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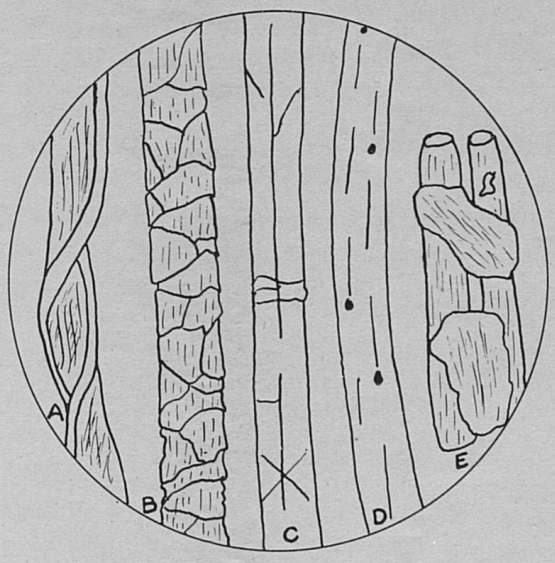
TEXTILE FIBERS AND FABRICS



Sketch of Fibers as Seen Under the Microscope

A, Cotton; B, Wool; C, Flax; D, Rayon; E, Silk

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Textile Fibers and Fabrics

By ISABELLE M. STORY

Textile fibers are fibers which are capable of being woven into cloth. A woven cloth is a textile fabric. There are five principal textile fibers: silk and wool, which are of animal origin, cotton and linen, which are of vegetable origin and rayon, a manufactured fiber having a vegetable base. Certain properties such as length, strength, elasticity, luster and power of absorbing moisture are possessed in varying degrees by each of these fibers and contribute to its value as a textile.

Long fibers are more easily spun into yarn than short fibers, and when woven they give a cloth of less fuzzy surface than short fibers.

Elastic fibers are stronger and more easily spun than inelastic fibers and give a cloth that drapes gracefully.

Each fiber has a characteristic structure by which it can be identified when seen under a high-power microscope.

The reaction of animal fibers to chemicals is different from that of vegetable fibers. Animal fibers are destroyed by alkalis, but not by weak acids. Vegetable fibers are destroyed by strong acids and weakened, more or less, by any acid. Alkalis, except in concentrated form, do not harm vegetable fibers. The effect of either acids or alkalis is more pronounced if concentrated, or if allowed to dry on a material.

Silk is the most expensive fiber to produce. There are two general varieties: cultivated and wild. Cultivated silk is produced by worms which are fed on mulberry leaves. It is fine, soft and smooth, and is used in the manufacture of all finer grades of silks. Worms producing wild silk are fed on oak leaves

The fiber is coarser and more harsh than cultivated silk, and is brown in color. It is difficult to bleach and dye, and for this reason is more often used in its natural color, as in pongee and shantung.

In winding silk from the cocoon the filament or thread is reeled into skeins, several cocoon filaments being wound together into a single strand. This is called "reeled" silk. Silk filaments vary in length from 300 to 1,500 feet. From four to six pounds of cocoons are required to produce one pound of reeled silk. Short and broken fibers which are not suitable for reeling are spun into yarn which is strong and durable, but which does not have the luster of reeled silk. This is used extensively as a filling thread in such materials as satin where it does not come to the surface of the cloth, in crepes which require tightly twisted thread, and in sports fabrics.

Silk is strong and elastic, and is easily spun into a smooth, strong yarn. It takes dye readily and, because of its natural luster, gives beautiful, rich colors.

The silk fiber as it comes from the cocoon is covered with a gum which must be removed in order to give the silk its high luster and softness. In this process of degumming it looses about twenty-five percent of its weight. To make up for this loss, silk is "weighted" or "loaded" by allowing it to take up chemicals from the baths used, especially the dye baths. Salts of tin and iron are most generally used for this purpose. Silk will absorb three or four times its weight of chemicals. This quality is taken advantage of in making cheap grades of silk fabrics which are allowed to take up large quantities of weighting substances in order to make them heavy and appear to be of good quality. This excessive weighting causes the cloth to crack and split after a time. Many of the less expensive grades of silk are heavily weighted, tin and iron being used in some cases, and combinations of starch, clay, gum, tallow and various other substances in others. Silks weighted with the last named substance shrink badly and become open and sleazy when washed.

Wool. There are many grades of wool, quality depending upon the breed of sheep, its food, the climatic conditions in which it lives, and also the part of the body on which the wool is grown.

Wool fibers vary from one inch to fifteen inches in length, but the average is about four inches. The fine, overlapping scales which cover the surface of the fibers are a help in spinning them into yarn and also keep the spun yarn from untwisting. These scales, however, collect and hold oily scretions of the body and dust containing bacteria, which makes it the most unhygienic fiber, especially as it will not withstand satisfactorily the rubbing and the high temperature necessary to thoro sterilization. Wool is very elastic. It takes dye readily, giving attractive and permanent colors. It absorbs a great deal of moisture without feeling cold to the touch. It is a poor conductor of heat, and clothing made of it holds the warmth of the body. Its power of felting or shrinking adds further to its value in the manufacture of thick, warm clothing materials.

Wool is divided into two general classes, determined by the length of the fibers. Combing or long-staple wools are those two and one-half inches or more in length. Clothing or short-staple wools include all those less than two and one-half inches in length. Combing wools are used in the manufacture of worsteds; clothing wools, in the manufacture of woolens.

Woolens are such materials as soft tweeds, homespuns, broadcloth and flannels. These materials are woven wider in proportion to the shrinking which will be given them, a 54″ finished suiting being woven to about 72″ in width. Fulling, that is, shrinking, strengthens good wool.

