Sewing and textiles: a textbook for grades and rural schools. 1918

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HOME ECONOMICS SERIES

SEWING AND TEXTILES

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A TEXTBOOK FOR GRADES AND RURAL SCHOOLS

PREPARED IN THE
EXTENSION DIVISION OF
THE UNIVERSITY OF WISCONSIN

BY

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PREFACE

This course in sewing is especially designed to help the teacher who has had little training and experience. The work is arranged in proper sequence and detailed directions are given for the making of each article or garment suggested. The problems chosen include the stitches, seams, and finishes which should be taught under elementary sewing. Patching and darning are taught on samplers, but aside from this the principles are applied on useful articles or garments. The illustrations will help to explain the directions and will be found useful in teaching children.

A study of materials is also given, suggesting simple methods of testing the quality and detecting adulterations, the emphasis in each case being placed upon the practical information which can be used in buying cloth. An effort has been made to make it simple and practical so that it may be presented to children in an interesting way.

The author wishes to express thanks to Miss Celestine Schmit of the Home Economics Department of the University of Wisconsin for the privilege of using several of her patterns, for reading the manuscript, and for offering valuable suggestions.

ANNABELL TURNER.

CONTENTS

SEWING AND TEXTILES

CHAPTER I

GENERAL DIRECTIONS FOR WORK

Sit erect in a comfortable, straight-back chair, with the light falling over the left shoulder. Bend the body from the hips, if necessary, but avoid allowing the head to hang forward. Before beginning to sew, see that all necessary articles are conveniently placed. Hands must be kept as nearly clean as possible to prevent soiling the thread and materials; if they perspire freely, keep a small towel near with which to dry them.

The work basket should contain: pins, needles (Nos. 7, 8, 9, 10, 11), white thread (Nos. 40, 50, 60, 70, 80, 90, 100), 60-inch tape measure, thimble, emery ball, stiletto, tracing wheel, and scissors. Use as fine a needle as the thread will permit. Length of thread in needle should be 15 to 20 inches. Thread the needle with the end hanging from spool when cotton thread is used, and the opposite end for silk. This helps to prevent snarling because of the direction in which the threads are twisted.

To make a knot, which is a mode of fastening, wind the thread one and one-half times around the first finger of the right hand, roll so as to twist the two threads together between thumb and finger, and draw into a hard knot under the nail of the second finger. Knots are used only where they can be concealed. To secure the other end of the thread fasten it to the material by two or three small stitches, one over the other. Do not break or bite the thread—cut it; biting injures the teeth and soils the thread.

Cloth is composed of two sets of threads: the lengthwise or warp threads, and the crosswise or weft threads. The term woof is sometimes used instead of weft. It is an older term, weft being more commonly used at the present time. Warp threads determine the length of the cloth, and the number of warp threads determine its width. Weft merely plies back and forth and fills in the warp.

How to Cut and Tear Cloth

There are four ways of dividing cloth:

1. Torn or cut with *warp*.
2. Torn or cut *across* warp.
3. Cut on bias.
4. Cut on true bias.

To tear across the warp or with the warp, clip into the cloth about one-fourth inch, take

the cloth in both hands and tear, with equal tension, to within one-fourth inch of the end, then cut. This prevents the raveling of threads.

A bias division is made by cutting across both threads. A bias fold is made by laying the warp thread over parallel on the weft thread, making an angle of 45°. Cut on fold—this makes a true bias.

When placing pins preparatory to basting or stitching, always insert at right angles to the seam, since they may then be removed more easily. The above method of pinning may be used instead of basting for all straight machine work. After a little practice the pins can be removed with the right hand, the work guided with the left while the machine is being run continuously. There are times when basting is necessary for accurate work and it should then be done carefully. Much time is wasted by basting when pinning would be sufficient, and judgment should be used to avoid this waste. When teaching beginners it is well to have them baste, since the practice of spacing is excellent training and they need to have the work held securely.

Symbols used in directions:

Inch = ″

Foot = ′

Yard=yd.

Read over directions carefully before attempting the work.

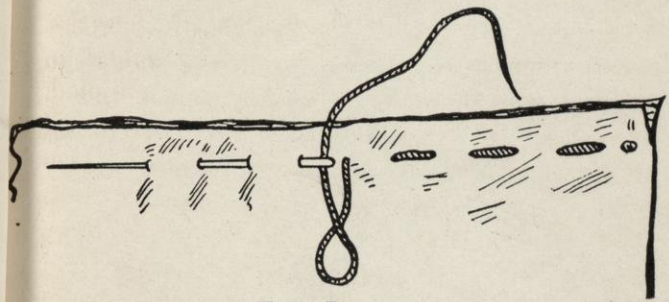
Needles.—Needles have been used for centuries, crude ones of ivory and bronze having been found in an old Egyptian tomb, and they are known to have existed in early Greek and Roman life.

At the present time a needle passes through many different stages before being completed. Steel wires are made in two-needle lengths, then the ends are pointed, the eyes punched in, and they are cut apart, tempered, and polished. After they are finished, they are sorted and put up in chemically prepared papers to prevent rusting. Because of the rapidity with which needles can be made, they are very cheap.

Pins.—The pin of ancient times was merely a thorn from a bush, or a fishbone. Gradually pins were made from gold and silver, but they did not become a manufactured article until the sixteenth century and were then very expensive. Now, pins, after the wire has been reduced to its proper size and condition, are all made in one machine. They are neither tempered nor polished as are needles. After being finished they are sorted by hand and then put in papers by machinery.

The thimble.—The thimble, a cap used to protect the finger from the pressure of the

needle in sewing, is made of gold, silver, steel, brass, aluminum, or celluloid. The metal is rolled out in sheets, cut into round disks, and given the correct shape over a die. The edge is next turned up, and the indentations, which prevent the needle from slipping, are made upon the top and sides. The metal is then tempered, polished, and decorated.



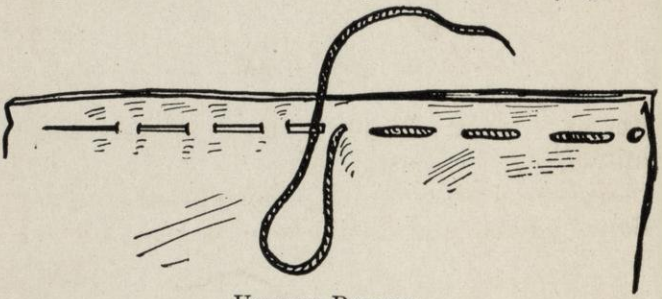
EVEN BASTING

Stitches.[1]—*Basting* is used to hold together two or more pieces of material until a strong stitch can secure them. It is sewed from right to left. Begin with a knot and keep it on the right side; fasten by sewing over and over in the same place once or twice. In even basting, stitches and spaces are of equal length. This is used for seams where there is any strain, as in garments to be fitted. Uneven basting is

[1] All stitches are made sewing from right to left, unless directions are given to the contrary.

done by taking long stitches with short spaces between; it is used in preparing for further sewing as it holds the material in position. (See illustration.)

Running stitch is made by running or weaving the needle through the cloth, taking a number of stitches at a time which are of equal length on each side. Beginners usually push

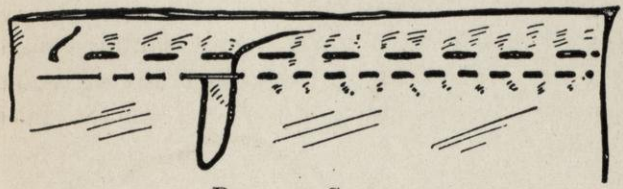


UNEVEN BASTING

the cloth on to the needle instead of forcing the needle into the cloth. This point must be carefully watched to avoid the formation of a bad habit. The size of the stitches depends on the material and strength desired but they are usually made as small as possible. (See illustration.)

Backstitching is the name given to a stitch resembling machine stitching. It is formed by taking up a short stitch *back* on the upper side, and one twice its length *forward* on the under side of material, which will bring the needle out

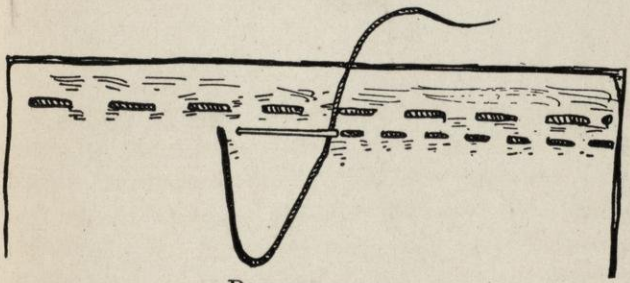
a space in advance of the stitch on upper side. Next, insert the needle to meet the last stitch, passing it under the material and out again as before. Continue. This forms a continuous



RUNNING STITCH

line of stitches. Fasten with two or three small stitches. (See illustration.)

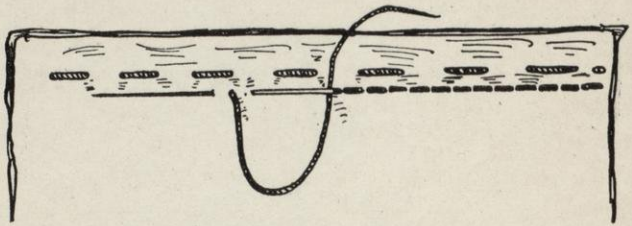
Half-backstitching is a strong seam stitching done by hand, and should never be placed where



BACKSTITCHING

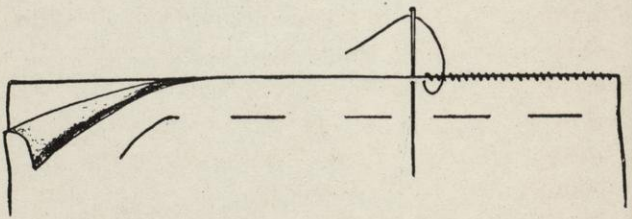
it shows. It is made in the same manner as backstitching except that it is taken half the distance back instead of all the way, leaving a small space between each stitch on the right side. (See illustration.)

Combination stitch, as the name implies, is a number of running stitches combined with occasional half-back or backstitches for added strength. For example: three runs and a back-



HALF-BACKSTITCHING

stitch is done by taking three small running stitches and then bringing the needle back over one of the spaces and out ahead one stitch. This brings a backstitch after every third stitch.



OVERHANDING OR FRENCH HEMMING

Overhanding may be begun at either the left or the right of the material—the name of the stitch is determined by the mode of using it. It is usually found most convenient to begin at the right side. The thread is more easily kept

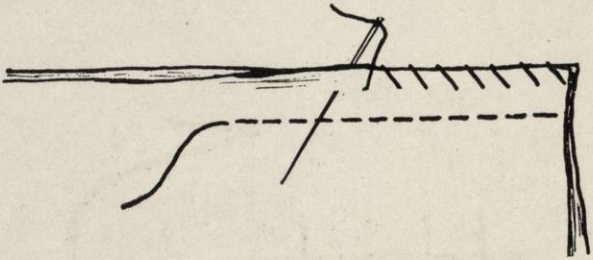
out of the way. It is used in making seams on sheets, pillowcases, underwear, patches, etc. The stitch is made by holding folded edges or selvages of material together and taking a small stitch through both thicknesses, pointing the needle toward the chest. This makes the stitches straight on the right side, running parallel with the warp or weft threads of the material and, therefore, inconspicuous. Sew with close, even stitches, taking up as few threads as possible so the seam will be smooth and flat when finished. (See illustration.)

French hemming is the overhanding stitch used on table linen or towels. An ordinary hem is folded in the material and then folded back on the right side. The two folded edges are then overhanded together with fine stitches showing as little on the right side as possible. The hem in table linen should be about ⅛" wide under ordinary circumstances, since the narrower the hem the less conspicuous it will be.

Overcasting is a larger and looser stitch than overhanding. It is used to secure raw edges and so prevent raveling. Authorities differ as to whether overcasting should be done from left to right or right to left, so either method may be used as desired. The needle should point either toward the right or left shoulder according as the work is done from left to right or right to left. Keep the stitches parallel, equal

distances apart and the same depth. The distance between the stitches and their depth depends on the kind of material. They must be deep enough to prevent pulling out and close enough together to look neat and prevent raveling. (See illustration.)

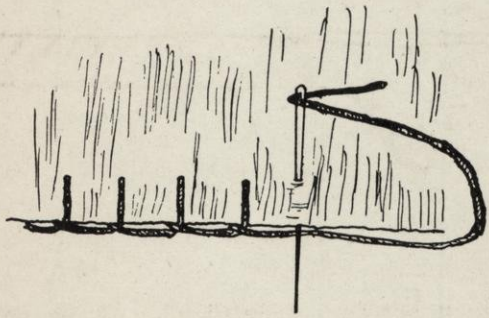
The blanket stitch is used for finishing raw edges to prevent raveling and at the same time



OVERCASTING

furnish a simple decoration. It is usually worked from right to left. Hold the work over the first finger of the left hand with the raw edge toward you. The upright part of the stitch is at right angles to the raw edge; the loop goes over the edge. To fasten the thread, use a knot or the following method: make a row of fine running stitches at right angles to the edge and directly under where the first stitch is to come, beginning as far from the edge as the depth decided upon for the blanket stitches. With the thumb on the thread insert

the needle again at the same place as before and take one stitch toward the edge bringing the needle out over the thread and so forming a loop. Insert the needle at the same height as the last stitch and as far to the right as desired. Again bring the needle out over the thread to form another loop. Continue the stitches the same height and the same distances apart. In

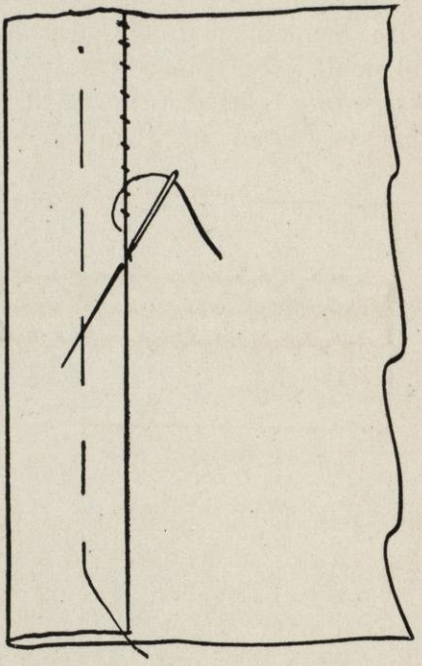


BLANKET STITCH

a corner three stitches should come in the same hole to make a neat turn. When a new thread is to be taken, fasten off the old thread under the last upright stitch. Begin the new thread by running stitches under the last stitch; catch the new thread through the loop and proceed as before. (See illustration.)

Hemming stitch.—Hold the work with the hem in a vertical position; place the hem over the forefinger and under the middle finger, and

hold it down with the thumb. Begin at the top and insert the needle through the fold, leaving a short end of thread to be folded back and caught under the hemming stitches. Pointing

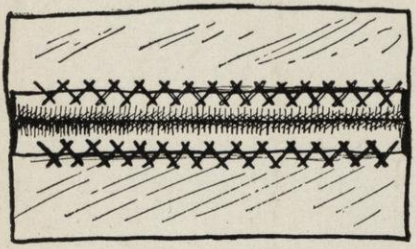


HEMMING

the needle toward the left shoulder, make a slanting stitch by taking up a few threads just under the edge of the hem of the material and one or two threads at the fold of the hem. To fasten thread at end of hem, take two or three

stitches, one on top of the other. Should it be necessary to use a new thread, leave a short end of the old thread, and, starting as in the beginning, tuck both ends of the new and the old thread under the fold of the hem and secure them with hemming stitches. Keep stitches even and small. (See illustration.)

Catchstitching is used to finish flannel seams and hems, to fasten down linings, etc. Hold



CATCHSTITCH ON OPEN SEAM

down the seam or hem lengthwise in front of you. Begin at top of seam. Take a small stitch a little to right of the seam through both thicknesses of material. Cross to the other side of raw edge. Allow thread to fall under the needle from the right, and again take a small vertical stitch. Cross again to the right, letting thread fall under the needle from the left, and so continue with alternating stitches, being careful to catch through so few threads that the stitches are not noticeable on right side of material. A

similar result may be obtained by beginning at the bottom and working up. The needle may be brought out either over or under the thread. Try both methods. Which do you find the easier? (See illustration.)

To crease a seam place the work on the table with the seam up and placed vertically in front of you. Turn seam to the right and crease, using the thumb nail. Turn seam to the left and do the same. This should make a distinct crease along the line of the stitches.

Hem.—Material is turned back upon itself and stitched with the machine or hemmed by hand.

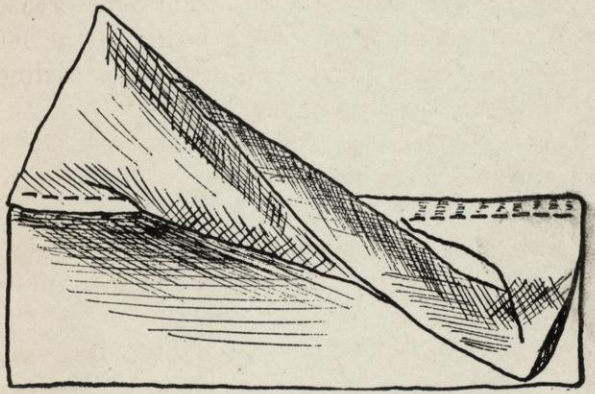
Faced hem.—A bias, shaped, or straight piece is sewed on to the garment and then folded back, bringing the seam at the fold.

Extension hem.—The entire hem is a separate piece fastened to some part of the garment. Use a piece of the material twice the width desired when finished plus allowance for seams. Stitch one edge to garment with the seam on the wrong side. Fold under the raw edge of other side and turn back upon seam, hemming or stitching so as just to cover the first stitching.

