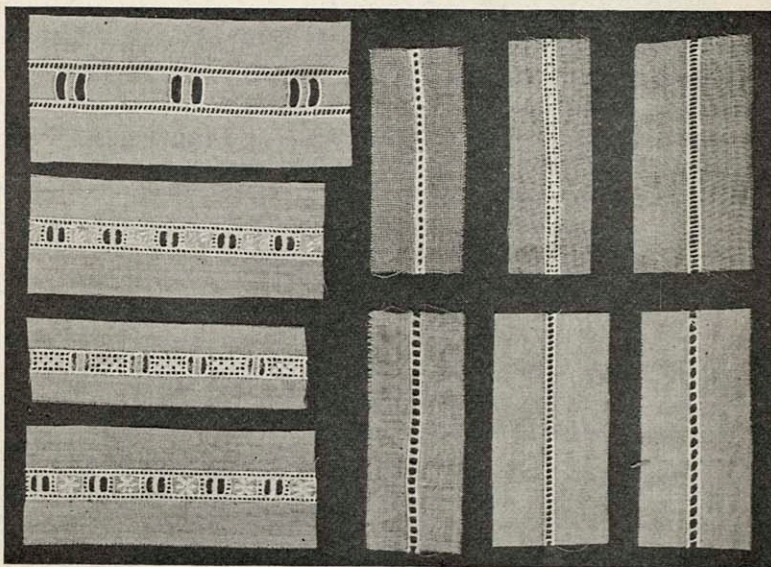


Fig. 21.—Entre-deux and beadings embroidered on batiste, Swiss, nainsook, soft finished cambric and voile, suitable for undergarments, infants' clothing, lingerie blouses, and dresses.

LABOR IN TEXTILE INDUSTRIES

It is highly important that the purchaser should know of conditions which attend the laborers engaged in the preparation of fibers, the manufacture of fabrics, and wearing apparel, so that they may aid the growing endeavor to better these conditions through investigation, the enactment and enforcement of laws, and the education of the individual buyer.

With the passing of the clothing industries from the home, women have been forced to follow these into the factory, and not only the women, but children, have also been forced to engage in factory labor, an evil outgrowth of which has been the overcrowding and huddling of the many, in badly lighted, poorly ventilated tenement houses, where long hours, little pay and ill health are the common lot of all. Some of the evils are these: (1) crowded factories; (2) unprotected machinery, causing accidents; (3) buildings, mere fire-traps; (4) bad sanitary conditions; (5) long hours; (6) child labor. Eager to cheapen the cost of production, manufacturers have also given out work from the factories to be done in the homes, and this without regard to the conditions under which the work is carried on. Many of the industries are carried on in such ways as follow,—people that are old and feeble, others sick and distressed, and little children, mere babies, are at work in dingy rooms, ill-fed, dull, and hopeless. Such conditions exist, but much has been done to correct them; legislation has followed on the footsteps of investigation, as pleas for better conditions have been made. Some states have passed laws regulating the number of hours per day women may work in the factories. School attendance has been made compulsory; children are not allowed to work in stores or factories until fourteen years of age. On the other hand, factory owners and heads of department stores have been led to provide good lunch and rest rooms, also club rooms, seats behind the counters for employees, and generally good sanitary conditions, throughout their establishments. Much has been done in the direction of this betterment through the efforts of the National Consumers' League, an organization of women whose endeavor has been toward the improvement of the working and living conditions of women's garment makers especially. They have made investigations, secured legislation and now grant to the manufacturer who meets the requirements of the League the right to use the label of the League, which assures the buyer that the articles purchased have been made under healthful conditions, in factories conforming to

child labor and other laws. This League publishes a White List containing the names of those manufacturers who conform to law. It becomes, then, the duty of the consumer to inquire whether goods bearing the Consumers' League label are available in her community, because if her demand becomes one of many, by law of economics, the supply must be made to meet the demand; then labor conditions will be more generally reformed.

SUGGESTIVE QUESTIONS

1. With what facts should a girl become familiar in order to learn how to buy wisely and economically?
2. Name the four principal fibers of which cloths are made. Tell some of the qualities which make them useful for manufacturing purposes. Which fiber is the most costly to manufacture? Why?
3. Tell briefly the history of growth, preparation and manufacture of cotton.
4. Name the most familiar weaves; describe briefly the difference between plain and twill weaves.
5. How can weave, or color design affect the cost of a garment?
6. *a.* List six different fabrics used in your own clothing. *b.* Name six used in men's clothing. *c.* State widths and costs.

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