Waste fibers which are too short for spinning often are fulled into cheaper grades of woolens to give weight and firmness. These usually are added to the wrong side of the material and, after a time, drop out and can be found as short, fuzzy waste in linings of coats, or hems of garments. Fulled cloth is rough and dull in appearance. The lustrous, soft pile which adds to the beauty of the cloth is made by passing it thru machines which

raise a fuzz on the surface. This nap is brushed and then sheared off to an even length. Pressing and other surface finishes follow, to give a smooth and lustrous surface.

Worsteds generally are woven in some form of twill and are distinguished by their smooth, finely twisted yarn and clear weave. Serges, diagonals and wool crepes are examples.

In manufacturing the yarn for worsteds the wool is combed to lay the fibers parallel and to remove all short pieces of wool and foreign substances. This gives a very smooth yarn which is stronger than woolen yarn. The short fibers, called noils, which are combed out, are used in the manufacture of course woolens such as coatings and men's suitings. Worsted suiting is napped merely enough to make the weave appear clean and bright. Worsted materials are more expensive than woolens and are not so likely to be adulterated. Their chief disadvantage is that they wear shiny very quickly. For this reason lighter weight, softer woolens are preferable for women's wear.

Cotton, because of its extensive production and wide range of usefulness is the most important of all textile fibers. Two-thirds of the world's supply of cotton is produced in the United States; and its production, manufacture and distribution has had a tremendous influence on the growth and progress of the nation. In addition to its usefulness in its natural state, cotton fibers form a base for rayon, our fifth important textile fiber.

Many varieties of cotton are grown, but Sea Island is considered the best. It is noted for the length, strength, fineness, softness and luster of its fibers. It takes mercerization better than other grades of cotton, and is used for fine dress materials, high-grade underwear and laces.

Cotton is the shortest fiber, varying in length from one-half inch to two and one-half inches. It has a flat, twisted structure which holds the fibers together, making it possible to spin short, fine fibers.

Cotton cloth has a dull and fuzzy surface, due to the large number of projecting ends of fibers. This fuzziness causes it to collect dirt readily, but as it stands rubbing and boiling with

little injury, it is practical and hygienic. Being a fine fiber, cotton can be spun into a very fine yarn.

The surface of better grades of cotton materials is gassed (singed) to remove loose ends and give smoothness. A chemical process known as "mercerization" often is applied to better grades of cotton yarn and cloth. It changes the structure of the fiber, giving it roundness and luster and, at the same time, greater strength and affinity for dye. Unmercerized cotton is not easily dyed and the colors are not so beautiful or permanent as those of silk and wool.

Lisle finish is given to yarn to be used in the manufacture of hosiery and underwear of better grades. A fairly hard-twisted yarn is passed over gas flames to singe off fiber ends and make it smooth. Lisle yarn often is mercerized, also.

Cotton is sometimes made to imitate linen. The fibers are spun into an uneven yarn, like linen, and damask patterns are copied for table linens. Such cloth is sometimes beetled, just as linen cloth is, to give it the leathery feel characteristic of linen. The addition of sizing followed by pressure under heavy rollers adds further to the completeness of the deception. The effect, tho satisfactory at first, is lost in laundering.

Cotton fibers and yarn may be treated with chemicals which give them the harsh feel of wool. The yarn is spun so as to make it fuzzy and springy, then woven into patterns of staple wool fabrics, and lastly given a finish similar to cloth made of wool. French serge which is all cotton can be found in most dry goods stores. An imitation woolen cloth lacks the springiness and warmth of a cloth made of wool.

Linen is made of the fibers which compose the inner bark of the flax plant. In order to separate it from the hard part of the stalk, flax is retted by soaking or exposing to moisture. In this process the solid matter begins to decay and is then readily separated from the fibers. Flax may be retted by spreading the plants on grassy ground and letting them remain there from two to four weeks. This is called "dew retting." It is rather uneven in its effects and the fibers are coarse and of poor color. This method is used in Russia. In Belgium the flax is retted in

running water. The flax, tied in bundles, is immersed in the water and allowed to remain there for about ten days. Fiber retted in this way is noted for its strength and good color. The method used in Ireland is similar to that used in Belgium except that the bundles of flax are immersed in pools of water which soon become stagnant. A stronger fiber is secured in this way, but it is grayish in color.

After being separated from the bark, flax fibers are combed. Two grades are produced in this process: the long, fine fibers, called line, and the short, tangled fibers, called tow. Line is used in the manufacture of better grades of linen. Tow is used in inexpensive towelings and in coarse, cheap materials. Such materials lack firmness and show many irregularities in size of yarn, while the many ends of the short fibers give a fuzzy surface.

Line fibers average about twenty inches in length. They are straight, cylindrical and inelastic, and are difficult to spin. Flax is stronger than either cotton or wool. It absorbs moisture quickly and gives it up more quickly than any other fiber. It is also a good conductor of heat. These qualities make it especially desirable for summer clothing, handkerchiefs and toweling. Linen is considered the most hygienic fiber because germs do not collect on it so readily as on cotton or wool, and because it stands satisfactorily the processes necessary for thoro sterilization.

Rayon is a synthetic fiber produced from cotton linters or wood pulp. By treating wood pulp or cotton linters with chemicals a gluey solution is formed which when forced thru minute openings flow out in continuous filaments, or threads. Further treatment with chemicals hardens these filaments and gives them strength, pliability and luster. The high luster of rayon accounts for the name "artificial silk" being given it in the early days of its manufacture. Thru recent developments in the manufacturing process a fiber can now be produced which has the soft, subdued luster of real silk.