Another method is to again use a piece of the material twice the width desired when finished plus allowance for seams. Fold the raw edges toward the wrong side, creasing well ¼″ from

the edge. Place folded edges together and crease well on the new fold. Slip the edge of the garment, to which the hem is to be attached, between these folded edges, pin in position, and then stitch on the machine.

French seam.—A French seam is a twice sewed seam, so made to cover the raw edges



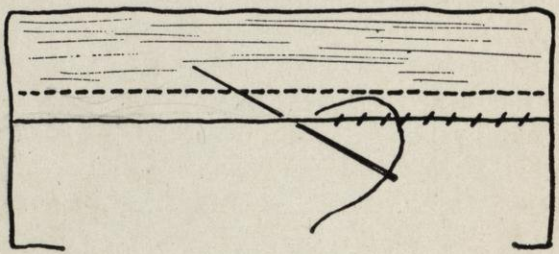
FRENCH SEAM

and make a neater appearing finish. Place the two pieces with wrong sides together and pin. Place pins at right angles to the edge with heads to right so that they may be easily removed while stitching.[1] Stitch ⅛″ from edge, and trim raw edges, leaving seam about 1/16″

[1] This method of pinning instead of basting is a practical short cut. After a little practice the pins can be removed with little loss of time while stitching.

deep. Fold right sides together and crease, having the seam exactly at the folded edge. Pin and stitch so that the edge of the seam is entirely covered. (See illustration.)

Felled seam.—Stitch ordinary seam a little more than ¼″ deep. This seam should be on the wrong side. Trim off one side, leaving not more than ⅛″. Baste the other side down flat, turning under the raw edge. Hem down by



FELLED SEAM

hand or stitch on the machine. The finished seam should present a flat surface on both right and wrong sides, and should be from ⅛″ to ¼″ wide when finished. The felled seam may be stitched the second time by using the hemmer. This is a short cut in that it avoids basting.

CHILD PSYCHOLOGY

A study of the child is essential. We must understand the stages in her development and plan the work accordingly if it is to be most

effective and not injurious. During the early grades the child is not able to make the fine adjustments necessary in fine sewing. The teacher, therefore, who understands the physical and mental development of the child will not require fine work before the fifth grade. By that time the child is capable of more accurate work and greater neatness. If this is not expected and demanded, slovenly habits may be formed which will follow the child through life. In very many cases the young child will do just as poor work as will be accepted. The question asked is, "Is this good enough?" The child's ideal is not the best of which it is capable, but something good enough to be accepted. In the lower grades is the place to begin to give children a higher ideal. The impressions of childhood are lasting and will in most cases remain through life—a great responsibility, yes, but a great privilege as well to mold aright the characters of the young lives entrusted to your care. Such work should be given in each grade as the normal child is capable of doing well. Poor work means, in most cases, that the teacher has not taught the correct method and insisted on high standards, or that the problem is too difficult for the child. By all means, work which is beyond the capacity of the child should not be expected, or the result will be disastrous. Until about the eleventh

or twelfth year the nerves and muscles are not sufficiently developed so that fine work may be required. After that time reasonably fine sewing is possible without injury in most cases. Exceptions will always be found where allowances must be made. If the child, after faithful effort, has not reached her ideal, she should not be censured but rather commended if she has done her best.

CHAPTER II

MAKING THE NEEDLE BOOK AND SEWING BAG

Needle book.—*Materials:* Aida or Java canvas 4½″x3½″; silkateen of four colors—rose, green, yellow, and brown; tapestry needle No. 24; white flannel 4″x3″.

Object: To learn the simple stitches on coarse material where the attention may be centered on the principle involved in making the stitch.

To straighten the edges of the cloth.

1. Find the thread nearest one edge that reaches all the way across the cloth. Draw out this thread.
2. Do the same with each of the other edges.
3. Carefully cut along the open lines formed by drawing these threads.
4. Thread the needle with rose silkateen.
5. Hold the work in the left hand with one of the long edges toward you.
6. Begin the uneven basting in the third row of open spaces down from the top and in the third hole from the right-hand edge. Fasten the thread by sewing around the first group of threads.

7. Continue according to directions given on page 6. Bring the needle over two groups of threads, under one and so on.

8. Repeat in the next row of open spaces below.

9. Fasten thread as in the beginning and the same distance from the corner.

Running stitch.

1. Thread the needle with green silkateen.

2. Leave one row of open spaces and, beginning the same distance from the right-hand edge, fasten thread as before. Put in a row of running stitches, working the needle over and under the group of threads according to directions.

3. Put in another row of running stitches in the next row of open spaces below.

4. Fasten the thread as in the beginning.

Combination stitch.

1. Thread needle with yellow silkateen.

2. Leave one row of open spaces and, beginning the same distance from the right-hand edge, fasten thread as before.

3. Put in three running stitches.

4. Bring the needle up two spaces in front of the last running stitch, then back over one group of threads, forming a backstitch.

5. Continue using similar groups and finish in line with the other rows of stitches.

6. Put in another row of combination stitches.

Half-backstitch.

1. Thread needle with brown silkateen.

2. Leave row of open spaces and, beginning as before, put in a row of half-backstitches according to directions.

3. Leave open space and put in a row of backstitches using the same color.

4. Leave open space and put in another row of half-backstitches.

NOTE.—The spaces between the last three rows of stitches may be omitted if preferred. In some cases it may be necessary to change the spacing, as the number of rows may not always be the same.

The row of backstitches is in the center of the piece, and the remaining half should be filled in exactly the same as the part just finished.

Blanket stitch.

1. Blanket stitch around the four sides, following directions.

2. Make the stitches one group of threads deep and one group apart.

To finish the needle book.

1. Pin the piece of white flannel to the wrong side of the canvas, placing it exactly in the center.

2. Fold the pieces lengthwise with the flannel

inside. This will make a little book 3½″ long and 2¼″ wide.

3. Baste the canvas and flannel together on the fold to keep them in place until the permanent fastening is put in.

4. Pin the corners so that they exactly match.

5. Thread the needle with brown silkateen. Hold the book with the open edges toward you. Fasten the thread in the upper left-hand corner by sewing over the blanket stitched edges three times. This fastening should be made one group of threads below the fold.

6. Overcast along the folded edge, making the stitches one group of threads deep and one group of threads apart. See directions. Fasten threads as in the beginning. This finishes the needle book.

NOTE.—A similar idea might be worked out for a napkin ring. It might be given as a special problem to the girl who works more rapidly than the majority in the class.

SUGGESTIVE REVIEW

1. How did you make the edges of the cloth straight?

2. Name the stitches you have made on the needle book.

3. Why did we fasten the overcasting stitch more securely than the others? Strain.

4. Why do the stitches look so nice on the canvas? Straight, same length, and same spaces between. It will not be quite so easy to make them regular when sewing without these guides, so greater care will be necessary.

Sewing bag.—*Materials:* Chambray or linen 15″ wide and 11½″ long.[1]

No. 60 white thread.

No. 7 needle.

Silkateen for cord.

Object: Practical application of stitches taught in the preceding lesson.

Discussion of warp and weft threads. Connect discussion with the study of cotton, weaving, etc. The warp threads are usually stronger, and for that reason garments will usually wear longer and look better if the warp threads run lengthwise. Call attention to the fact that the sewing bag will be made in that way.

Straighten edges of the cloth. See Lesson I. Fold material lengthwise with the wrong sides inside. Care should be taken to see that the edges and corners are exactly even. Pin to hold in position.

Seams—French. (See directions given above.)

1. One of the ends should be left open for the

[1] These proportions work out well for material which is 30″ wide. For wider or narrower material the proportions should be changed.

top of the bag and the other end and open side sewed in seams.

2. Baste ¼″ from the edge, using uneven basting.

3. Crease a line 3/16″ from the edge along the two sides which have been basted.

4. Sew along this creased line, using fine running stitches.

5. Trim seams. Cut as straight as possible, being very careful not to cut through the running stitches.

6. Crease seam. See directions given above.

7. Fold for a French seam, and baste ¼″ from the edge.

8. Sew, using combination stitch and making the seam not more than 3/16″ deep.

To hem the top.

1. Measure down 2″ from the top, using a tape line or piece of cardboard. Mark with pins, placing them from 2″ to 3″ apart. Turn this portion to the wrong side and crease in line with the pins. This crease should come at the top of the bag.

2. Turn the raw edge under ¼″, crease, pin, and baste.

3. Secure hem with hemming stitches (see above), making the stitches about ⅛″ apart.

Preparation for cord.

1. Turn bag to the right side. Measure up ½″ from the edge of the hem. Mark with pins

every few inches, crease and sew along this line, using fine running stitches.

2. Cut slits in the right side through only one thickness of the cloth. These should run vertically between the row of running stitches and the bottom of the hem. Care should be taken not to cut through the hemming or running stitches. Make one slit about 3/16″ either to the right or left of the seam and the other at the fold on the opposite side.

3. Overhand along both sides of these slits to prevent raveling and strengthen the edges. Care should be taken not to catch the needle into the cloth underneath.

4. Measure five strands of silkateen two yards in length. Have two pupils work together, each holding opposite ends of the threads. Wind in opposite directions until a firm twist is secured. Bring the ends together and fasten with a knot. This should form a twisted cord. Two such cords are needed for each bag.

To put in cord.

1. Thread one end of the cord through a bodkin or tape needle. Beginning at the slit near the seam, run cord all the way around the bag, coming out where you started.

2. Tie the ends of the cords together, making a knot about ⅜″ in diameter, exactly at the end. This makes a nice neat finish. A tassel

made of short ends of the silkateen may be used if preferred.

3. Do the same with the other cord, beginning at the opposite slit. If put in according to directions and without catching the second cord through the first, pulling on the ends of the cords will close the bag.

NOTE.—If desired the bag may be ornamented with a cross-stitched initial. The pupils who work more rapidly than the majority might be given this as special work.

CHAPTER III

STUDY OF COTTON MATERIALS

INTRODUCTORY

Work in sewing should also include a study of materials. It is not only of interest to know something about the fibers from which our clothing is made, but it is of practical value as well, since each has distinct properties which adapt it to different uses. In order to judge between good and poor material, one must know the standards of purity and quality of the different fibers and weaves.

This course is, therefore, planned to include a brief study of the four common textile fibers —cotton, linen, wool, and silk. It can be made interesting to children if it is made a live subject. If the relation is shown, wherever possible, to their geography, history, and composition lessons, all will be made more real and vital.

It is suggested that morning exercises be given to this work once or twice a week.

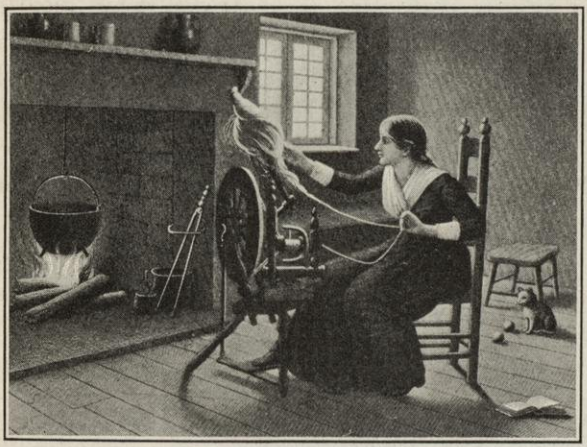
Evolution of weaving and spinning.—The textile art is older than man, for, long before

he came upon earth, spiders and caterpillars spun their threads, birds wove their nests, and certain trees formed a kind of cloth by closely interweaving the fibers of their inner bark. Man gradually conceived the idea of using this bark for clothing, by soaking it in water and beating it with wooden mallets to felt the fibers together; it was then dried and bleached in the sun, and colored with vegetable dyes, the method of coloring being to lay a leaf or flower on the dye and, as soon as the surface was covered with the dye, it was pressed down on the cloth, thus fixing the design. The bark most largely used for this *Tapa* cloth, as it is called, was that of the paper mulberry.

Perhaps the interlacing of the barks suggested other possibilities to the people of that day, for they began rudely to weave together reeds, rushes, and twigs to form baskets and mats, expressing their ideas of art and beauty by combinations of color and weave. Beautiful examples of primitive weaving are found in northern South America, Africa, and among our western Indians. With the discovery of spinning yarn the *true* textile art began, however, and, although there is no real information as to the actual time of the origin of spinning, we do know that it dates back before 2000 B. C. Early nomadic tribes used threads to

fasten together the skins which they used as clothing. Perhaps wool torn from the sheep in passing by bushes and brambles may have suggested it to them.

Until 1500 A. D. all spinning was done by



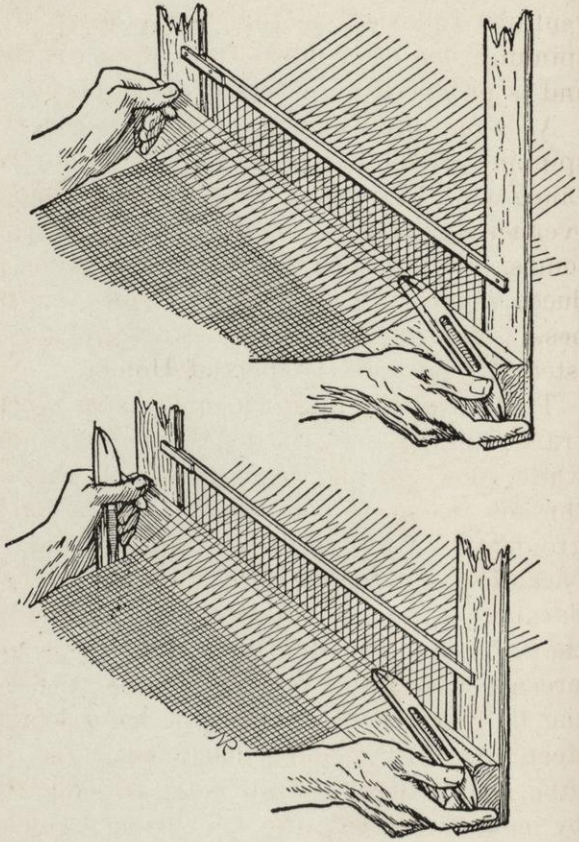
Courtesy of Marshall Field Co.

GIRL SPINNING

hand and a spindle, which was at first merely a stick upon which the thread was wound. Later it was discovered that the spindle could be whirled around faster if it had a weight on the end, so a piece of wood was attached to the lower end. This was called the whorl. The need of something to fasten the wool to, brought the distaff, a stick around which the wool was

wrapped and then held in the hand or tucked in the belt.

At the end of the fifteenth or beginning of the

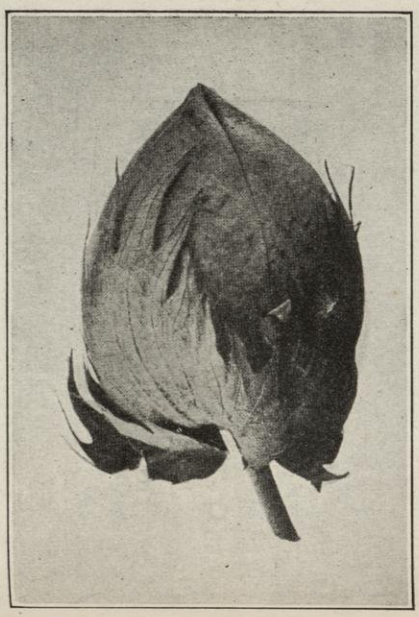


THROWING THE SHUTTLE THROUGH THE WARP SHED BY HAND

sixteenth century, a one-thread machine was invented which enabled the spinner to produce seven times more yarn than by the distaff and spindle. Gradually improvements and new inventions followed, so that today most of the spinning has been taken from women's hands and is produced by means of machinery.

As a natural sequence to the discovery of spinning came the weaving of the spun yarn. Linen cloth of exquisite fineness of thread and evenness of weave is found in old Egyptian tombs, and the early Greeks and Romans produced woolen fabrics of great beauty and firmness. Manufacture of both wool and flax existed in Greece in the days of Homer.

The early Egyptian loom was a vertical frame similar in idea to the tapestry loom, while some *savage* tribes stretched the warp threads between convenient objects on the ground or from horizontal supports and wove back and forth between the warp threads as in darning. Many modifications have come since the early days, but the same three steps to the process of weaving remain, whether the weaving be done on the crudest of hand looms or upon the most modern machinery: (a) *shedding,* the lifting of certain warp threads, thereby making a space, or shed, through which the shuttle is passed; (b) *picking,* passing the shuttle through the threads; and (c) *battening,*



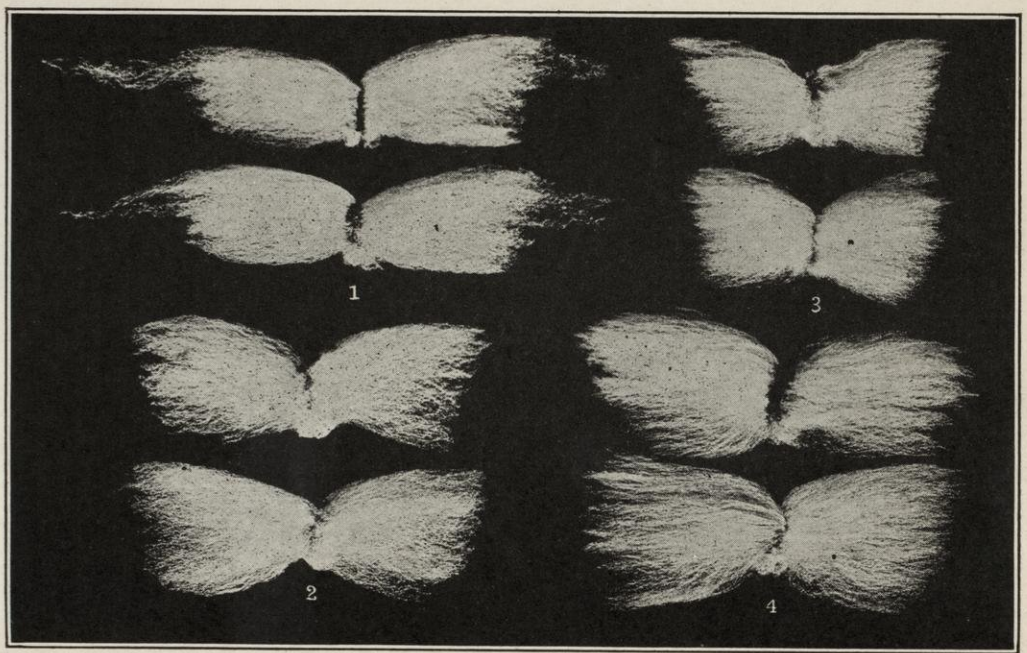
A Cotton Boll Unopened

A Cotton Boll Opened

pressing the weft thread against the preceding ones to make the cloth firm and even.

Cotton.—The cotton plant belongs to the natural order of Malvaceae, or mallow family, and is known scientifically by the generic name *Gossypium.* It is a shrub which reaches a height of from four to six feet, and is native principally to island and sea-coast regions of the tropics, although it can be cultivated up to about 37° on either side of the equator. A warm, humid climate and sandy soil are most favorable to its growth. In the southern states cotton is planted with a machine, the seeds being dropped in a continuous stream. When the young plant is about three inches high it is thinned out with a hoe, about twelve inches being left between plants. The time for planting depends upon the latitude, beginning about the middle of March and ending the first half of May.

Ten or eleven weeks after the planting the shrub is ready to bloom. The flower has five petals, yellow at the base and growing lighter in color at the edges. When the flower drops off a dark green pod is seen which increases in size and finally discloses a mass of downy white fibers in which are imbedded the dark brown or black seeds. The cotton is picked as soon as ripened and separated from the seeds by a process known as ginning. The seeds are hulled



COTTON SEEDS WITH LINT ATTACHED

and the kernel put through a hydraulic press which squeezes all the oil from it, leaving the meal, which is used for feed for cattle. The refined oil is used as a substitute for olive oil, the residue being used as soap stock.

The bales are wrapped in bagging and strapped with sheet-iron bands. When the cotton arrives at the mill, the bales are broken and the cotton starts upon its journey through various processes until it is made into yarn. The first step consists in giving the cotton a thorough cleaning, which is accomplished by a series of machines which pull the wads of cotton into shreds, beat out the dirt and any seeds left in, and finally leave the cotton in the form of batten upon the cylinders. From here the cotton goes to the carding machine where it is combed to straighten the fibers and remove any remaining foreign material and also some of the short fibers. Then it follows into the combing machine which casts aside as waste all fibers below a certain length, passing the rest on to the drawing machine where the fibers are laid perfectly straight and parallel and the cotton drawn out as much as possible without breaking. The combing process is omitted unless the cotton is being prepared for especially fine or high grade materials.

Several intermediate steps take place before the fiber is spun into yarn, the principal point

of difference being the amount of twist imparted to the strand. Spinning produces the finished yarn, which is converted into thread by uniting two or more yarns firmly by twisting. All sizes of 6-cord threads are made of six strands and 3-cord spool cotton is made of three strands. The ordinary spool of cotton thread contains 200 yards.

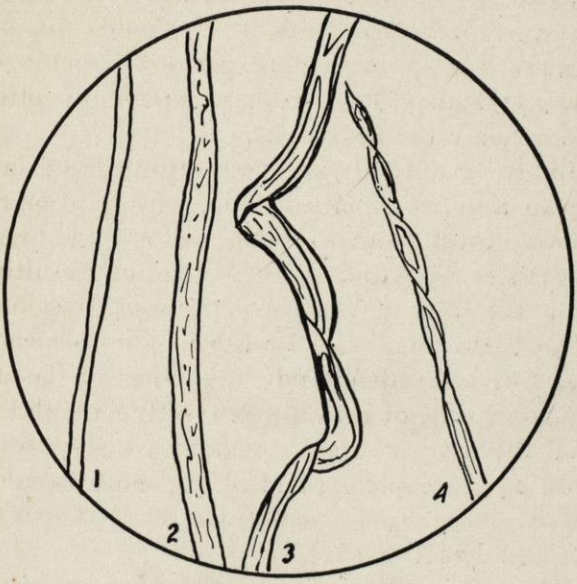
Before weaving into cloth, cotton threads are strengthened by coating them with a preparation of starch, flour, paraffin, tallow, etc., to enable them to withstand the friction resulting from the weaving process without breaking. After weaving, the material is bleached, starched, and calendered—the object of the last process being to give it a perfectly smooth and even surface and also to impart a luster to the cloth as it passes through. The cloth is calendered several times according to the finish required. (See below.)

Cotton is dyed either in the yarn or in the cloth, but it has much less affinity for dyestuffs than animal fibers, and, relatively speaking, there are only a few with which it can be dyed without the assistance of a mordant.[1]

Physical characteristics.—Under the microscope the cotton fiber usually presents the ap-

[1] The term mordant comes from a word meaning "to bite." It is a substance which will unite with the fiber and also with the dye to be used.

pearance of a flat, slightly twisted ribbon with thickened edges. Physically the individual cotton fiber consists of a single long cell with one



TYPES OF COTTON FIBERS

1. Glossy, dead, structureless fiber; 2. Thin, transparent, flat, unripe fiber; 3. Half-ripe fiber with thin cell wall; 4. Mature, ripe fiber with full twist and thick, well-defined cell wall.

end attached directly to the surface of the seed. While it is growing, the fiber is round and cylindrical, having a central canal running through it, but, after the pod has ripened and

burst, the cell wall collapses, thereby causing the fiber to form into a flat, ribbon-like band. Upon ripening, the juices in the inner tube dry up, causing the characteristic spiral twist of ripe cotton. This spiral twist makes cotton valuable for spinning purposes as it causes the fibers to lock around each other more tightly. In diameter the cotton fiber is rather even for the greater part of its length, gradually tapering to a point at its outgrowing end. The length of different varieties of cotton fibers varies from ¾″ to 2½″, sea-island cotton being the longest.

The hygroscopicity, or the power to absorb water without feeling damp, is between six and eight per cent of its weight. Cotton which has been freed from the natural vegetable wax is more hygroscopic and is known as absorbent cotton.

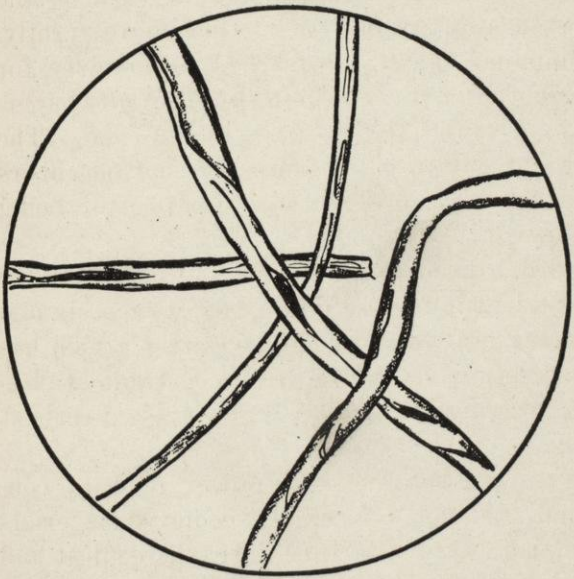
Linen has the greatest power of heat conduction and cotton ranks second. Materials made from linen are, therefore, the coolest and cotton comes next.

Though resistant to the action of moths and insects in general, cotton is acted upon by mold, as is evidenced by the formation of mildew on cotton fabrics stored in warm, damp places.

Mercerized cotton.—The process of mercerization is named after John Mercer, who in 1844 discovered that cotton might be given a

high degree of luster and at the same time strengthened by subjecting it to the chemical action of caustic alkali and a strong tension to prevent contraction.

When the cotton fiber is placed in the caustic



Cotton, Mercerized and Stretched, Showing Incomplete Mercerization

solution it undergoes a peculiar physical modification, changing from the flat, twisted, ribbon-like shape to a smooth, rounded, cylindrical fiber with thickened cell wall. The tensile

strength is greatly increased, amounting in some cases to from 30 to 50 per cent.

Mercerization imparts a high luster to the cotton fiber due partly to the fact that the fiber, being cylindrical, reflects the light instead of absorbing it. Another condition which affects the lustrous appearance is due to the change in the cell elements. The substance becomes gelatinous and translucent, thereby affecting the optical properties of the fiber and lessening the amount of light absorbed. Ordinarily the process of mercerization is not continued until every fiber is completely mercerized. Mercerized cotton is somewhat more reactive towards dyestuffs than ordinary cotton.

Yarns of ordinary grades of cotton cannot be successfully mercerized, and as the cost of producing high grade mercerized yarn is about three times that of the same quality of unmercerized cotton, the higher cost of the finished product may readily be understood. Long-stapled sea-island cotton and Egyptian varieties are usually selected for the manufacture of mercerized materials, as they are better able to withstand the tension necessary for the perfection of the process than the short stapled fibers.

Cotton may be mercerized either in the yarn or in the cloth, although it is usually done in the yarn.

Silk finish.—Both mercerized and unmercerized cottons are often calendered to increase the luster of the material. The cloth is passed between rollers, under heavy pressure, one roller being engraved with obliquely set lines (125-600 to an inch). The large number of very fine parallel surfaces reflect the light, producing a beautiful silk-like luster. Unmercerized cotton which has been finished this way is no stronger than ordinary cotton.

A test for mercerized cotton.—Wash the samples, rinse well, and when dry compare with a piece of the same which has not been washed. If the luster remains, the material was mercerized. The finish put on by sizing material, pressure, and calendering is removed by washing.

Printing.—Block printing was first used, the design being engraved in relief on blocks of wood. These were dipped in the colored paste and applied to successive portions of the cloth by hand. These blocks are now replaced by engraved copper rolls, the design being such that it is repeated once or a number of times in each revolution of the cylinder. There is a printing roll for each color of the design. Sometimes both the background and the design are printed on the cloth, but the more common process is for the design only to be printed on the cloth, which may be dyed afterwards. In the

paste of the printed design there is some chemical which prevents the portions printed from taking the dye, consequently these remain white or a different color as the case may be. This is called the "resist" process. Another process is first to dye the cloth and then print on some chemical which, when the calico is steamed, discharges the color. This is called the "discharge" process. Sometimes this weakens the goods in the places where the color has been discharged. This accounts for the dropping out of dots and also the giving way of white stripes in printed materials. The color paste contains both the dye and the mordant. After calico has been printed it is steamed to develop and fix the color, washed to clear the white, usually sized and then pressed and dried by passing over slowly revolving, steam heated drums. In general printed materials are not so fast to washing and sun as those dyed in the piece or yarn.

The subject of dyeing is a large one and too technical for treatment here. The commercial dyes on the market give satisfactory results when the directions are carefully followed. The colors are usually harsh, but with a little knowledge of mixing colors, very pleasing effects may be obtained. A small sample of the material to be dyed should always be tried out in the dye

solution to make sure the color is right before the entire piece is immersed.

Testing: For fastness to sunlight.—Cover one end of a sample of material with a piece of heavy cardboard and expose the uncovered end to the sunlight for a number of days, examining it in the shade to see if the exposed end has changed in color from that of the covered part. Note the number of days it takes to change the color. Fabrics that are but slightly changed at the end of a month are called "fast"; "moderately fast" colors are those but slightly faded in 14 days; and those which are more or less completely faded in 14 days are called "fleeting."

For fastness to washing.—Fabrics should withstand the action of soap, the heat, and the mechanical friction necessary for laundering. To test the fabric wash it in a soap solution similar to that used in the household, not warmer than 131° F. Repeat several times and if the color does not fade it is *fast* to washing.

For crocking.—Many dark colored cottons which have been poorly dyed discolor other garments or the skin. Materials may be easily tested by rubbing them briskly on white unstarched cotton fabrics.

For per cent of shrinkage.—Pour boiling water over a sample and leave it immersed over night. Dry at a moderate temperature without

stretching. Press. Measure before and after treatment. In the home the folded material may be immersed as given above and then hung on the line to dry without wringing. This keeps the material in good shape and little pressing is necessary.

Wearing qualities compared with price.—Cotton, being cheapest, is not adulterated with any of the other fibers, but an inferior grade of material is often made to appear heavier by the addition of dressing. Starch, glue, dextrine, etc., are used, and they may add greatly to the weight of the cloth. The spaces between threads are filled and a good finish is given to the material, but after washing the cloth loses both in weight and firmness. This dressing may be detected in thin fabrics by holding them up to the light, the starch showing between the threads. Also by rubbing the material in the hands it is freed from part of the dressing and one may determine the firmness of the cloth. Still another method of determining the amount of sizing present is that of thoroughly washing a sample of the material and comparing it with the original.

If the material is to give good service, the warp and weft threads must be in good proportion. Materials having some heavy threads, as dimities, or having a much heavier warp than weft, are apt to split because of the unequal ten-

sion. Materials which have been on the market for some time may have become weakened by the action of the chemicals which were used in the bleaching or in the sizing.

The strength may be judged by the following test:

Place the thumbs together and press them down hard on the material, holding the cloth tight underneath. Consider the amount of strain resisted.

In choosing between two grades of the same type of material, consider the additional wearing qualities obtained for a slight additional cost. Often a piece of material costing two or three cents more will wear twice or three times as long as the cheaper material. This is not always true, however, as sometimes a large part of the price is represented in the novelty of weave, design, or color.

The firmness of the weave and the quality of the fiber are always important factors to consider. To judge the quality of the fiber untwist a thread of the cloth and notice the length of the separate fibers. A long fiber indicates strength and, therefore, good wearing qualities, other things being equal.

Always consider width as well as price in comparing two pieces of material. The wider material will usually cut to better advantage, and may, therefore, be more economical.

In purchasing dotted Swiss be sure to determine whether the dots are embroidered or merely printed or pasted on. Printed dots are more likely to fade and those made of paste become discolored by ironing and wear off.

Suggestive Review

1. Early history of the textile industry.

2. Cotton—growth and manufacture, where grown; necessary climatic conditions; correlate with the geography of the southern states. Picking, ginning, baling, cleaning, carding, combing, spinning, and weaving. What effect did the invention of the cotton gin have on the history of the United States?

3. Properties of cotton fiber—appearance under the microscope (what caused the twisted appearance), hygroscopicity, heat conduction. Mercerized cotton—how different from ordinary cotton, what physical change increases the luster and makes the fiber stronger?

Compare mercerized materials with those which have simply been calendered or treated to give them a lustrous finish.

4. Study of cotton materials—learning names, uses, and prices of the common types. Tests for quality; comparison of wearing quality and price. Get hold of as many samples as possible to use as illustrative material.

Remember that in all the study of fibers, the main idea should be to give to pupils practical knowledge which they can use in buying materials.

CHAPTER IV

DARNING AND PATCHING

Darning.—But little sampler work is given because samplers as such should be used only in rare cases. Children dislike to spend hours on a little square of cloth which has no practical value when completed. Usually the principles may be taught just as effectively on useful articles or garments. In giving the mending lessons it sometimes seems wiser to teach the correct method on small pieces of cloth, since it is not always possible to have the children bring worn garments from home with materials to match, etc. Then, too, the variety of problems would be so great that individual attention would be demanded of the teacher. After doing the practice work at school the pupils should be encouraged to mend their own worn garments and bring them to the teacher for inspection and suggestions.

It is always possible to have the children bring worn stockings from home, and it is suggested as the most practical arrangement in teaching stocking darning.

The repair lessons are not the most interesting so it is well to put them in between the more interesting ones. The logical and psychological orders are not always the same, and it is frequently best to sacrifice the logical order in order to hold the interest of the pupils to the greatest extent.

Darning is used to reinforce worn and weak places and to repair holes, by weaving threads back and forth in such a manner as to imitate the original material. If possible, in darning cloth, the raveled thread of the material should be used; if not, it should be matched as closely as possible with darning thread. Silk thread, if used, should be split. Darning is usually done on the right side of the material. Begin at the upper right-hand corner of the worn place, putting in the warp thread first and being careful to weave a short distance beyond the worn place so that the material is sufficiently strengthened. After the warp threads are all put in, the weft threads are woven in. In the weaving, have the threads lie close to each other to form a strong web, and take up every alternate thread in crossing back and forth.

Darning of Knitted Garments

Materials.—Worn stocking.
Darning cotton or woolen yarn.

Crewel needle.

Flat stocking darner, if any.

1. The stockinette darning may be done on either the right or wrong side, but can be made to look neater with less effort if done on the right side. The new stocking darners which have a flat surface do not pull the material out of shape as does the old egg-shaped variety.

2. Pull out the threads around hole until the edges are even.

3. Weave in lengthwise threads, beginning at upper right hand corner and at least ¼″ from the edge of the worn place. Take up one loop and drop one until the hole is reached; carry thread across to opposite sides, and take up loops in a similar manner, continuing ¼″ beyond, or still further if the material is thin and worn. Upon returning take up alternating loops. When all the lengthwise threads are put in, run in weft threads in a similar manner, laying them in close to each other and keeping the darn flat and even.

Darning with net.