Count Chardonnet, a Frenchman who devoted his life to scientific research, created the first "artificial silk," and in 1889

announced his discovery to the world. The new textile became immediately popular and its production has increased so rapidly that more of it is now used than of any other textile fiber except cotton and wool.

There are many kinds and qualities of rayon, and yarns resulting from various processes of manufacture, tho similar in appearance, may differ greatly one from another and from silk in fineness, evenness, strength and luster. Rayon takes dye well, giving beautiful, rich colors. It loses strength when wet, so should be handled carefully in laundering. White rayon does not yellow as does silk. Because of its slippery surface, woven materials ravel badly and pull at seams, and knitted materials run quickly where stitches are dropped. Processes of manufacturing are continually being improved so as to overcome these disadvantages. Combining rayon with other fibers, making the surface of the yarn less smooth, twisting or delustering, and the use of lockstitch knitting and close, firm weaving all help to make rayon materials more durable.

Because it is cool, comfortable to the skin, is not affected by perspiration and does not cling to other materials, rayon is ideal for underwear. When combined with wool it improves the luster and feel of the material, makes it cooler and prevents too great shrinking. Its combination with cotton has resulted in the development of many interesting, new materials.

MINOR TEXTILE FIBERS

Additional fibers used in textile manufacture are ramie, pina, jute, hemp, sisal and fibers of other plants and trees.

Ramie, often called Chinese grass, is a strong, fine, silky fiber from a plant of the nettle family which grows in Southwestern Asia. It can be spun into fine yarn and produces a cloth similar in texture to linen. It is manufactured into dress goods, fine laces, underwear, upholstery, tablecloths, toweling, as well as heavy canvas, waddings and cordage. It can be grown

in the United States, but cheaper methods of cleaning it must be devised before it will be cultivated extensively.

Pineapple fibers are used for textile purposes in China. They produce a strong, durable cloth which is sheer and lustrous, tho rather stiff. It is called pina cloth and is used for luncheon sets and sometimes for waists and dresses.

Jute and *hemp* are bast fibers. The method of separating the fibers from the woody stalk is similar to that for the flax plant. They are used for some upholstery fabrics, for carpets and for cordage. Hemp is the stronger and more durable of the two.

Sisal is obtained from henequin, a plant which is similar to what is known in this country as century plant. The fibers are separated from the leaves by scraping away the fleshy part. Sisal fibers are used chiefly for hammocks and sacking, tho recently, very extensively for women's summer millinery.

YARN

The appearance, durability, texture and serviceableness of a cloth depend largely upon the character of the yarn used in its construction. The strength and evenness of yarn depend upon the quality of the fiber used; the amount of cleaning, carding, combing and drawing given it; and the weight and the amount of twist given the yarn. Combed yarn is stronger than yarn which has been merely carded, for the short fibers have been removed and the remaining fibers made parallel. Fine yarn costs more to manufacture than coarse yarn, because of the greater number of processes necessary to its manufacture and the slower process of spinning made necessary by the greater amount of twist used. Yarn having a few twists to the inch is said to be slack-twisted; that having many twists to the inch is hard-twisted. Tight twisting gives a finer, stronger and smoother yarn than loose twisting. Cheap grades of muslin, gingham and many other materials are made of loosely twisted yarn. A soft-twisted yarn is necessary for materials which have a napped or fuzzy surface. Crepe surfaces usually are produced by the use

of hard-twisted yarn, about forty turns to the inch, and having part of the threads twisted to the right and part to the left.

Yarns also differ in weight. In spinning, a single strand is first produced. This is called a "single." If a heavier, stronger yarn is desired, two, three, or more of these singles are twisted together and are called two-ply, three-ply, and so on, depending upon the number of singles used. Since soft-twisted yarns are necessary for some fabrics and hard-twisted for others, in judging the quality of a yarn it is necessary to keep in mind the particular use for which it is made.

WEAVE

Weaving is the interlacing of two sets of threads at right angles. The threads running lengthwise of the cloth are called warp, those running crosswise are calling filling. Warp threads usually are finer, stronger and smoother than filling threads, in order to withstand the friction of weaving. The number of threads running each way of the cloth is referred to as the cloth "counts." If the number of threads per square inch is small, the cloth is said to have a low count, but if the number is great. a high count. Closely woven fabrics (those of high counts) are firmer and warmer than loosely woven fabrics, and they do not stretch out of shape so quickly nor shrink so badly. Warp threads often are referred to as "ends," and filling threads as "picks."

A loose weave is used in making cheap cloth, because it takes less yarn, and because less time and care are required in its manufacture. Loose, open weaves are used also in making cool, sheer and dainty summer dress materials from yarn which is fine and of good quality.

To meet ideal conditions, warp and filling threads combined in a fabric should be of equal quality. Many variations from the ideal are found, however, and warp and filling threads differing greatly in size and strength are combined to produce patterns in cloth. To produce a durable cloth when such a combination is made, it is necessary to have a great many more of the fine yarns than of the coarse, in order to balance in strength.

The Plain Weave is the simplest and easiest made. It is made by carrying the filling threads over and under alternate warp threads. It is used in muslins, ginghams, batistes, taffetas and many other fabrics. It can be made with the least amount of yarn of any weave and is, therefore, the cheapest. Variations of the plain weave are seen in ribbed materials such as reps, poplins, bengalines, failles, etc. In such materials one set of yarns—usually the warp—is finer and has a much higher count. The yarn of the cord is usually of a cheaper grade fiber. The amount of wear a ribbed material will give is uncertain because the heavy cord is apt to cut the finer threads.

Basket Weave. Basket weaving varies from plain weaving in that two or more warp threads are crossed by two or more filling threads.