1. Prepare the hole as given above.

2. Baste a piece of net to the wrong side and proceed according to above directions with the following variations: weave the lengthwise threads in and out through the meshes of the net. This brings a thread through each row of

holes and makes the horizontal threads unnecessary.

3. Trim the net to within about ⅜″ from the darned place. Catchstitch the edge of the net to the material, using fine cotton thread.

Darning by Machine.—Table linen, towels, knitted garments, and stockings may be darned very satisfactorily using the sewing machine. For the table linen and the towels stitch back and forth, putting in the warp threads first and then the weft. If the knitted garment is badly worn, baste a piece of thin, soft material over the hole, stretching the garment slightly while basting, to allow a little extra fullness. A form is necessary if stockings are to be darned on the sewing machine. There are various styles on the market which are satisfactory, but small embroidery hoops work very well. This makes it possible to get at the hole conveniently.

Short cut methods should be taught and used whenever possible. Work of this kind is often justly criticized as being "too fussy," and "impossible for the busy housekeeper." As teachers of sewing we must meet this by giving simple, practical, and reasonable methods of doing things. In many cases the mending and darning may be very satisfactorily done on the sewing machine, and while teaching other methods we must also include this as a time saver.

There are so many things which are really worth while that the busy housekeeper often finds no time for unless we help her to see how time may be saved in doing the routine duties of the household.

Hemmed or Counter Patch

Materials.—Cotton print.

Dimensions.—2 pieces 6″x5″.

No. 70 cotton.

No. 9 needle.

The hemmed or counter patch is called the wash patch, and is generally used on material which is to be laundered.

1. Trim the irregular hole [1] to form a rectangle, bringing the cut edge on a line with a thread of the material.

2. In each corner cut up diagonally ¼″.

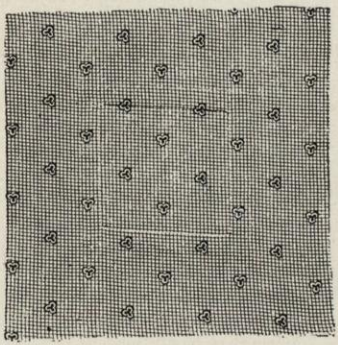
3. Fold the edges of the square back on the wrong side ¼″. The crease should be straight with a thread of the material.

4. Place patch, shrunken (and faded if necessary in order to match perfectly), back of the worn piece, match the figures exactly, baste carefully, and hem the garment piece down to the patch with fine, even stitch.

[1] A real hole might be made by tying a pebble in the center and rubbing on a rough surface.

5. Cut off edges of patch to within ½″ from hem, turn in ⅛″, and hem down to the garment piece having a ⅜″ hem. Remove bastings and press on the wrong side.

Observe much care to prevent stretching the



Hemmed Patch (Right Side)

material. Goods less firm may require a deeper first hem to prevent fraying. (See illustration.)

Overhand Patch

Materials.—Checked gingham.

Dimensions.—2 pieces 5″x6″.

No. 90 cotton.

No. 10 needle.

1. Trim the irregular hole to form a rectangle, bringing the cut edge on a line with a stripe.

2. In each corner cut diagonally across one square.

3. After matching the patch to the garment piece, fold back the edges of the patch to a line where it *exactly* matches the other piece, and overhand the two pieces together, on the wrong side, using fine even stitches.

4. Cut off edges of patch ¼″ from the joining and press back; cut off the corners so they will just meet as mitered edges.

5. Overcast the edges from left to right, being careful not to overhand the mitered edges together.

This patch is particularly adapted for use on wool goods or wash materials, when appearance is of more importance than strength. (See illustration.)

Making a Sewing Apron

Materials.—Crossbarred muslin (small check about ⅛″) ⅞ yd. Mercerized cotton, in a dainty color for featherstitching, cross-stitching, or chainstitching.

No. 70 or 80 white thread.

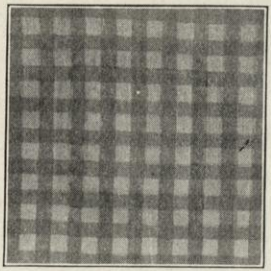
No. 7 or 8 needle.

Object: To review stitches previously learned and teach putting on of a band, overhanding, featherstitching, cross-stitching, or chainstitching.

To prepare material.

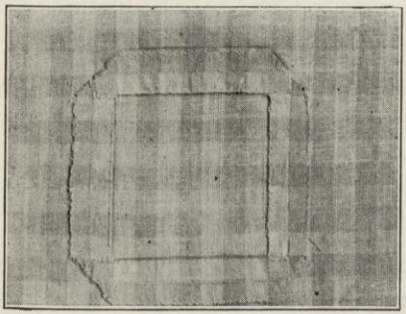
1. Straighten edges of cloth. See Chapter I.

2. Remove selvage from both sides, keeping the cut edges just as straight as possible.



OVERHAND PATCH (RIGHT SIDE)

3. Measure over 3″ from one edge and pull a thread or use one of the threads in the material as a guide in cutting. This strip is for the band and is cut lengthwise of the material because the warp threads are stronger.



OVERHAND PATCH (WRONG SIDE)

4. Measure again 4″ and cut off as before. This strip should be cut in two crosswise and used for the ties. The remainder of the material is for the body of the apron.

The body of the apron.

1. Baste a ¾″ hem in one end of the large piece of material. Turn a hem to the right side and allow ¼″ to fold under.

2. This hem may be hemmed, cross-stitched, or featherstitched as desired.

3. Turn the hemmed end of the material to the wrong side, forming a pocket 9″ deep.

4. Sew up the sides, using combination stitch (2 running stitches and a backstitch). Leave seams open ⅛″ at the top of the pocket.

5. Overcast these seams with stitches 3/16″ apart and four or five threads deep.

6. Turn to right side. Finish the side by making ⅛″ hem. The edge of the hem should be in line with the seam in the pocket. It will be necessary to clip the hem just at the end of the seam to allow it to be turned to the wrong side. This will bring the hem ⅛″ below the top of the pocket, making a neater and stronger finish than would be possible if the hem ended at the top of the pocket.

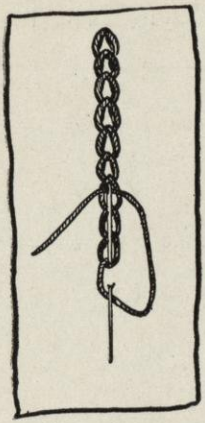
7. Secure the remainder of the seam by overhanding the edges together.

8. The pocket may be divided into two or three sections as desired. The dividing lines

may be made with rows of featherstitching, cross-stitching, or chainstitching.

To put on band.

1. Gather apron ¼″ from the top, using fine running stitches.



CHAINSTITCH

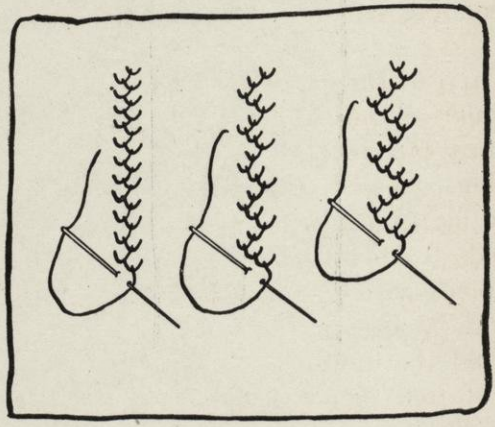
2. Fasten thread, so that apron is gathered into about 12″.

3. Find the center of the band and of the apron. Mark with pins.

4. Place right side of band to right side of apron with the centers together. Arrange gathers, having more fullness at the sides than in the center. Pin to hold in place and baste just above the gathering thread, holding the gathers toward you so that they may be kept in place. Use the half-back or backstitch for

the permanent seam, having the stitches come just under the gathering thread. It is important that the seam be perfectly straight. Again hold the gathers toward you while working.

5. Turn the band up and crease well along the line of the stitches. Turn to the wrong side.



FEATHERSTITCHING

Fold under the raw edge ¼" and baste the band, having the folded edge just cover the first stitches. When basted the band should be free from wrinkles on both wrong and right sides.

6. Finish the portion of the band beyond the apron by turning in the raw edges the same amount as in the center. Baste and then overhand the edges together.

7. Hold the right side toward you and begin the overhanding at the left end of the band. Continue until the body of the apron is reached.

8. Turn to the wrong side and, without breaking the thread, hem the band to the body of the apron. Care must be taken at this point that the hemming stitches do not show on the right side.

9. Turn to the right side and overhand the remainder of the band.

To put on the strings.

1. Hem sides of strings with ⅛″ hem.

2. A half inch hem in the bottom may be hemmed, featherstitched, or cross-stitched to correspond with the finish of the hem on the top of the pocket.

3. Fold the unfinished end of the strings in pleats so that they will fit into the ends of the band. The ends of the band must be turned in about ¼″ to make a neat finish.

4. Hem the strings to the band on both the right and wrong sides.

Christmas and Group Work

Three or four lessons previous to the Christmas holidays may well be devoted to the making of simple gifts. The children will enter heartily into the making of gifts for mother, father, or other members of the family, and

this is a splendid opportunity to develop the spirit of giving and increase their desire to do for others. The constant making of things for themselves has a tendency to make children selfish and this should be guarded against. Working together, on things which may be used in the school or given to some worthy cause, is splendid training for any child. Towels or curtains might be made for the school. A doll could be dressed and sent to a children's hospital, or given to some unfortunate child. You doubtless will have ideas of your own which will be especially good for the children you have in charge.

CHAPTER V

STUDY OF WOOLEN MATERIALS

Wool.—Wool, the most important of the animal fibers, is the soft curly covering of the sheep and similar animals. The references to wool in history show that it has been used from the earliest times. In Genesis 4:2 we find, "And Abel was a keeper of sheep." King David, of Israel, wrote some of his psalms while tending his sheep. Homer and Virgil described the processes of wool preparation. Alexander, we are told, on expeditions to India saw woolen shawls of great beauty.

The great wool producing countries are Australia, England, South America, the United States, and South Africa. Wyoming, Montana, Idaho, and Oregon produce the largest part of the wool raised in the United States. Australia is the largest producer of the finest wool, although Ohio, Pennsylvania, and West Virginia furnish a fine quality which is a close rival. The quality of the wool depends upon the breed of the sheep, feed, care, climate, and the part of the animal from which it comes. The best wool

in soundness of fiber, softness, and evenness of length comes from the shoulders and sides of the animal. The various kinds of wool used in commerce are named either from the breed of the sheep or the locality in which the sheep is raised, as: Australian wools, New Zealand wools, Cashmere, Shropshiredown, and Merino wools.

Shearing in the United States is usually done by experts who begin work in Southern California, Texas, etc., about May and work on up through Wyoming, Montana, Idaho, Oregon, etc., and then into Canada, in this way being busy most of the year.

Most of the wool on the market comes in the form of fleece wool, the product of one year's growth. The fleeces are rolled into bundles as they come from the mill, and are sorted according to quality and length of fiber, the wool from the shoulders and sides being, usually, the choicest part of the fleece. After sorting, the wool is washed to remove grease and dirt; dried and oiled to render it soft; burred and carbonized to remove seeds, leaves, and burs; and blended, by which means a more even yarn is produced. After the wool is blended it comes out in a soft, fleecy condition ready to be carded.

The carding machine finishes the cleaning, separates and straightens the fibers, delivering the wool in soft strands called slivers. This is

accomplished by passing the wool between cylinders and rollers revolving in opposite directions, from which project the ends of many small wires.

If the wool is to be used for worsted material it must be further straightened and have the short ends or "noils" removed by a process called combing. This leaves only the good long fibers lying practically parallel to each other. The combing process is unnecessary in the manufacture of woolen materials as the yarns are composed of short fibers which cross and are somewhat matted.

The processes of drawing and spinning draw out and twist the long soft rolls until the thread is reduced to the size required.

Before weaving, the warp yarn is sized by a starch preparation to enable the threads to withstand the friction due to constant weaving back and forth of the weft thread; it is then placed in the loom, the warp running lengthwise. The filling thread, or weft, is wound on a bobbin, which is fastened in a shuttle, allowing the thread to unwind as it is passed back and forth. As fast as the weft passes through between the warp threads, which are separated into different groups to form the pattern, it is beaten up tight against the preceding thread, thereby keeping the cloth firm and even.

Dyeing is done either in the yarn or in the

piece,—the piece-dyed materials being of a single color, while wools dyed in the yarn allow various combinations.

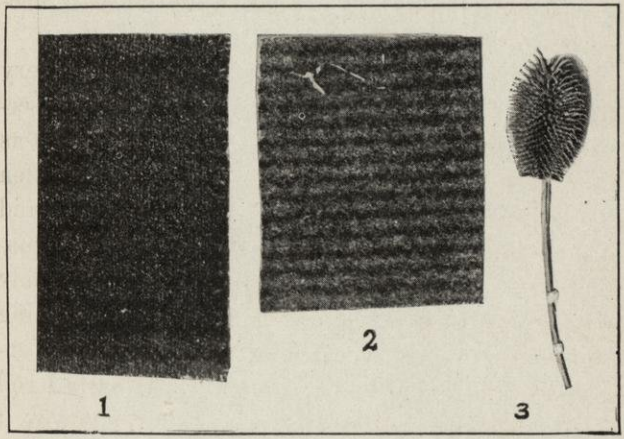
When cloth comes from the loom it is in an imperfect condition for use. Knots tied in the thread are carefully drawn to the surface and clipped off; threads are woven in where any have been left out; and repairs are made if necessary.

"This part of the finishing must be done very carefully for worsted materials, as the intersections will not be covered by a napped surface as in woolen materials. The beauty of woolen goods lies largely in the finish of the cloth, and of worsted goods, in the weave. If worsted materials are fulled or shrunken at all, it is only to soften the weave, and the object of fulling woolen materials is often to obliterate this entirely. The cloth is pressed over a heated roll to give it a permanent finish and luster before it goes to the retailer."

The finishing of a material such as broadcloth, where the weave is entirely covered by a napped surface, is an interesting process as it shows the severe treatment which is necessary to obtain the highly lustrous finish. This in turn throws light on the high price of good chiffon broadcloth, as a good quality of wool must be used to withstand the treatment, and the extra labor also adds to the cost.

The cloth as it comes from the loom is loosely woven and much wider than desired when finished. It is then churned in hot soap solutions to felt or shrink the material. This process is repeated until the desired result is obtained.

Napping, which raises the ends of the fibers



1. Woolen Goods as it Comes from the Loom. 2. Same, After Shrinking. 3. Teasel.

on the face of the cloth, is done by means of a wire teasel gig. The teasel is a vegetable product about the shape of a pine cone, and it is interesting to note that no mechanical contrivance has ever been invented to equal it for the purpose. The napping which has been raised by the teasel is sheared or cut to a proper length

A Woolen Yarn Untwisted

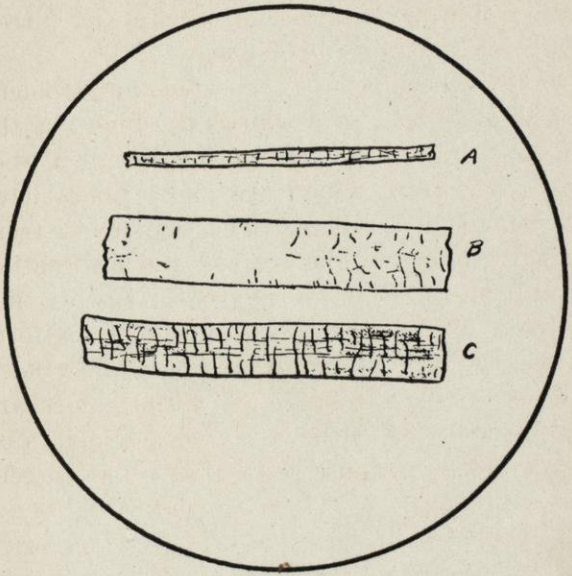
A Worsted Yarn Untwisted

by a machine which works like a lawn mower. The cloth is pressed and, if a higher luster is desired, it may be necessary to repeat the napping and shearing before the material is wound upon copper cylinders and steam is forced through it at a high pressure.

The difference between worsteds and woolens is principally that in worsteds the fibers of the wool lie parallel, one to another, combed wool being used, from which the short fibers have been removed, while woolens are made from yarns in which the fibers cross and are matted and intermixed. A worsted fabric when finished has a clear, bright, well-defined pattern, and seems close and firmly woven, while woolen cloths are softer, more elastic, the colors are more blended, the threads are not so easily distinguishable, and there is a duller effect in general.

Physical characteristics.—The scales give wool its peculiar felting property due to the interlocking of their projecting edges—the deeper the scales fit into one another, the closer becomes the structure of the material. This property is taken advantage of in the manufacture of such material as broadcloth. It is also this property which necessitates extra care in the laundering of woolen materials to prevent shrinkage, which is simply another name for the interlocking of the scales.

"The difference between hair and wool is largely in this layer of horny scales. On hair they are much less marked, and often do not



a—Dark-brown hair from new-born female child. *b*—Golden hair from same child at age of four. *c*—Dark-brown hair from adult female.

project at all at the edges. The distinction is sometimes made that hair is straight and wool is curly or that hair is stiffer than wool; but here again the difference is sometimes greater between the extremes of wool or the

extremes of hairs than between a given wool and a given hair.