Twill Weave, of which serge, poiret twill and gabardine are examples, shows diagnoal lines across the face of the fabric. These lines, or ridges, vary in width and the angle at which they cross the material, and they may be continuous or broken and zigzag. This weave gives a firm and durable cloth which keeps its shape well, and which stays clean longer than a cloth of plain weave. The cost of weaving, however, is greater, it is more difficult to clean, and clothing materials in this weave become shiny with wear.

Satin or Sateen Weave is a Broken or Skip Twill. In this weave a series of threads are thrown on the surface of the material, with a cross thread at intervals which binds sufficiently to hold, yet is not noticed. This construction gives a surface that is covered with long, loose threads, called "floats," which reflect the light and give a cloth of high luster. In satins the warp threads are thrown to the surface, in sateens, the filling threads, generally. The chief drawback to this weave is that the threads slip out of place easily, and in the less expensive grades the surface becomes rough and fuzzy with wear.

Figure Weave. Huck toweling in an example of simple figure weave. Damasks and brocades are much more intricate and are woven on a very complicated loom known as the Jacquard. New patterns are expensive and require much time to

set up for weaving; therefore cloth woven in Jacquard patterns costs more than that in simpler weaves. Brocade materials in large designs do not wear well, because of the long floats which are necessary to produce the desired effect. A looser weave results where such long floats occur at one place and allow the threads to slip from position. The friction caused by this slipping of the threads wears the fabric out at that point. Linen and silk fiber are long and give way less quickly than the shorter cotton fibers.

Pile Weave is a weave in which some of the threads are drawn to the surface and left in loops, as in bath toweling, or cut off evenly, as in velvet and plush, to form a nap. The durability of toweling of this weave depends upon the number of ground threads that are inserted for each row of loops. The very poorest grades have alternating threads of ground and loop, and are loosely beaten up, giving a sleazy material with loops that will pull out easily. Better grades of toweling are woven with three or more ground threads between the rows of loop threads, and are closely beaten up, holding the loop threads closely in place. In velvets and similar materials the important thing to notice is whether the pile is thick and firmly fastened in.

Gauze Weave. This is a form of netting produced on a special loom. In addition to the regular warp and filling threads used in plain weave, extra threads, generally warp, are introduced. These do not run parallel with the regular threads but are intertwined with them in various ways. In this way a strong cloth of sheer and open texture, as in marquisette and mosquito netting, is produced.

Lappet Weave. An imitation of embroidery introduced into other weaves, especially plain and gauze. Example: Dotted swiss.

KNITTING

Knitting is a method of making cloth with a continuous thread, by catching one loop into another. Both combed and carded yarns are used. Knitted materials are durable and elastic when well made, and make warm, light-weight garments

which do not wrinkle so badly as woven goods. Ribbed knit materials are more expensive than plain knit, but are more satisfactory.

FINISHING PROCESSES

Bleaching. All fibers which are intended to be pure white in the finished cloth have to be bleached, not only because of the original color of the fiber, but because of the yellowing which takes place during the process of manufacturing. Various chemicals are used for bleaching, the kind depending upon the nature of the fiber. These chemicals would injure, or even destroy, the fiber if used in concentrated form. Great care must be exercised, therefore, to see that the bleaching baths are not too strong and that no particles of undissolved bleaching powders are present to come in contact with the cloth. The time, also, which the materials remain in the bleaching baths must not be long enough to cause weakening of the fabrics. It is estimated that linen loses twenty percent of strength for a full bleach and fifteen, for a half bleach. Many weak cotton materials have been rotted in the bleaching.

Dyeing. Both the quality of the dye used and the method of applying it affect the value of a cloth. The use of an expensive dye may add as much as fifteen cents per yard to the cost of material. The dye situation in the United States has improved very much during the past few years, the percentage of colored materials that will not fade having been greatly increased.

Dyeing is done in three ways: (1) In the stock, that is before being spun into yarn, (2) in the skein after being spun, and (3) in the piece after being woven into cloth. The first method is used when fibers of different colors are to be spun together to produce a yarn of mingled effect. Dyeing after the cloth is woven is cheaper and takes less dye than when applied to the yarn in the form of skeins. In the former method the dye does not always penetrate to the core of the yarn thoroly, and the color is not so lasting.

Materials to be decorated with simple printed designs on a dark background often are dyed a solid color and then printed

with chemicals, to neutralize the dye, so that when the fabric is washed the dye is "discharged" on the spots thus treated. If the chemicals used are too strong these spots will later fall into holes. Another method used is that of printing the fabric with chemicals before it goes to the dye bath, the chemicals causing it to "resist" the dye.

Sizing. Most materials, especially cotton, require a certain amount of dressing to give them firmness and an attractive finish. Various materials such as starch, clay, mucilage, gums, fats and oils are used for this purpose. As a rule these wash out when the materials are laundered. Cloth made of poor quality of fiber and loosely woven often is heavily sized to fill open spaces and give it weight. Such cloth will show particles of dust when rubbed between the hands or when torn. Upon washing, the sizing is dissolved, leaving the cloth thin and light weight.

HOW FABRICS DIFFER

Fabrics differ greatly according to the kind and quality of the fibers of which they are made and the methods used in their manufacture. The character of the yarn, the weave, and the finish, each contributes to the general appearance, weight and durability of the finished cloth. Many clever imitations of expensive materials are made, cheap fibers often are substituted for expensive ones, and adulterations are added in such a way as to give the appearance of being genuine. Cheap materials, if sold for what they really are, fill a real need, since many persons cannot afford expensive ones.

There are simple tests for the durability and composition of fabrics. Some of them can be made in the store, others require a sample to be tested in the home. Women should familiarize themselves with these tests and apply them to the materials which they buy.

HOW TO SELECT FABRICS

1. Keep in mind the use for which a fabric is intended.
   (1) If for hard service which will necessitate frequent laundering, be sure that it is color fast and durable

(2) If for occasional use, daintiness may be the deciding factor in one's choice.

(3) If for long-time use, select designs and colors of which you will not tire quickly.

2. Consider the width of the cloth in relation to:

(1) Advantage in cutting. To use 40-inch material to cut a slip only 32 inches wide means a twenty per cent waste. A greater waste may be caused by buying a material too narrow for the width of a garment, necessitating additional yardage to supply a small additional width.

(2) Cost per square yard. Cloth 27 inches wide, at 60 cents per yard, costs 80 cents per square yard. Cloth 40 inches wide, at 60 cents per yard, costs 54 cents per square yard.

3. The feel and weight of a material free from adulterations is a fair guide to its quality.

(1) A piece of cloth when crushed in the hand should have the characteristic feel of the fiber of which it is supposed to be made.

(2) A firm, closely-woven cloth in which well-twisted yarn has been used, weighs more than a similar cloth woven loosely of slack-twisted yarn.

(3) Too great weight is an indication of the presence of "loading" which is added to cheap, light-weight cloth to give it the appearance and "handle" of a better grade of cloth.

4. Much can be told of the quality of a material by its appearance. Examine it closely, holding it between you and the light.

(1) A smooth, even yarn woven closely and evenly, is an indication of good quality.

(2) Lasting colors are clear and thoroly applied. On printed fabrics the design should show plainly on the wrong side of the cloth.

(3) The mottled appearance of cloth, especially of silk crepes, seen when held to the light, is due chiefly to heavy weighting or to sizing.

5. To test cloth for *strength and durability*:
   (1) Hold the material firmly between thumbs and forefingers, ends of fingers touching. Bend hands as if to make knuckles touch, placing a heavy strain on the cloth. The strength of the cloth will be shown by the ease or difficulty of tearing.
   (2) Scrape diagonally across cloth with thumb nail. If threads slip out of place easily the material will pull at seams.
6. To test for color fastness:
   (1) For method used in dyeing, ravel thread from material and break it.
      (a) If yarn-dyed the thread will be all of one color.
      (b) If piece dyed, yarn shows white specks or white core.
      (c) If printed, threads will be mottled.
   (2) For fastness to sunlight; expose a piece of material to air and sunlight for a few days, then compare with a piece which has been kept away from the light, and note changes.
   (3) For fastness to laundering; launder a piece of material in the same way it would be laundered if made into a garment, using mild or strong soap and tepid or boiling water as required. When dry, compare with an unlaundered sample and note difference in color.
   (4) For fastness to perspiration; sew sample to undergarment where it will come in contact with perspiration of body for a day. Note changes.
7. To test for water spotting; sprinkle slightly with water. Dry and note if spots show.
8. To test for shrinking; cut a sample and trace exact outline on a piece of paper. Dip sample in warm water and dry Apply to tracing and calculate percent of shrinkage.

TESTS TO DETERMINE THE KIND OF FIBER USED

1. *Appearance.* Study fabrics made of the five textile fibers and learn to distinguish them by appearance.

2. *Feel.*
   (1) Wool feels warm and springy.
   (2) Cotton, dead and lifeless.
   (3) Linen, cool and leathery.
   (4) Silk, smooth, slippery and soft, if unweighted.
   (5) Rayon, harsher and stiffer than silk.

3. *Biting*
   (1) Wool is gritty when ground between the teeth.
   (2) Cotton crushes into roughish ball.
   (3) Silk crushes between teeth, but holds together.
   (4) Rayon is easily bitten to pieces.
   (5) Linen crushes into a smooth, slippery ball and is more easily bitten to pieces than cotton.

4. *Burning*
   (1) Wool burns slowly with the odor of burning feathers, leaving a black ash in the form of a ball.
   (2) Silk, slowly, with odor and ash similar to wool.
   (3) Cotton, quickly, the threads spreading out as it burns
   (4) Linen, more slowly than cotton, and ends stand erect instead of spreading as cotton.
   (5) Rayon burns quickly with a flash, giving off a vegetable odor.

5. *To Separate Wool from Cotton,* add one tablespoon of household lye (any lye used in making soap will do) to a pint of water. Heat to boiling point, using granite vessel, and immerse sample to be tested. Wool will be completely dissolved in a few minutes, the cotton remains unchanged.

3. *Test for Silk and its Adulterants.*
   (1) For weighting with tin or iron. Burn sample. If heavily weighted it will burn slowly, often with difficulty, and retain its shape.

(2) For weighting with substances other than metal. Wash sample with warm water and soap. Starch, tallow and similar substances will dissolve, leaving sample thin and sleazy.

(3) For adulteration with cotton, rayon and wild silk, use lye test described above. Cotton and artificial silk remain unchanged. Silk dissolves completely, tho more slowly than wool. Wild silk will require possibly fifteen minutes for complete dissolving.

7. *To Distinguish Linen from Cotton.*

(1) Use breaking and burning tests already given.

(2) By weight and feeling. Linen feels cool and leathery.

(3) Appearance: Linen is nearly one-fifth heavier than cotton, and has a natural luster that is not removed by laundering.

(4) The Oil Test. Free sample of all dressing by washing thoroly. Dry. Add a drop of oil and hold to light. Linen threads will appear more transparent than cotton.

(5) The Acid Test. Wash sample carefully to remove all dressing, dip in concentrated sulphuric acid for a minute or two, then wash in water and dry on blotting paper. All that remains on the blotting paper is linen, the cotton having been quickly dissolved by the acid.

WOOLEN MATERIALS

Alpaca (Mohair, Brilliantine). A wiry, shiny cloth made of angora goat hair, usually having cotton warp. Used for suits, coats and dresses; heavier grades are used for upholstery and draperies.