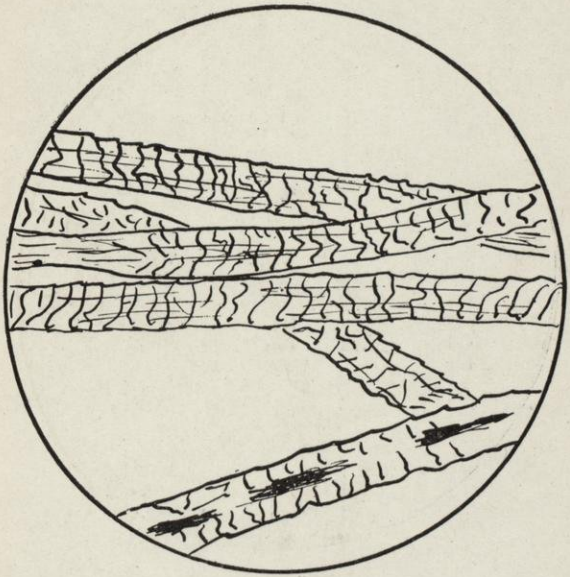
"The amount of luster which wool has also depends on the scales. If the edges of the

WOOL FIBER IN THE GREASE

scales are rough and uneven the fiber as a whole will not be so smooth and lustrous as a fiber in which the scales are more regular and reflect the light evenly. The fiber from the Angora goat, which has less prominent scales, has greater luster than the wool from most

sheep, but there is also great variation in different breeds of sheep."

The length of the wool fiber varies from one to eight inches, depending upon the breed

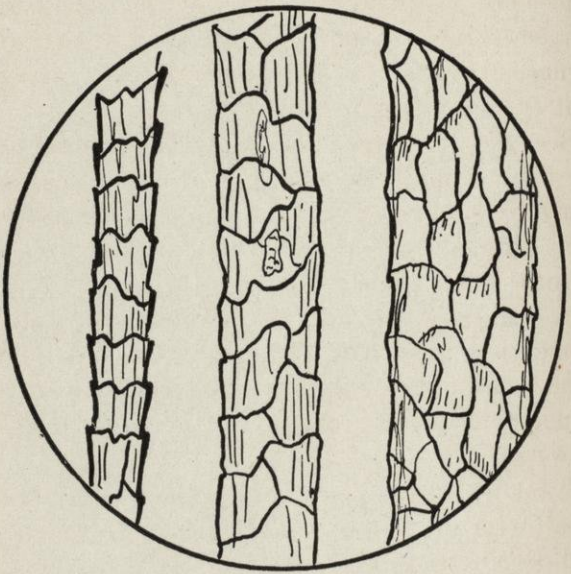


Typical Wool Fibers After Removal of Grease

of sheep and the location on the animal. The wool fibers may be roughly classified as long staple wools or "tops" from which worsteds are ordinarily made, short staple wools used in the manufacture of woolens, and the miscellaneous or carpet and blanket wools. This

classification is based on the length, fineness, and felting qualities of the staples.

The hygroscopicity of wool, or the property of absorbing water without feeling wet, is



Comparison of Different Varieties of Wool

greater than in any other textile fiber. It varies in different wools from eight to seventeen per cent. It absorbs slowly and evaporates in the same way. A garment of wool, when dry, feels warm next to the skin; when wet, the moisture is not felt unless there is a great deal of it.

In elasticity it is next to silk. This is the

property which makes woolen materials keep their shape better than linen or cotton.

Wool is a poor conductor of both heat and electricity. It feels warm to the touch because it does not conduct the heat away from the body. Woolen shirts are worn by men working around furnaces because the wool prevents the extreme heat from reaching the body.

Because of the peculiar physical structure of the fiber a material made from wool encloses many air spaces. Dead air spaces conduct heat very slowly, which accounts for the greater warmth of a loosely woven fabric. Materials with a napped surface, as blankets and outing flannel, are also warmer for this reason. Two light-weight garments are warmer than one of heavier material because of the layer of air between.

Wool, on a dry body, as on old people or on those who do not exercise freely, feels warm and continues to do so as long as the evaporation of the skin is not in excess of the garment's power to absorb and eliminate the moisture. If, through physical exercise, this amount of moisture is increased and the wool does not absorb it as fast as it is excreted, the air about the body will be moisture laden and evaporation interfered with.

The tensile strength varies so greatly that no definite statement can be made.

Of all the textile fibers, wool is the most reactive to coloring matter. Consequently, it may be dyed very easily and the colors are usually "fast."

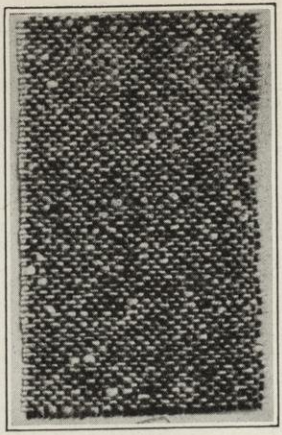
Owing to the rapidly changing fashions today, dress materials are frequently cast aside when only partially worn. Naturally this greatly increases the demand for new fabrics and, therefore, for raw wool.

Statistics from 1909 give approximately 220,000,000 pounds as the amount of new wool, freed from grease, used in the United States. Later figures show that about 250,000,000 pounds are used per year at the present time. Estimating the present population at about 90,000,000 the amount of raw wool per capita is less than three pounds. Considering the waste in manufacture (one hundred pounds of raw wool being required for eighty-five pounds of cloth) and also the proportion which must be used for blankets, carpets, rugs, felts, and upholstery, it is very apparent that the supply of new wool is not equal to the demand. To make up for this shortage, shoddy and cotton have come into general use as substitutes.

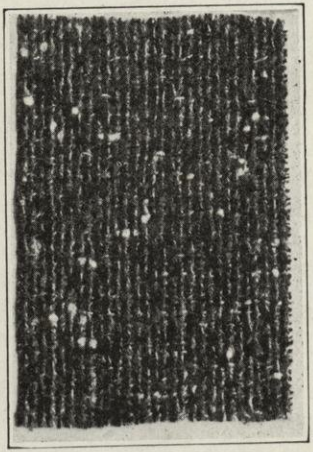
Shoddy is the term which has come to be applied to all reclaimed wool which has already served one or more periods of usefulness. The term is unfortunate as it suggests only deception, sham, and fraud. No objection is raised

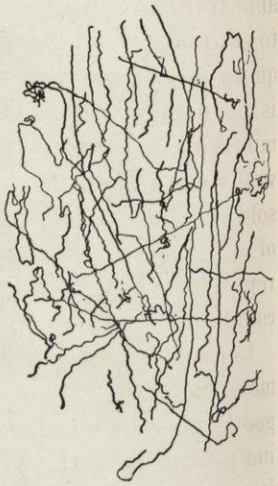
to the use of other waste products, so why should there be in this case? The only just cause for complaint is found in the abuse rather than the use of the so-called shoddy.

The wool is reclaimed from wool rags, tailors' clippings, and scraps of various kinds. These are dusted, cleaned, and then torn apart by machines especially designed for that purpose. If any cotton is present the mass is treated with dilute acid to decompose the vegetable matter, leaving only the wool. This is washed, dried, and carded, preparing it for spinning a second time. The quality of the shoddy depends upon the quality and value of the material from which it is made. The best quality is obtained from knitted goods and worsted materials if a good quality of fiber was used in the first place. To be sure it is not so strong as it was originally. The strain undergone in the various processes through which it has passed has weakened the fibers to a greater or less degree. Yet in many cases it is not "worn out" by any means. The much felted woolen materials give the very short inferior fibers. It has been said that, "Anything with two ends may be spun." When we find fibers not more than a fourth of an inch in length we realize the truth of that statement and wish the manufacturers were a little less clever. These short fibers soon become loosened or wear



Poor Quality Shoddy





Better Quality Shoddy

off, leaving the garment "threadbare" as we say.

The better quality may contain fairly long fibers ready to do good service again. The processes undergone thoroughly sterilize the material, so there is no possible danger of contamination. The existing prejudice is not justified, as the use of these reclaimed materials has clothed many people much more cheaply and warmly than would otherwise have been possible. In fact, it is the only way in which the insufficient supply of new wool may be pieced out and made to go around. Should this material be wasted, many persons would be unable to afford proper clothing and it is difficult to estimate what the price of wool would be. To quote from an article in a trade journal: "This is no excuse for dishonesty, false labeling, or misrepresentation. Good, honest, sound, and well wearing cloths can be made, are made, and sold on their merits at prices 'within the reach of all' and all that is needed is that they be represented for what they are in the name of common honesty."

Because there will always be unscrupulous manufacturers who will misrepresent their goods, there should be pure textile laws requiring proper labeling of all materials. Until that is accomplished some knowledge of materials, on the part of the shopper, is necessary if full

value is to be received for the dollars expended.

"All wool and a yard wide" has come to be synonymous with good quality in the minds of many. This is a misconception, as a material may be "all wool and a yard and a half wide" and a poor material at the same time. The quality of the wool and the weave of the material are fully as important as the fact of its being all wool.

To judge of the firmness of the weave hold the material up to the light. If the light shines through, it indicates a loose and open weave unable to withstand strain. The tensile strength test given below should also be used in this connection. The "feel" of the wool, to be acquired by practice, tells much in regard to quality. Notice carefully the difference in the "feel" of the wool in a series of blue serges. Threads should be unraveled and the length of the separate fibers noted. Long fibers usually indicate a good quality of wool, and very short ones indicate shoddy.

Tensile strength.—The warp yarn in a material is always more tightly twisted and stronger than the weft or filling yarn. This is necessary because of the greater strain on the warp in weaving. In cheap materials, frequently, there is more difference than is necessary between the strength of the warp and weft yarns. This may be detected by exposing the

warp and weft threads separately. When considerable difference is found, it is an indication of poor wearing quality as the weft threads will not be able to stand the strain of the warp.

To test the tensile strength place the thumbs together and press them down hard on the material, holding the cloth tight underneath. Do the threads separate or break more easily in one direction than the other?

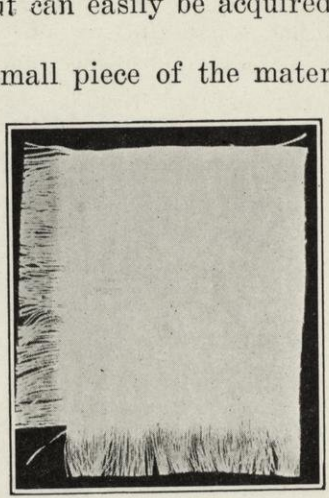
If the threads can be separated by the thumbs in this way the material will not give good service if subjected to hard wear.

It will usually be found to be economy in the end to buy good material. The extra expenditure of $.25 to $.50 per yard will amount to very little in the cost of a garment, and yet it may double or treble its value. In the case of a garment which will be worn only a few times, because of the rapidly changing styles, a cheaper material may serve the purpose fully as well. The use to which the garment is to be put should always be considered when purchasing the material. If service is an important item, remember that *pennies saved* may mean *dollars lost.*

Appearance and feeling can no longer be trusted absolutely, but the trained hand and eye may do much in judging of the quality of materials. Woven fabrics made of wool should be soft when gathered up in the hand and

should spring back when the hold is loosened. Wool should feel warm and springy. There is a great difference in the "feel" of different qualities of wool. The difference is hard to describe, but can easily be acquired with practice.

Take a small piece of the material and ex-



WARP AND WEFT THREADS EXPOSED SEPARATELY

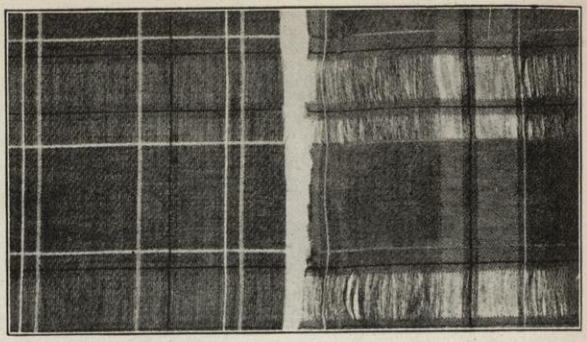
pose the warp and weft threads separately. After some practice the cotton can be quite readily detected unless it is covered with wool, as is very often the case. Wool threads are more curly and elastic than cotton. White wool usually has a creamy tint, while cotton is dead white

Burning to detect cotton.—This is most useful in determining whether threads are part

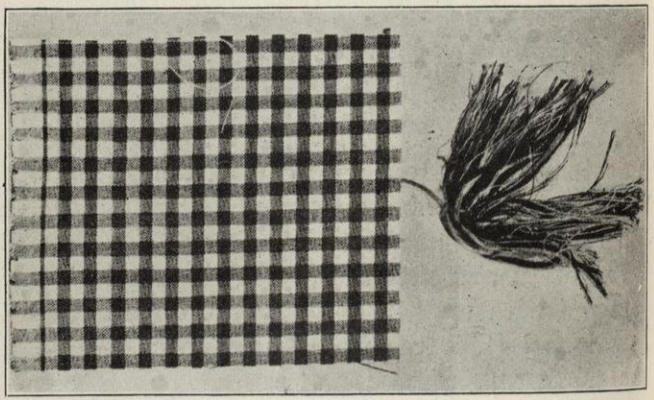
wool or all cotton. If cotton and wool have been spun together, this test is not reliable, although something may be learned if the yarn is unraveled so that the fibers may be burned separately. Cotton burns quickly, leaving a small amount of ash and no perceptible odor. Wool burns slowly, leaving a black ash in the form of a ball at the edge of the flame. The odor of burning wool is that characteristic of burning bones or feathers.

Chemical Test for any Mixed Cotton and Wool Fabric

Boil a sample for five minutes in a solution of ½ teaspoon of household lye in a pint of water. If all wool the entire piece will be destroyed, if mixed with cotton, the cotton will be left and the wool destroyed. Should there be a residue it must be thoroughly washed. This residue represents the cotton in the cloth. If mixed with wool in spinning, an open material will be left, if the warp is made of cotton, it alone will remain. The weft will be destroyed. A small sample of the cloth to be tested should be placed in a *granite* dish, well covered with the solution and allowed to boil *gently* to prevent rapid evaporation and consequent strengthening of the solution. The use of a granite dish is emphasized as the alkali will



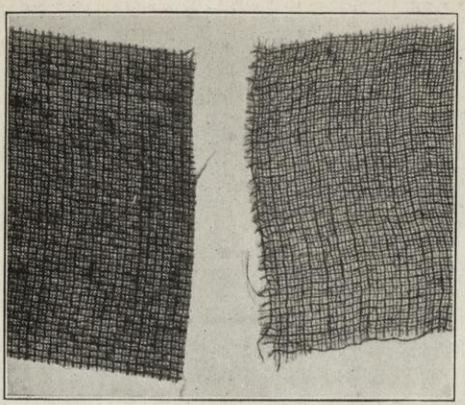
Original Cotton Residue
36 inches wide—50 cents per yard



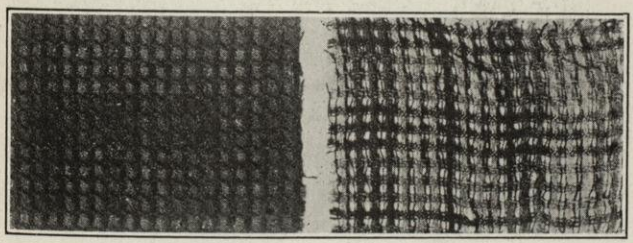
Original Cotton Residue
44 inches wide—65 cents per yard

MATERIALS BEFORE AND AFTER BOILING IN THE LYE SOLUTION

act on some metals, especially on aluminum. Several pieces of imported Viyella flannel,



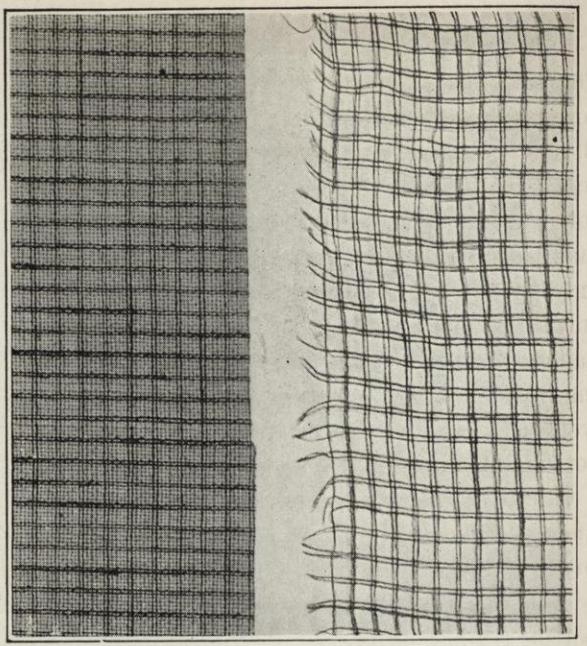
Original Cotton Residue
36 inches wide—50 cents per yard



Original Cotton Residue
54 inches wide—$2.50 per yard

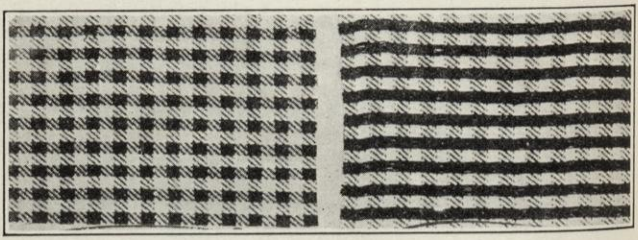
MATERIALS BEFORE AND AFTER BOILING IN THE LYE SOLUTION

sold as all wool and nonshrinkable, when tested were found to contain 50 per cent of cotton,



Original Residue

54 inches wide—$1.25 per yard



Original Residue

36 inches wide—50 cents per yard

MATERIALS BEFORE AND AFTER BOILING IN THE LYE SOLUTION

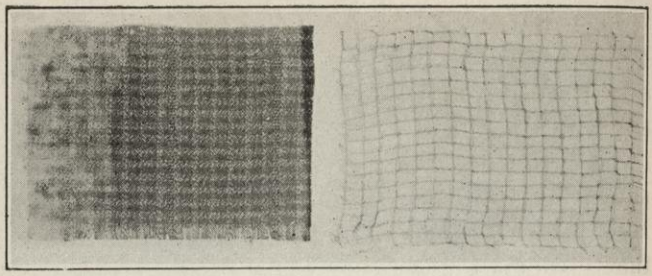
The cotton made it fairly nonshrinkable, as advertised, and increased its value for men's shirts and ladies' shirt waists, but it was deceptive and $.75 per yard was too much to pay for a material 30 inches wide, containing so much cotton. The same could be said of the only piece of so-called "all wool" white flannel, suitable for infants' clothes, which was to be had in a high class store. We are not objecting, however, to the use of cotton but to paying wool prices for cotton and to being sold half cotton as all wool.