Astrakhan. A heavy pile fabric made in imitiation of the fleece of the Astrakhan sheep. The foundation of the cloth is cotton. Used for coats, neckpieces and dress trimmings.

Batiste. A light-weight fabric in fine, even, plain weave. Used for dresses.

Bedford Cord. A worsted material resembling pique and corduroy in weave. Used for women's and children's spring coats and suits.

Bolivia. A coat material similar to velours, but having a thicker, longer pile, which is often woven and cut to give a pebbled or a ridged effect.

Broadcloth. A soft, lustrous, closely-woven woolen fabric, napped and pressed so as to hide the weave on the right side. A dressy material. Used for dresses, suits and coats.

Cashmere. A soft, light-weight worsted material with uneven twill surface. Used for women's dresses and for infants' and children's sacques and coats.

Challis (Challie). A light-weight fabric of plain weave, usually in printed patterns. Not very dressy. Used for dresses and kimonos.

Charmeen. A firm, medium-weight worsted material with smooth, twill surface. Expensive, but very durable. Used for dresses, suits and coats.

Cheviot. A heavy, loosely-woven material with a hairy surface, woven like serge. Used for suits and wraps.

Chinchilla. A heavy-napped cloth of wool, or wool and cotton, made in imitation of chinchilla fur. Used for winter coats, overcoats and caps.

Covert. A heavy, twilled cloth in natural undyed shades, white being mixed with the warp threads. Used for riding and sports suits. Also a fine, light-weight worsted dress material in plain weaves. It is made in a variety of colors, but always has white mixed with the warp.

Duvetyne. A woolen fabric with a short, thick, soft nap. Its suedelike finish and its fine, silky nap give it the appearance of velvet. Used for dressy wear in suits, coats and dresses.

Eiderdown. A warm, soft material with a knitted background of cotton and a heavy nap of wool on one or both sides. Used for winter covers, bath robes and sleeping garments.

Felt. A heavy material made by matting together fibers of wool, fur, hair or cotton. Finer grades are used for hats.

Flannel. A loosely-woven, light-weight fabric in plain or twill weave, with a slightly fuzzy surface. There are many kinds and qualities, made for a variety of uses.

Baby Flannel is a cream-white material made of rather fine yarn. It may be all-wool or wool mixed with silk or cotton.

French Flannel is a fine, soft twill heavily pressed, used for coats and dresses. "Ladies' Cloth" is a superior grade of French Flannel.

Kasha is a fine dress flannel in natural undyed shades or plain colors, with variegated effect.

Veyella Flannel is a wool and cotton mixture, treated so that it is guaranteed not to shrink. Used for sports wear and men's trousers.

Gabardine. (Poiret Twill). Twill fabrics in which the wales are close together and stand out like cords. The twill is finer in Poiret than in gabardine. Expensive, durable, but becomes shiny with wear. Used for coats, suits and dresses.

Homespun. A plain-weave cloth made in imitation of hand-woven cloth. The yarns are of mixed colors, giving the cloth a variegated effect. It is warm and durable. Used for every day and sports suits and coats.

Jersey (Stockinet). A knitted fabric made of soft-twisted yarns. It is durable, comfortable and inexpensive, but not dressy. Used for dresses and sports garments.

Melton. A heavy, compact fabric with a short nap. Used for men's winter overcoats.

Poplin. A fine-ribbed material in which the coarse filling threads are completely covered by the fine, numerous warp threads. A very satisfactory material. Used for women's dresses and suits.

Serge. A reversible worsted fabric in twill weave. It wears well but gets shiny.

French Serge is light-weight and soft. It is used for dresses and for spring suits and coats.

Storm Serge is coarser, heavier and more wiry than French serge. It is used in garments for hard wear, as middy suits.

Tricotine. A twill material woven of soft, worsted yarn, the weave of which is varied so as to give a knitted effect. It is suitable for semi-dress wear in suits, coats and dresses. Tricotine is the name applied also to millinery fabrics knitted of various fibers and straws now much in vogue.

Tweed. A rough, rather coarse material, similar to homespun. Used for suits and coats for sports wear.

Velours. Woolen fabrics having a short thick, wooly nap. Lightweight varieties are used for suits, coats and dresses; heavier-weight for draperies and upholstery.

SILK MATERIALS

Bengaline. A heavy, corded fabric with coarse filling yarn which may be of silk, wool or cotton. Used for coats, millinery and draperies.

Charmeuse. A medium-weight dress material in satin weave. It is softer and more clinging than satin.

Chiffon. A very sheer, soft, transparent fabric made of hard-twisted yarn. Used for dresses and blouses.

Chiffon Cloth (Indestructible Voile). A little heavier than chiffon, wears better, but does not give quite so sheer an effect.

China Silk (India Silk). A thin, plain, very evenly-woven material with high luster. Used for waists, dresses and linings.

Crepe. A firm, medium-weight material with creped surface. The crepe is produced by the way the yarns are twisted. Used for dresses, underslips and coat linings.

Crepe de Chine. A thin, rather loosely woven fabric, heavily sized and slightly creped. Used for dresses and lingerie.

Faille. A ribbed fabric similar to taffeta in weight and stiffness, but wears better. Used for dresses, suits, coats and hats.

Foulard. A lightweight material made in plain, twill or satin weave. It usually comes in printed patterns. Used for dresses and coat linings.

Georgette. A thin, sheer crepe, woven of fine, hard-twisted yarn. It is dressy and wears well. Used for dresses, scarfs and neckwear.

Grosgrain. A serviceable, all-silk fabric with round cords of even width Used for dresses, coats and ribbons.