For a garment which must be laundered frequently the addition of some cotton will help to prevent shrinkage and perhaps add usefulness to the garment. If represented as being part cotton and sold for a reasonable price, no objection can be raised.

Test the following and note results of tests:

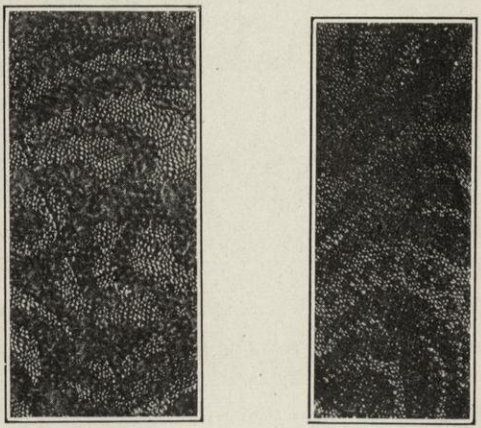
2 pieces of white flannel.
2 pieces of serge.
2 pieces of shepherd check (black and white).
2 pieces of gray or tan mixed novelty goods.
1 piece of broadcloth or a similar material.
2 pieces of any materials you are especially interested in.

It will be found helpful to study the sample, before using the alkali test, and see whether you can form some opinion as to the composition of the material.



Original Residue

54 inches wide—$1.25 per yard



Original Residue

54 inches wide—$5 per yard

MATERIALS BEFORE AND AFTER BOILING IN THE LYE SOLUTION

Test one at a time, but the same solution may be used. Add water to replace what evaporates and if testing many at one time add some fresh solution.

The relation of cotton to wool is often plainly shown by the form in which the cotton is left. If a piece of woven fabric remains we know that either wool was mixed with the cotton in the yarn before weaving or that wool was blown into the cloth mechanically during the felting process and finished over to give the appearance of woolen material. Cheap eiderdowns are often made in this way. Sometimes the warp is cotton and the weft wool. (A sample of shepherd check showed a cotton warp with every other check filled in by cotton weft. It was therefore practically one-fourth wool.)

Tests for fastness to dyes, crocking, and fading.—A very simple and practical test for crocking is to rub the material with a soft white cloth which has been slightly moistened. If any color comes off on the white cloth, the material will crock.

Fastness to light.—The sample to be treated is placed in a suitable frame in such a manner that only a part is exposed. The frame is then placed in such a position that it receives as strong sunlight as possible. A window with southern exposure is a good location in which to hang the frame containing the samples. At the

end of one week's exposure the samples are examined and note made of those which show any appreciable fading; these are to be classified as *not fast.* At the end of the second week another examination is made and those samples noted which show an appreciable fading; these are to be classified as *fairly fast.* At the end of four weeks the samples are once more examined and the colors fading in this period are noted and classified as *fast.* The samples which show no fading at the end of four weeks are classified as *very fast.*

The samples may be partly covered with black paper, fastened securely to a piece of wood and exposed to the light as suggested above.

Test eight samples, varying in color and price, for crocking and fastness to light.

Tests for Shoddy

The following indicate the presence of shoddy:

Very short fibers.

Fibers of various colors.

Lack of uniformity in size and general character of the scale structure.

Ends broken and uneven.

Scales missing on parts of the fiber.

A high power microscope is necessary for these determinations.

The adulteration of a worsted cloth is more easily detected than of a woolen as the entire thread is usually replaced by a similar one of cotton. There are pure wool cloths made of "Virgin wool" and nothing else. The great family of serges, worsted cheviots, and certain white flannels contain only fleece wool. This must be understood to refer to good quality materials demanding a fair price. It still remains a fact, however, that many fabrics used for clothing contain other materials than wool fresh from the sheep shearer and in many cases without detriment and in some cases with positive advantage. If the shoddy is of fairly good quality and especially if mixed with some good new wool, the resulting fabric may look very well and give good service.

Suggestive Review

1. Wool—growth and manufacture. Breeds of sheep which produce good wool—where raised. Correlate with geography work. Shearing—how done in the United States? Main processes in the preparation of the wool for weaving.

2. Distinguish between woolen and worsted materials—differences in kinds of fibers used,

in appearance of spun yarn, in the finishing, and in the appearance of finished cloth.

3. Properties of wool fiber. Appearance under microscope—scales. (See illustration.) Poor conductor of heat—why? Care necessary in laundering because of the scale structure. Length, luster, hygroscopicity, and elasticity.

Shoddy—reclaimed wool, use a necessity because the demand for wool exceeds the supply of new wool. Quality varies greatly. Should be sold for a fair price and not misrepresented.

4. Materials which may be classified as worsteds and woolens with samples of the materials. Note prices, considering width, uses, and wearing qualities.

5. Judging materials. Important to consider quality of fiber and firmness or looseness of weave. Tests.

6. Use of cotton as an adulterant. Different tests for detection, as: appearance, "feel," burning, and boiling in dilute alkali solution.

CHAPTER VI

BUTTONHOLES, PLACKETS, AND HEMMING. MAKING A FLANNEL PETTICOAT

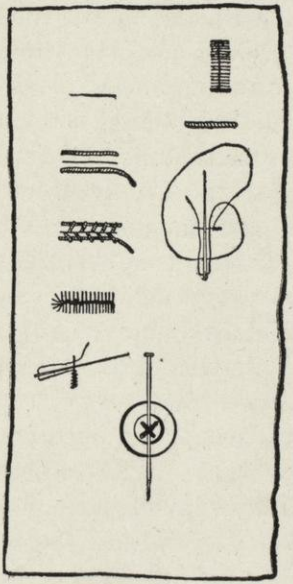
Buttonholes.—Buttonholes should be made large enough to allow the button to slip through without pressure. They are worked on the right side of double material. Buttonholes should be at least ¼″ in from the edge of a garment, and the distance between them is regulated by the material, and by the size and the location of the buttons. Buttons should not be too large or too close together on undergarments. The beauty of a buttonhole depends largely upon the straightness of the cut, the regularity of the distance between the stitches, and the evenness of the stitches in depth. Make buttonholes with a fan at the end receiving the strain and finish with a bar on the other end. A vertical buttonhole, with strain at neither end, should be finished at both ends with a bar. Use thread to correspond with weight of material. Thread should be long enough to make the entire buttonhole.

To make a buttonhole.—Cut a slit the required length through both thicknesses of cloth,

being careful to cut between two threads. Knot the thread, insert the needle ½″ above the right end of the slit, bring it out three or four threads below the right end of slit, insert needle same distance below left end of slit, bring out same distance above, insert again above right end, coming out where you started three or four threads below the right end of slit. If material frays easily, the slit should be overcasted before attempting to buttonhole. Begin the buttonholing by bringing the needle about half way out at the lower right end just below the long stitch. Throw the double thread, from the eye of the needle, to the left and under the point of the needle with a circular movement to form a loop; draw the needle through the loop thus formed and pull up the thread away from you at right angles to the edge of the buttonhole, thus forming a double knot on the edge called a purl. Form the following stitches in the same way, leaving a thread of the cloth between each stitch and bringing the needle out under the same thread of the cloth each time to make the stitches the same length. In making a horizontal buttonhole at the left end spread the stitches in fan shape and then continue down the other side and at the right end make two stitches the length of the width of the buttonhole, drawing the two sides together. Wind the thread spirally around these long stitches

until completely covered, carry the thread through to the under side and fasten.

The vertical buttonhole is used in the front of a shirtwaist and where there is no strain.



BUTTONHOLES
SEWING ON BUTTONS

The horizontal buttonhole is used on bands, backs of waists, and where the fastening will be subjected to a strain. (See illustration.)

To sew on a button.—Take a small stitch, bringing the knot on the right side. Run up

through one hole of the button and draw it down just over the knot. Lay a pin across the button and work the stitches over the pin. When the button is firmly sewed on, remove pin, and pull button out from material; wind the thread several times around the thread between the button and the cloth to form a shank and pass the needle through to the wrong side. Fasten with several small stitches.

The knot is placed under the button to prevent its being worn off. The idea of making the shank is to facilitate buttoning and to save strain on the cloth. (See illustration.)

Plackets.—A placket is the opening made in a garment to insure greater ease in slipping it on. The best types for use in undergarments will be given here.

Placket No. 1.—Cut an opening the length desired or leave the seam open the amount necessary. If a French seam is to be used, leave the last stitching until the placket is finished.

The binding should be cut with the warp threads of the material twice the length of the opening and 2½″ to 3″ wide. Put right side of binding to the right side of the garment and baste, holding the bias edge rather loosely with the garment toward you. Stitch ¼″ from the edge. Remove basting and fold the seam back on the binding piece. Make a ⅛″ fold on the

binding piece, fold over to the line of stitching, baste and stitch or hem by hand.

Placket No. 2.—Cut an opening the length desired or leave the seam open the amount necessary. Use a piece of material with a good selvage, cutting it twice the length of the opening and 1¾″ wide. Lay the raw edge of the strip on the left-hand side of the opening with the right side of the strip lying against the right side of the cloth. Baste so that the edge of the strip will be just below the raw edge of the material. Begin at the end of the slit and make a felled seam (about 3/16″ wide; ¼″ to 5/16″ may be necessary when outing flannel is used) with the cloth hemmed or stitched down *on the strip.* Baste and stitch the remainder of the raw edge of the strip to the opposite side of the opening. Fold the strip back on the garment, having the seam come at the fold. Baste into place and then stitch or hem down by hand. If stitched on the machine, continue stitching across the bottom of the placket. If hemmed by hand, it must then be backstitched across the bottom.

Placket No. 3.—This placket is cut and started as for bound placket No. 1. The left side is finished in exactly the same way. The under side of the facing for the right side is cut out. Care must be taken to leave enough material to turn under. This is basted down on to the

material and then stitched according to directions given under Placket No. 2. The finished result is quite the same as in No. 2. This is more difficult to do neatly, and if a good piece of selvage is available the use of No. 2 is advisable under ordinary conditions.

A placket may also be finished by using a hem or facing on the right side, and an extension hem on the left side. The raw edges may be covered by a small rectangular piece of cloth put on neatly and stitched close to the edge.

If allowance for hems and facings has been made on the pattern, the idea given above may be carried out without the added labor of sewing on extra pieces.

These different methods have been given because each has peculiar advantages, under certain circumstances.

To join bias binding.—The binding should be cut with a thread of the cloth, allowing at least ⅛″ to fold under. Match the edges exactly and hem with small neat stitches.

To join selvages when piecing or sewing ruffling together, overhand the edges together or stitch on the machine, catching only one or two threads of the material; with practice this latter method may be used very successfully, giving almost as neat a finish as the overhanding with a great saving of time.

An old rule was, "cut off all selvages," the

reason being that they draw in washing. Experience has shown that a good selvage may often be used to advantage in making a neat, flat finish. When it is stitched down to the body of the garment it will not draw in washing. It should always be removed in making a French seam.

Hemming Towel and Sewing on Tapes

Materials.—½ to 1 yard linen crash, glass or huck toweling.

No. 7 needle.

No. 60 white thread.

3 inches of linen tape ¼″ wide.

Individual hand towels for use at school or hand or dish towels for use at home may be made as the teacher thinks best.

1. Straighten the edges of the cloth.

2. Fold both raw edges toward the same side, creasing well ⅛″ to 3/16″ from the edge. (⅛″ will not be sufficient if the material is coarsely woven.) Turn again and crease, making the finished hems ¼″. Baste to hold in place while the permanent stitches are being put in.

Note: Hems may be creased by using a hemmer on the sewing machine (without thread). This is a practical short-cut method.

3. These hems may be secured with the ordinary hemming stitch or by using French hem-

ming. The latter method is suggested here to give practice in the French hemming.

To sew on the tape.

1. Fold tape as shown in illustration, turning the raw edges toward the right side.

2. Place the tape on the wrong side of the hem either in the center or at one end. The folded edge should be placed at the lower edge of the hem.

3. Hold the wrong side toward you and hem around the three sides, using small stitches and close together so that the tape may be secure.

4. Overhand together the edges of the tape which lie over the hem.

5. Turn to the right side. Turn the tape back, bringing the folded edge at the edge of the hem. Overhand these edges together.

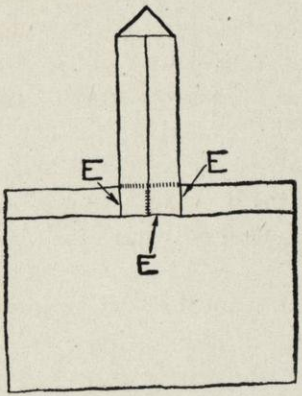
The hemming could also be done on a napkin if in any case that seems more practical.

Outing Flannel Petticoat

Use outing flannel of a quality that will wear well, but avoid the very heavy variety on which it will be difficult for the young child to do nice handwork.

To determine the amount of material needed, measure the child's skirt, allow two or three inches for a hem, and if the child is growing

rapidly it may be well to allow for a couple of ¾″ tucks.[1] These may be placed just above the hem and taken out as the child grows. From 1½ to 2 lengths will be needed, depending on the



E—Hem These Edges, Sewing on Tape

age of the child, making allowances for hem and tucks as suggested above.

Cut off a lengthwise strip for the band 2¼″ wide and as long as the waist measure plus 2″. The extra 2″ allows for the placket and turning in at the ends. Also cut a piece of selvage 1⅞″ wide and twice the length of the placket. The opening for the placket should be about 8″ or 10″ long, depending on the size of the

[1] Remember the child will grow while you are working on the garment and allowance should be made for this growth—from 1″ to 2″.

child. Lay aside these two pieces and do not remove the selvages. Divide the large piece of the material crosswise into two equal parts. If two breadths are to be used, use both pieces; if one and one-half will give sufficient fullness divide one of the pieces lengthwise and use one of these with the large piece. Two girls about the same size might get their material together and so use all the material. Place pieces together so that a selvage and a raw edge come together. Baste the two pieces together for felled seams and sew, using two runs and a backstitch. Remove basting and trim the raw edge, leaving about ⅛", fold the selvage over the raw edge and secure with hemming stitches.

Placket.—Cut opening the length necessary for the placket in the large piece halfway between the two seams. Follow directions given for placket No. 2.

Putting on band.—Find the center front and mark with a pin. Begin at the placket and put in a gathering thread, stopping at the center front. Start again with a new thread at the center front and continue to the placket on the other side. Leave a few extra inches of thread in each case and knot the end or wind it around a pin to prevent it from being pulled out.

Place the piece which was cut off for the band lengthwise in front of you with the right side up, and the raw edge toward you. Measure

over 1½″ from the right-hand side and mark with a pin. Find the center of the remaining amount and put in a pin. Place the right side of the band to the right side of the skirt with the pins marking the center of the skirt and the center of the band together. This brings the extra allowance on the band over the extension part of the placket. Pin at the ends, allowing ¼″ to be turned under. Arrange gathers so that the greater part of the fullness comes at the back. Baste and then sew with a backstitch, holding the gathers toward you.

Hem.—Turn raw edge toward the wrong side ¼″. Since this material will not crease it must be basted to hold it in place until the hem is turned. A cardboard gauge will be an aid in putting in the hem. The hem may be secured with the hemming stitch or by featherstitching.

Tucks.—If tucks are to be put in, looking forward to increasing the length at some future time, use a fine running stitch so that it may be taken out easily. Leave about ¼″ between the top of the hem and the edge of the first tuck, and the same between the tucks.

CHAPTER VII

USE AND CARE OF SEWING MACHINE

Sewing machine.—A sewing machine is a valuable aid in teaching sewing. Sufficient handwork may be given in connection with the machine-made garments to afford the practice which will give the necessary skill in hand sewing. Is it not reasonable to teach the girls, while in school, the methods which they must and should use later on? Most of them will be busy housekeepers some day without a great deal of time for hand sewing. It therefore seems unfair, to say the least, to require hours and hours of time to be spent sewing up long seams by hand. Sewing machine companies make special prices to schools, usually quite a reduction. If you cannot persuade the school board to buy a machine for you, you might borrow or rent one the first year until you can demonstrate that the results warrant the expenditure. Possibly you could raise part of the money by a school entertainment or in some such way. If you cannot buy, beg, or borrow a machine, allow the children to stitch the long

seams at home. Be sure the work is carefully pinned or basted in place and also that the child knows exactly what to do before allowing the work to be taken home. There is always the possibility of mistakes when work is done away from your supervision, but in this case it is a question of choosing the lesser of two evils.

There are several good makes of machines and in general it is best to choose one which has an agency in your community. This will give you access to an agent who can keep the machine in good condition. With a number of inexperienced people using a machine it will get out of order from time to time and need the attention of one who understands it thoroughly. The machines having a round shuttle with a rotary or oscillating movement run more quietly than the old-fashioned long variety. The round bobbins hold more than the others and so do not need refilling as often.

Use and Care of Sewing Machine

General Directions.

Keep all attachments in their proper places.