Habutai (Wash or Tub Silk). A soft, light-weight closely-woven material in plain weave. It washes well, but yellows if proper care is not taken. Used for dresses, underwear and men's shirts.

Jersey. A knitted slik fabric used chiefly for underwear. Good qualities wear well.

Maline. A fine, very stiff hexagonal-mesh netting, similar to tulle. It is not durable. Used especially for veiling and scarfs.

Marquisette. A very open material woven in gauze weave of strong, fine, tightly-twisted yarn. Used for dresses and curtains.

Messaline. A medium-weight silk in satin weave. It is softer than satin, but not so substantial and lustrous. Used for underslips, linings and dresses.

Moire. A corded silk with a watered effect which is produced by pressing. Used for dresses, ribbons and hats.

Ottoman. A heavy-ribbed material. The cords are of cotton and are placed farther apart than those of bengaline. Used chiefly for ribbons and ladies' wraps.

Peau de Soir. A rather stiff, heavy material with dull, satin face and ribbed back. Used for dresses and dress trimmings.

Plush. A fabric similar to velvet but having a much longer pile. It is durable and dressy but wears shabby.

Pongee (Florentine). A soft, unbleached, washable fabric woven of wild silk. Cheap grades are heavily starched and become sleazy with washing. Good grades wear well. Used for dresses, coats and underwear.

Poplin. A fine-ribbed material, usually in plain colors. Very satisfactory. Used for dresses and suits.

Pussy Willow. A plain cloth woven like taffeta, but very soft, having little or no weighting. Plain and printed. Used for ladies' dresses.

Rajah, Shantung, Tussah. Fabrics woven of wild silk, but are heavier than pongee, and woven of more irregular yarn. Used for dresses, suits and sports wear.

Radium. A soft, rather thin, smooth fabric, lighter in weight than pussy willow. Used for semi-dress wear, linings, coats and underwear.

Satin. A very dressy, lustrous fabric in satin weave with twill or crepe back. There are many qualities and weights, some light, others heavy and stiff. Used for dresses, linings, underwear and millinery.

Silk Broadcloth. A firm, light-weight, dull-finished fabric in plain weave. It launders well. Used for men's shirts and women's tailored waists and sport dresses.

Silk Serge. A soft, even-twilled material of high luster. Used for coat linings.

Surah. A soft, twilled silk with dull finish. Very serviceable. Used for linings and dresses.

Taffeta. A plain-weave closely-women and heavily weighted silk with dull finish. Used for coats, dresses, linings and millinery.

Tulle. (See Maline).

Velvet. A pile fabric with the pile cut close. It may be all silk, or silk with cotton back. There are many qualities and weights. Used for hats, dress coats, winter dresses, upholstery and many other purposes.

LINEN MATERIALS

Art Linen. A fine, even cloth, woven of hard-twisted yarn. Used for art needlework, embroidery and luncheon sets.

Butcher's Linen. A rather coarse, heavy, linen cloth made from the cheaper grades of flax. Used for aprons, dresses and needlework.

Crash. A coarse fabric in loose, plain weave. There are many grades, the better being used for dresses, the poorer, for towels and covers.

Damask. A fabric with a figure or pattern weave so woven that the cloth is reversible. Used for table linen and slip covers.

Glass Toweling. A soft, loosely-woven linen having a one-inch check formed by two colored warp and filling threads each time. Used for dish towels.

Handkerchief Linen. A plain fabric woven of irregular threads, part of which may be very fine, part coarse. It is made in two weights; one very sheer, the other heavier and less transparent. Used for handkerchiefs, infants' dresses and fine underwear.

Huckaback (Huck Toweling). A toweling woven so that a small, square pattern stands out from the background. It is very absorbent. Also made of cotton.

Ramie Linen. Fabrics woven of ramie fibers in suitings or in textures similar to handkerchief linen. Used for suits, dresses, and needlework.

Sheeting. A medium-weight cloth woven in widths suitable for sheets.

COTTON MATERIALS

1. Suitable for street, school or house dresses and blouses.

Broadcloth. A soft, firm fabric with smooth, glossy surface. Very durable and launders well.

Calico. An inexpensive fabric, heavily sized and printed on one side.

Chambry. A durable and attractive material, always woven with a colored warp and white filling.

Crepe. A medium-weight, crinkled material. Made in plain colors. Wears well.

Gingham. A yarn-dyed material woven plain or in checks or stripes. Very durable. Cheap grades shrink badly and are apt to fade.

Madras. A medium-weight, closely-woven material, usually striped in colors or with a woven-in white cord.

Percale. A plain or printed material of firm, close weave, having a dull finish.

Pique. A heavy cotton material woven in straight cord effect, the cord extending in the direction of the warp.

Pongee. A fabric made of mercerized cotton, woven and finished to resemble silk pongee.

Poplin. A ribbed material constructed like silk and wool poplin. It is of medium weight and wears and launders well. Plain colors and prints.

Ratine. A coarse fabric in plain weave, woven loosely of threads having irregular knots. It is strong, but becomes rough with wear. Used for sports dresses and suits.

Sateen. A heavy, mercerized or glazed fabric in sateen weave.

Soisette. A rather heavy, highly mercerized material. It wears and holds its luster well. Used for tailored blouses, children's clothes and underslips.

2. Suitable for Cool Summer Dress.

Batiste. A soft, sheer, highly mercerized fabric. It wears and launders well. Plain colors and prints.

Dimity (Jaconet). A crisp, sheer fabric having cords or groups of cords arranged in stripes or cross-bars. Its wear is uncertain. Plain colors and prints.

Dotted Swiss A fine, thin fabric, rather stiff and loosely woven and having dots of heavy yarn woven at regular intervals over its surface. A good quality is expensive but wears well. White, plain colors and prints.