In adjusting attachments see that they are pushed on as closely as possible and screwed tightly.

Before sewing see that every part is oiled and

wiped, and when through clean away all lint and dust.

Do not run the machine rapidly and then make sudden stops.

Do not run the machine when it is threaded unless there is cloth under the foot.

To turn a corner, lower the needle so that it will hold the cloth firmly; then raise the presser foot and turn the work, using the needle as a pivot.

Do not pull the cloth when stitching.

Before removing cloth raise the needle and the take-up to the highest point, then pull the cloth backward under the presser-foot and cut on the thread cutter. Do not pull thread toward you—it bends the needle.

See that the needle is set correctly, and never try to use one with a blunt point. A fine stitch made with a blunt needle will cut the material.

In setting the needle be sure it is correctly placed, shoved up as far as it should go, and that the screw is tight.

Consult your instruction book for means of regulating the stitch.

The stitch should not be longer than three or four threads of the goods.

Test the stitch on small sample before beginning work again if some one has used the machine since you left it. The size of the stitch

should be kept the same throughout your garment.

When finishing a seam, stitch back at least eight or ten stitches. Be especially careful when stitching pockets on aprons or other such points where there is unusual strain.

Be sure the tension is not too tight, especially for wash goods. The strain of washing and ironing will tear the thread. Rather have the tension too loose than too tight.

Causes for thread breaking.

I. If upper thread breaks see if—
   a. Machine is properly threaded.
   b. Needle rubs against presser-foot.
   c. Upper tension is too tight.
   d. Needle is set properly.
   e. Needle is correct size for thread.
   f. Eye of the needle is sharp or rough.
   g. Point of needle bent or broken.

II. If lower thread breaks see if—
   a. Bobbin is too full.
   b. Bobbin is unevenly wound.
   c. Bobbin case is correctly threaded.
   d. Thread slipped over the bobbin in the shuttle.

If the stitches slip see if—
   a. Needle is bent.
   b. Needle is set incorrectly.
   c. Needle is too fine for thread.
   d. Shuttle point is broken.

If the material puckers see if—

a. Tension is too tight above or below.
b. Too much or too light pressure on presser-foot.

Do not attempt to regulate tension without consulting the instruction book.

Before beginning work on the articles or garments, practice on waste material until you are sure of doing the work correctly and neatly.

A good exercise for machine practice is to rule a piece of paper with several parallel lines. Without thread on the machine have the pupils stitch, following these lines as closely as possible.

The larger part of the presser-foot should always be at the left of the line which is being followed.

Design for undergarments.—In choosing the design for a garment, simplicity should be kept in mind. This is especially true when planning those garments which will be worn frequently. The question of laundering is an important one. A simply trimmed garment will stand laundering so much better than the elaborate lace adorned one. The kimono gown, simple princess slip, and chemise, finished with a little good lace or embroidery and possibly some hand embroidery, show much better taste than the type often seen bedecked with yards of cheap lace and ribbon.

The following points should be kept in mind when choosing material for undergarments:

1. Purpose of the garment.
2. Amount of dressing in material (can be estimated by allowing the light to shine through, by rubbing between the hands, or by washing a sample and comparing it with the original).
3. Comparative strength.
4. Width—often wide materials cut to better advantage and avoid piecing.
5. The amount you wish to spend.
6. Transparency—very sheer material for gowns is immodest. Sheer material in a princess slip necessitates an extra petticoat if worn with thin dresses.

Cotton crêpe, which has been used so much the last few years, is well deserving of its popularity because it saves work in ironing. Some object to the serpentine crêpe for nightgowns because it has a tendency to form in uncomfortable rolls under the body. The seersucker crêpe does not do this.

Much of the crêpe on the market at the present time is very sheer, but firmer qualities are also manufactured.

The choice of trimming depends largely on the kind of material to be used. A firm material requires a cambric embroidery or a heavy lace, etc. The trimming should be suited to the material. It should look as if it belonged

with it. The edge of the trimming usually receives the most wear and, therefore, it is important to choose a piece with a good firm edge.

Insist that pupils choose simple, durable, and inexpensive trimming for the garments they make. Help them to see that there is greater beauty in good material, a little nice trimming, and good workmanship than in the over-trimmed garment.

Apply the following questions when deciding between two or more possible methods.

1. Which gives the greatest strength?
2. Which makes the best appearance when finished?
3. Which requires the least time?

That giving the best results in the shortest time should be chosen.

Kimono Nightgown

Pattern.—The kimono gown could be drafted very easily. It is so simple that it is hardly necessary to buy a pattern. If you wish to, use a commercial pattern, having each girl adjust to her measures, keeping the bottom the desired width. The length from shoulder to floor, bust, and length of arm from neck to elbow should be considered in modifying the commercial pattern.

Material.—The kimono nightdress may be

made of a material suitable for summer wear or of outing flannel for use in winter. The season of the year should determine what material should be used.

The amount required will be twice the length from the shoulder to the floor plus the allowance for the hem.

Trimming of some kind should be placed around the neck and sleeves. The amount needed may be determined by measuring these places.

Cutting.—If the drafted pattern is used, fold material crosswise and place pattern at folded edge. Cut out, allowing 2″ for hem, if allowance was not made on the pattern. It is well to finish cutting the neck with the garment on the figure to be sure it will be just as you want it. The neck may be round or square or pointed as desired.

Seams.—Either French or felled seams may be used. The seams may be sewed up once on the machine and then felled down by hand. This makes a good combination of hand and machine work. French seams sewed both times on the machine will give more practice in machine work. The kimono nightgown is a good garment on which to begin machine sewing because of the long straight seams. Use pins instead of basting on the long seams. Make seams as narrow as possible.

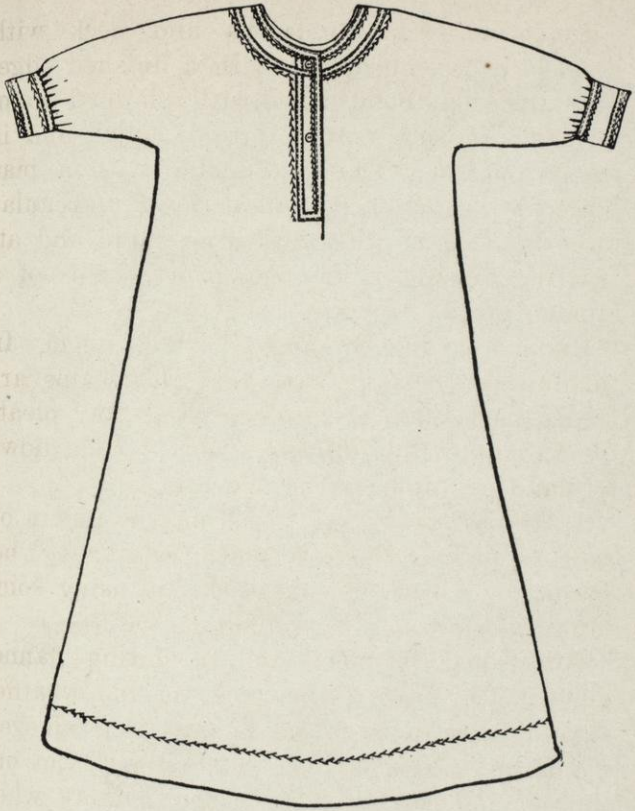
Finishing.—Finish sleeves and neck with linen lace or embroidery with a finished edge. The latter may be attached with a lapped seam. It makes a very simple, durable finish and is easily put on. Trimming made with a bias piece of the material, caught down at regular intervals, makes an extremely simple and attractive finish for the neck and sleeves of a kimono gown.

Using a cardboard gauge, mark a 2″ hem. In turning the hem be sure that the seams are folded back upon themselves. Use tiny pleats to distribute the fullness evenly. Hem down by hand or stitch on the machine.

If desired, three ¼″ tucks may be put in on each shoulder. Baste in place, leaving ½″ between the tucks. Secure tucks by using some fancy stitch as featherstitching.

Additional problems on an outing flannel gown.—The gown to be worn in cold weather should have a high neck and long sleeves. Finish neck as shown in illustration. Cut out just enough to make it fit comfortably when buttoned at the neck.

Cut or tear an opening on the center front line, about twelve to fifteen inches down from the neck. This opening must be of sufficient length to allow the garment to slip on and off easily. To finish the placket see previous directions. The last suggestion will do very



KIMONO NIGHTGOWN

nicely for this first garment. It is the most simple method suitable for this garment and will look neat if carefully done.

To finish the front and neck as shown in the illustration, baste bias lawn tape, beginning at

the neck ¾″ from the center of the finished placket. Continue straight down ½″ below the opening. Turn a square corner and run across to the edge and then up and around the neck. The edge of the tape should come just to the edge of the opening down the front. Baste the second row of bias tape so that the space between the two rows will be the same as the space between the two rows down the front. Stitch around both sides of the bias tape and ornament with featherstitching if desired.

To lengthen the sleeves.—Attach a piece of sufficient length by using an ordinary seam, catchstitched down on the wrong side. The warp threads in the piece sewed on should run around the sleeve as in the rest of the sleeve.

To finish the bottom of the sleeves.

1. Gather the sleeve into a straight cuff about 2″ wide when finished, and trim with the bias bands and featherstitching to harmonize with the neck and front. The easiest method, and a very satisfactory one, if carefully done, is to join the cuff to the sleeve before the seam is sewed up. Care must be taken to have the edges of the cuff and the bias bands match when the seam is sewed.

a. Gather the bottom of the sleeve into such an amount as will allow the finished sleeve to slip over the hand easily. Place the cuff to which the bias bands have been stitched with

the wrong side of the sleeve and the right side of the cuff together and baste. Turn to the right side, fold under the raw edge ¼", baste so as just to cover the gathering thread, and stitch.

b. To attach the cuff after the seam of the sleeve has been sewed, proceed according to directions given above except that the cuff must be sewed together before being turned back and stitched or hemmed down to the right side.

2. The bottom of the sleeve may also be finished as follows:

Baste and stitch as narrow a hem as possible in the bottom. Put in a gathering thread 1½" above the hem. Fasten the thread so that it will slip over the hand easily. Cover with a band of bias tape. Another gathering thread and band of the bias tape might be placed about 1" above the first if desired.

Buttons and buttonholes.—Place buttons and buttonholes down the center front three or four inches apart. See directions for making buttonholes and sewing on buttons. Have the pupil make a sample buttonhole on a scrap of cloth before attempting one on the garment. This is essential, as a buttonhole cannot be taken out and done over.

Calculate cost of material used. Keep track of the time spent in making the garment and estimate the value by counting five cents an

hour for beginners and ten cents an hour for a more experienced person.

Compare material, workmanship, style, finish, and cost with a similar ready-to-wear garment. This should be done for each garment that is made.

CHAPTER VIII

STUDY OF LINEN MATERIALS

Linen.—It is difficult to tell just when or where linen was first used, but historians agree fairly well that Egypt probably first discovered the value of the flax plant as a source of linen. The earliest picture writings show that the linen industry was well developed. Genesis 41:42 tells us that Pharaoh arrayed Joseph in vestures of fine linen and there are other references to flax in Egypt. This was about 1715 B. C. The reference to "fine linen" would indicate that the industry had reached a high state of development. Mummy cloths 4,000 years old show linen of quite a fine quality.

From Egypt linen culture spread to Babylon, to Greece, and to Rome. Great encouragement was given to it in Italy, and guilds were later formed to regulate and protect the linen trade. All over Europe during the Middle Ages, and until the invention of power spinning, linen was used almost entirely where we use cotton today. Since the industrial revolution, cotton has replaced linen for many purposes. It can never

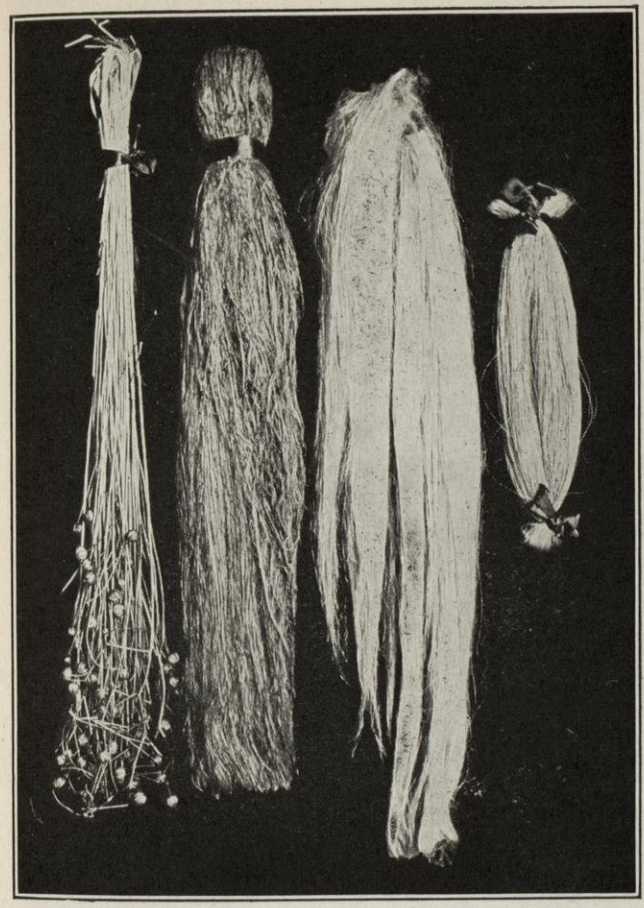
replace linen for table service and many other purposes because it lacks luster, smoothness, and the splendid laundering qualities.

Ireland, Belgium, Holland, Germany, Russia, France, parts of the United States and Canada are raising large quantities of flax at the present time. Russia produces more than one-half of the world's supply, but Ireland and Belgium rank first in quality. Flax culture must be divided into two branches, culture for fiber and culture for seed. In the United States flax is raised almost entirely for the seed. The relatively small amount of flax manufactured is imported and used largely for coarse fabrics, twine, and thread.

The flax plant requires a temperate climate and a rich soil, if it is to be used for fiber, as the growth must be rapid. An even, moist temperature and low altitude produce the best grades of fiber.

The seed is sown early in May and it is grown and ready to pull by the last of June. The plant grows to from a foot and a half to three feet in height and bears a delicate blue flower. Before the seed is entirely ripe, and when the stalk of the plant has turned yellow about two-thirds of the way down, the flax is harvested. It is pulled instead of being cut to save all the available fiber.

Linen is the bast fiber of the flax plant, and



FLAX IN DIFFERENT STAGES OF ITS PREPARATION FOR WEAVING

to separate it from the rest of the plant is a long and tedious process. Weaving linen is rather more difficult than weaving cotton. The fiber is not so elastic, and when there is a sudden strain breaks instead of stretching as cotton does. Coarser linens, such as Russian crashes, are still woven on hand looms by peasants in different countries. Fine damask, woven for so long on hand looms, is now done almost entirely on power machines.

Bleaching may be done at one of two different times: (1) immediately after retting, or (2) after the cloth is woven. If it be done most carefully it requires a combination of many washings, treatments with bleaching powder, rinsings, grass bleaching—processes requiring not only weeks of time, but proper fields upon which the cloth may be spread and favorable weather to do the grassing.

The modern process in the United States is accomplished almost entirely by chemicals. It is treated with sodium carbonate, bleaching powder, and dilute sulphuric acid successively, being thoroughly washed between these operations. Ireland, famous for its beautiful linens, uses the first method.

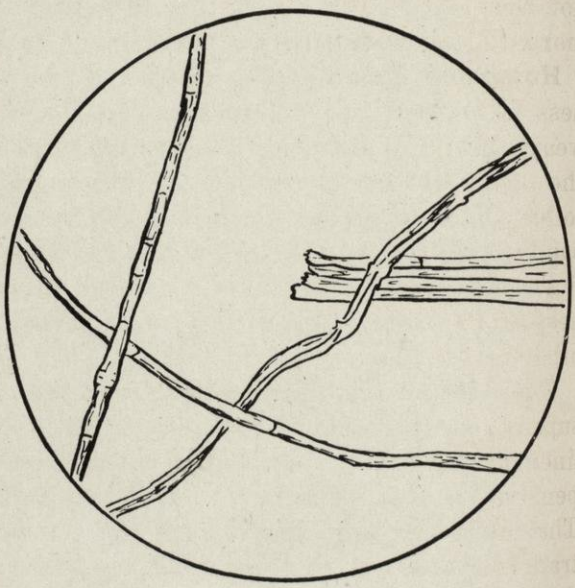
Linen loses from 25 to 30 per cent in bleaching and becomes weaker as it becomes whiter. The loss of tensile strength is much more marked when chemicals are largely used than

when the natural agents, sun and air, do the work. This partially explains the great difference in wearing quality between the old homespun and the modern machine-made linens. After bleaching, the material is washed, dried, starched, and ironed to give it a glossy appearance. The heavy pressing after the addition of sizing materials not only gives a good finish but also makes it possible to handle the linen in the store without destroying its finished appearance. Sizing, when added in excess, makes a poor grade of cloth look well, but after washing, the material often disappoints the buyer.

Physical Characteristics of Linen Fiber

Good flax fiber, when separated from the stalk, should be from 12 to 20 inches in length, and will vary greatly in fineness. It is stronger than cotton but lacks elasticity. Under the microscope the flax fiber is seen to be a long, cylindrical tube with transverse markings or nodes at more or less regular intervals. (See illustration.) The fiber is composed of cells consisting almost entirely of pure cellulose. The color varies from yellowish white to brown and from pearl to steel gray, the best quality being pale yellowish white. The variation in color is due quite largely to differences in the process of retting.

The ability of linen to absorb water without feeling damp is low, varying from 5 to 8 per cent, but the absorptive power is unusually high. It is this quality which makes linen an especially valuable material for towels.