Lawn (India Linen). A thin, light-weight, rather stiff material. It is inexpensive and wears only fairly well. White, plain colors and prints.

Mull. One of the sheerest cotton fabrics made. It is very soft and crushes badly.

Organdie A sheer, stiff, very transparent material, suitable for dresses for occasional wear. It is not very durable and does not launder well. All-white, plain colors and prints.

Voile. A sheer, soft and durable fabric. It is woven of hard-twisted yarn and frays and wrinkles badly.

3. Underwear and Infants' Clothing Materials.

Batiste. (See 2).

Cambric. A firm, closely-woven fabric with a slightly glossy finish. It is not suitable for hand sewing. Good for hard, everyday wear.

Crepe (Plisse, Crinkle Crepe, Underwear Crepe.) A soft, light-weight material with crinkled surface. Durable, easily washed and does not require ironing.

Dimity. (See 2).

Longcloth. A very white material of superior quality. It is quite like bleached muslin, but is more closely woven.

Marquisette. A sheer, dainty material in gauze weave. It wears well.

Muslin. A plain-weave material made in many grades, the finest of which are suitable for underwear.

Nainsook. A light-weight material with little or no dressing. It is finer and softer than longcloth, but not so thin and sheer as batiste. Better grades are durable.

4. Suitable for Children's Play Clothes and Hiking Suits.

Cottonade. A strong, durable and inexpensive material in twill weave.

Devonshire, Kiddie Cloth, Kindergarten Cloth, Romper Cloth and *Peggy Cloth,* are trade names for about the same kind of fabric. All are heavy, stout materials, usually with double warp.

Drill (*Jean*). A heavy, coarse cloth made in firm, twill weave. Durable but hard to wash and iron.

Indian Head. A heavy muslin with a smooth finish. Substantial and inexpensive. White and plain colors.

Khaki. A heavy fabric woven closely in twill weave and dyed khaki (dust) color. Durable and fast colored.

5. Miscellaneous.

Bird's eye. A fabric woven in small diamonds with a dot in the center of each. It is soft, light-weight and absorbent. Used for towels and for infants' underwear.

Bobbinet (net). A cotton net woven so as to form octagonal meshes. It is thin and transparent, but strong. Finer grades are used for dresses, waists and neckwear; coarser grades, for linings and curtains.

Buckram. A stiff, heavily-sized cloth used for hat frames.

Burlap. A rough, coarse fabric in plain weave. Made of jute, cotton or hemp. It is strong and cheap. The poorer grades are used for sacking and coverings. The better grades are used for couch, floor and wall coverings.

Canton Flannel (Cotton Flannel). A heavy fabric in twill weave with a heavy nap on the wrong side.

Canvas. A heavy, durable fabric, woven in plain weave of coarse yarn. Used for tops of shoes, shoe linings and, sometimes, sports skirts.

Casement Cloth. A light, open fabric, woven of uneven yarn which gives it the appearance of pongee.

Chamoisette. A closely-woven or knitted fabric with a finish that imitates chamois. Used for gloves.

Cheesecloth. A thin, sleazy, unsized and loosely-woven cloth. Very cheap. Used for curtains, decorations for entertainments, and for fancy costumes.

Corduroy. A heavy fabric with a pile surface in the form of ribs running lengthwise of the cloth. It is warm and serviceable. Used for everyday suits, riding breeches and work clothes.

Coutil. A heavy brocade fabric used for corsets.

Cravanette. Any material that has been made waterproof by a process called cravanetting.

Cretonne. A heavy, unglazed fabric, printed in large designs. Used for draperies and furniture covers.

Chintz is lighter weight than cretonne and is printed in simpler and smaller designs.

Damask. An imitation of linen damask.

Denim. A rather coarse and very durable material in twill weave. It is frequently woven in two colors. Very durable. Used for men's work clothes and upholstery.

Duck. A heavy, water-tight fabric that stands hard usage. Used for curtains for showerbaths, tennis shoes and men's trousers.

Flannelette. A soft, light-weight fabric in twill or plain weave, having a napped surface on one or both sides.

Monks-cloth. A heavy, coarse material in basket weave. It is strong and durable, but must be drycleaned rather than washed. Used for hangings and couch covers.

Outing Flannel (Domet). A warm, soft fabric, napped on both sides. Used for winter night-clothes and infants' kimonos and petticoats

Osnaburg. A coarse fabric woven loosely of cheap, uneven yarn. It is sometimes printed. Cheap but durable. Used for curtains and draperies and for men's work clothes.

Scrim. A strong, semi-transparent fabric made of heavy yarn in an open, plain weave. Used for curtains.

Silkaline (Nearsilk). A thin, light-weight fabric with a high luster. It is usually printed, is attractive and cheap, but does not wear well. Used chiefly for draperies.

Tarlatan. A very loose, heavily-sized cloth used chiefly for fancy-dress.

Terry Cloth (Turkish Toweling). A pile fabric woven in such a way as to form loops on both sides of the cloth. Very absorbent, easily washed and does not require ironing. Used for bath accessories, such as towels, cloths, mats and robes. Printed patterns are used for draperies.

Ticking. A stout, heavy, durable material with a closely woven twill weave. Used for pillows, mattresses and furniture covers.

Velveteen. A cotton velvet. Used for a great variety of purposes.

RAYON MATERIALS

Rayon fibers resemble silk fibers in luster, evenness and length. Almost all rayon fabrics are copied from silk fabrics which they are made to resemble as far as possible, and whose names they take. Some of these are: Chiffon, crepe de chine, flat crepe, moire, radium, surah, taffeta, velvet, voile, many varieties of satin knitted fabrics and ribbons.