Flax Fibers

Luster is one of the most prized assets of linen and is retained as long as the fiber lasts. The process of retting may affect the strength and luster to some extent if allowed to continue after the resins are dissolved.

Compared with the other textile fibers linen is the best conductor of heat and electricity. It is this property which makes linen feel cool to the touch.

Toward mordants and dyestuffs, linen does not react so readily as cotton, therefore it is more difficult to set dye in linen cloth.

Household linens.—Because of its smoothness of texture, its brilliancy, and its excellent wearing and laundering possibilities, linen is the one fiber best suited for the table and the toilet. The very fact that it does not take dyes easily makes it easier to remove stains from linen than from cotton, and the satin smoothness of the cloth keeps it clean longer than another material.

Table linen.—Ireland, Scotland, and Germany supply us with most of our table linens. Irish linens are the best and likewise the most expensive, running from $0.75 to $3.00 a yard. The John Brown linen, with the shamrock trade-mark, is one of the well-known brands of dependable quality. The Scotch linens have excellent patterns and run from $.50 to $2.00 and over per yard. German damask, which is very durable owing to its having a closer, harder twisted thread than the others, runs from $0.50 to $1.50 a yard. French damask is noted for its exquisite designs and effective appearance; the thread is fine and round. There is a wide range

in quality from the most expensive to cheaper grades.

When buying linens, rub between the fingers to remove the starch and choose those which are firm and heavy with not too fine a thread. A consideration of the pattern is not only important from the standpoint of design but of wearing quality as well. A large figure with long overshot threads will not wear so well as the one with a smaller design and shorter threads on the surface. The reason for this is very obvious but is often forgotten when purchasing table linen.

Bed linen.—Although most attractive in appearance and most durable, linen is not the most satisfactory material to use for sheets and pillowcases as it is so easily wrinkled and furthermore feels damp and chill when brought in contact with the body. The high price of linen is also a point against its common use in this way. Linen sheeting ranges in price from $1.50 to $2.50 per yard. Hemstitched linen sheets may be purchased for about $7.50 per pair. The tubing for pillowcases ranges in price from $1.00 to $1.25 per yard and the ready-made pillowcases from $1.25 to $2.00 per pair.

Toweling.—The quality of easily absorbing moisture which is a characteristic of linen makes it suitable for use as towels. The checked glass toweling is excellent for drying

silver and glassware, while for heavier dishes medium weight crash will give satisfaction.

Hand towels of Irish huckaback give the best satisfaction, being fine and soft and yet firmly woven. The familiar cotton Turkish towel is now duplicated in linen which after one or two launderings to remove the harshness is a delight to use.

Because linen brings a much higher price than cotton, and because cotton may be finished to resemble linen, dishonest dealers frequently deceive the buyer into paying for a product which she does not receive. Sometimes the two fibers are mixed, and again cotton alone is heavily starched and given a linen finish which is hard to distinguish from the true fiber.

Distinguishing Between Cotton and Linen

1. Linen feels smooth, cool, heavy, and leathery, compared with cotton. It is more lustrous than cotton and takes a greater luster in ironing.

2. Untwist a cotton and a linen yarn. Pull apart slowly and steadily. Ends of cotton fibers curl, linen fibers remain stretched and pointed.

3. Tear material and compare edges. The torn edge of linen is more irregular.

4. Apply glycerine or oil. Cotton remains opaque and linen becomes translucent. Place

over dark background or hold up to light to make the difference more apparent.

5. Burn material. Burnt end of cotton is tufted, and same of linen is rounded.

6. Ink dropped on linen is quickly absorbed and makes a spot with a regular outline; while on cotton the absorption is slower and the remaining spot has a much more irregular outline. Often ink will be drawn out along the separate cotton fibers for some distance. This is due to a difference in the capillary attraction of the two fibers.

This test involves somewhat the same principle as the old test of moistening the finger and putting it under the material but is much more satisfactory.

NOTE.—No one of the above should be taken as absolute. Try several before making final decision. Wash the samples thoroughly to remove the dressing before applying the tests.

Manufacturers have become so clever that they are able to treat cotton so as to make it look and react very much like linen.

Test several samples of linen and cotton and label as your judgment indicates.

SUGGESTIVE REVIEW

1. Linen—history, growth, and manufacture. Historical references to linen. Main processes

in the preparation for spinning. How is linen bleached—two ways.

Where is flax raised on a commercial basis for seed? For fiber? Plant some flax in a large sponge. Keep it moist and the flax will grow quickly, furnishing some attractive green for the schoolroom. The children will be interested in seeing it grow and flax and linen will thus be made more real to them.

2. Appearance under the microscope. (See illustration.) Properties as to heat conduction, luster, elasticity, tensile strength, and absorption. Review appearance and properties of cotton fiber, comparing it with linen. Tests for distinguishing between linen and cotton.

3. Household linens—reasons why linen is preferable for table linen and towels. Kinds of table linen and toweling. Get together as many good sized samples as possible to illustrate varieties and qualities. Emphasize the value of learning to judge by appearance and feeling. This means experience with materials and while not always reliable is a valuable aid in determining the quality.

CHAPTER IX

SEAMS AND HEMS. MAKING AN APRON, CHILD'S PRINCESS SLIP AND DRAWERS

French felled seam.—This seam is used when gathers are to be sewed on the edge of a straight piece.

Place the wrong side of the gathered piece to the wrong side of the straight piece, baste and stitch a seam having the stitching coincide with the gathering thread. The ruffle may be gathered and stitched on to the straight piece at the same time by careful adjustment of the gatherer. This may save time and it may not, depending on the time it takes to adjust the gatherer. Trim raw edges, leaving not more than ⅛". Holding the wrong side toward you, fold the straight piece over the seam, making the seam as narrow as possible. Baste and stitch, having the gathered side up and the stitching as close to the fold as possible. This method of attaching gathers does not interfere with the fullness and gives the appearance of a French seam. A seam very similar to this is often used on the long seams of ready-made

garments. It gives a finished seam in one operation which means a saving of time. Place right sides together and pin so that one edge extends beyond the other about 1/16". Hem with the foot hemmer.

Tucked hem.—A tucked hem is begun as the French felled seam and the same directions are followed up to the last stitching. Then open with the right side uppermost and the fell folded back on the plain part of the garment. Stitch on fold close to the ruffle. Turn to wrong side and stitch on fold next to plain portion.

Lapped seam.—Turn raw edge of material to wrong side and raw edge of piece to be joined to the right side. Lap these edges so that both are covered and stitch twice. This method is often used in joining a straight piece of embroidery to a garment.

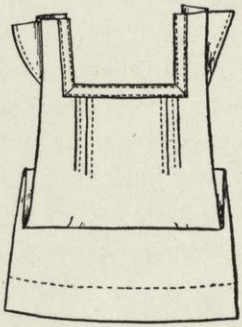
A weighted pin-cushion, which may be made by covering and padding a brick, will be found very convenient when sewing. The work may be pinned to this and held securely while the worker sits erect. A pupil should never be allowed to pin her work to her knee since this usually means bending the back and sitting in a cramped position.

Apron—kimono style.—*Material:* Percale or gingham may be used for this apron. Percale with a white ground and small black dot or figure makes a very neat and attractive apron.

The black and white combination launders very well also, which is another point in its favor.

The amount needed may be estimated after the pattern has been adjusted to the correct size.

Pattern.—Select a pattern similar to illustration.



KIMONO APRON

To increase the width over the bust allow the necessary amount along the center front and center back line.

To decrease the width over the bust remove the surplus at the center front or center back line or put it into tucks as shown in the illustration.

The apron may be lengthened or shortened by adding on or cutting off the necessary amount at the bottom. Allow from 2″ to 4″ for a hem. The side seams may be closed all the

way down, or, if the material should not be wide enough to allow the slant of the underarm seam to be continued to the bottom, the lower part may be hemmed, bound, or faced and left open.

The sleeve may be lengthened or shortened as circumstances require, with very little trouble. The neck may also be varied as desired.

Cutting.—Fold the material in half crosswise, being careful to have the selvages together. This will bring the fold of the material in line with a weft thread. Place the pattern with the top on the fold and either at the extreme right or left side of the material. This will leave the surplus material in as large pieces as possible. Pin pattern in place and cut out the apron.

Making.—Cut down the center back line about 10″ or 12″, or enough to allow the garment to slip on and off easily. Face back the left side, making the facing ½″ when finished, and turn a ¾″ hem on the right side. To finish the raw edge of the faced piece at the bottom of the placket, turn the edge under and hem it down neatly, or cover with a rectangular piece of similar material and stitch in place. If the first method is used, it will be necessary to stitch with a machine or backstitch by hand across the bottom of the placket on the right side to make it secure.

To finish the neck.—Use a bias facing around

the neck as shown in the illustration. To cut strips on a true bias, fold material so that the warp threads in the material are parallel to the weft and cut on the folded edge. Strips cut from either of these edges will be a true bias.

If tucks are to be placed in the front, it should be done before the facing is put on. They should be stitched down about 5″ or 6″.

Place the right side of the bias piece to the wrong side of the garment. Baste in place, being careful not to stretch or full the bias edge. When attaching a bias piece to a curved place, it is necessary to full one side and stretch the other in order to make it lie smoothly.

Seams.—Use French seams at the sides, making them as narrow as possible. If the seams are to be left open part way up, the raw edge should be finished before the French seams are put in.

Hem.—Follow directions given for other garments.

Sleeves.—Baste in a narrow hem and hem by hand or stitch on the machine, preferably the former, to give practice in hemming.

NOTE.—A white apron with sleeves, trimmed with lace, might be given to an advanced grade or as extra work to a girl who works more rapidly than the others.

Child's princess slip.—*Material:* Use a soft-

finished, rather sheer material so that the garment will not be too clumsy at the waistline. A simple, durable trimming suited to the material should be used.

The amount of material and trimming needed should be carefully estimated after the pattern has been adjusted to the individual.[1]

Pattern.—Use a pattern similar to illustration.

Use a pattern which is a little larger than the child needs. Adjust it to fit the child, making allowances for seams, hems, and growth.

Cutting.—Fold the material lengthwise, so that the double width of the material is as wide as one-half the pattern at the widest part with the folded edge parallel with the warp threads. Place the larger part of the front at the cut end with the center front on the folded edge of the material. In placing the back, slip the neck up into the end you have just cut, and so save as much material as possible. A great deal of material may be wasted through thoughtless placing of patterns on material preparatory to cutting and, therefore, care should be exercised at this point.

The bottom may be finished with a hem or ruffle as desired. This question should be de-

[1] Allow 1¼″ to 1½″ per yard for shrinkage. The material may be shrunken before making up, but it is more difficult to work on after the dressing has been removed.

cided before the garment is cut and allowance made on pattern. If possible plan to make the garments with a ruffle on each one, so that the pupils may have the new problem of setting on a ruffle.

CHILD'S PRINCESS SLIP

Seams.—Use French or felled seams on the sides.

To finish the neck or armseye.—The neck and armseyes should be finished with a continuous strip of trimming. Novelty lingerie trimming would make an inexpensive, attractive, and durable finish. A narrow linen lace would also serve the purpose nicely. If the trimming

chosen is finished on both edges, it may be attached by turning the raw edge of the garment toward the wrong side and creasing it about ⅛″ from the edge. Place the trimming on the wrong side, covering the raw edge. Baste and stitch twice, once at the folded edge of the garment and once at the edge of the trimming. When turning corners, lay the surplus material in pleats.

A buttonhole should be placed in the point, which laps over the front, on the shoulders. Determine the place for the button by lapping the end at the shoulder the necessary amount to make the garment fit correctly. Mark the place directly under the buttonhole with a pin. Place a button at this point.

To finish the bottom.

1. *With a hem.*—A 2″ or 3″ hem may be used. In that case follow directions which have been given previously.

2. *With a ruffle.*—The ruffle should be at least 4″ wide, as a narrower one is difficult to iron. The amount of fullness depends upon the prevailing styles, varying from 1¼ to 1½ times the part to which attached. Embroidery, material edged with lace, or material hemmed and tucked may be used for the ruffle.

Joining of ruffle.

1. If embroidery is used for the ruffle, match the pattern as nearly as possible and join, using

an overhanded French seam, a very narrow felled seam, or an ordinary seam closely overcasted.

2. If ruffle is to be edged with lace, join with a narrow French seam, crease hem, open, and stitch lace ⅛″ below crease. Turn back and stitch hem.

3. A hemmed and tucked ruffle should be joined by narrow seams and made continuous, then hemmed and tucked. The seams, above the tucks, should be overcasted. (French seams might be used if the material is not too heavy.)

Attaching ruffle to garment.—Divide ruffle and the bottom of the garment into four parts and mark divisions with pins placed at right angles to edge of material. The ruffles may be attached by using a tucked hem or French felled seam or by using white bias binding as follows:

1. Place wrong sides together with pins matching. Care should be taken to avoid having a seam come at or near the front. Draw up the gathers, distribute fullness evenly, pin, baste, and stitch.

2. Remove basting, trim seams, and turn up. Cover the raw edges with white bias binding, placed so that the lower edge just covers the stitching. Stitch as close to the edge as possible.

Drawers.—Either open or closed drawers may be made, as preferred.

Decide on the pattern, alter to correspond with pupil's measures, and submit original and corrected patterns together with measurements.

If the pattern was purchased to correspond with the waist measure, few changes should be necessary except possibly in the length. Take the measurement from the waistline to the knee on the side and also in the back when seated. The back should be about ⅛ of the hip measure longer than the front. The finished garment should come just to the knee.

In changing the length, alter it in two places, unless the amount is very small, halfway between the waist and seat line and halfway between the seat line and bottom. A change of 1″ or less may be made at the bottom. Seams should always be allowed on a pattern to avoid mistakes in cutting and should be traced so that the garment may be put together accurately.

To calculate amount of material.—Do not rely on estimate given on commercial pattern. Estimate amount needed, using a corrected pattern which has been cut off or turned back the depth of the ruffle minus ½″. Make allowances for facings or placket, band, and ruffle if same material is to be used. Calculate amount of ruffling (straight or bias) by taking 1¼ to 1½ times the part to which it is to be attached. Ruffling should be cut across the warp threads or on the bias. Embroidery, material edged with lace,

or material hemmed and tucked may be used for the ruffle.

The ruffle should not be less than 4″ wide when finished, as a narrower ruffle is more difficult to iron.

To cut out the drawers.—Straighten the raw edges of the material by cutting on a thread or tearing straight across. Fold the cloth, placing the raw edges together. Place pattern on material with the bottom on the edge of the goods. Pin in place, trace seams, and cut out. Before removing pins make two or three short traced lines at right angles to the seams. They will serve as connecting points when garment is put together. This method of marking is preferable to notches, as the latter may be accidentally cut too deep.

To make the drawers.—1. If a ruffle is to be used, it may be put on at this time or after the legs have been sewed together. If put on at this time, proceed as follows: Gather ruffles on the machine or by hand; divide ruffles and the bottom of each leg into four parts and make divisions with pins placed at right angles to the edge of the material. Place wrong sides together with seams and pins matching, distribute fullness evenly, pin, baste, and stitch. Remove basting, trim seam, and turn up. Cover the raw edges with white bias binding, placed so that the lower edge just covers the stitching. Stitch

as close to the edge as possible. A tucked hem might also be used as a finish.

Put ruffle on the other leg in the same way, being careful to see that both are not for the same leg.

Closed drawers.—Pin or baste the two front edges together, having the seam come on the wrong side. Stitch on traced line. Stitch back seam in the same way. Pin together at the center before trimming for felled seams. Care must be taken at this point, as there is no remedy if the wrong side is trimmed. Both seams should be turned the same way so as to appear continuous. Follow directions given for felled seams.

Place wrong sides together with the front and back seams carefully matched. Pin and stitch for a French seam. This method of stitching the lower seam of the drawers and ruffles at the same time is the simplest, and gives a neat appearance.

Open drawers.—Pin and stitch lower seams and ruffles for French seams, being careful to see that the ruffles and binding with which they are put on are carefully matched. Finished seams should be ⅛″ deep.

Cut bias strips 1¼″ wide and long enough to reach along each front and back. Lay the right side of the bias strip and right side of the leg together. Pin and stitch, using a ¼″ seam.

Turn this bias strip over on to the wrong side, turn in the raw edge, crease, pin, and stitch or hem by hand if preferred. Put strip on the other leg, in the same way.

2. Fold one leg over, right sides together, so that the curved sides which run up from the bottom are together. Baste with a ¼″ seam.

Stitch on traced line and fell down by hand, using fine hemming stitches. (Long straight seams may be felled on the machine, but since these are on the bias they can be finished more neatly by hand.) French seams could be used here if preferred.

Sew the seam in the other leg in the same way, being careful to fold it so that it is not for the same leg as the one just made.

NOTE.—The felled seams should match when the legs are sewed together. Pin together before trimming the seam, that there may be no mistake.

Closed drawers.—Beginning at the felled seams, pin or baste the two front edges together with a ¼″ seam, then the two backs (beginning at the same place).

Stitch seams on the traced line, pin together at the center *before trimming.* Great care must be taken at this point, as there is no remedy if the wrong side of the seam is trimmed. Both seams should be turned the same way and so appear continuous.

Open drawers.—Cut bias strips 1¼″ wide and long enough to reach along each front and back. Lay the right side of the bias strip and right side of the leg together. Pin and stitch, using a ¼″ seam. Turn this bias strip over onto the wrong side, turn in the raw edge, crease, pin, and stitch or hem by hand if preferred. Put strip on other leg in the same way.

Joining of ruffle.—1. If embroidery is used for the ruffle, match the pattern as nearly as possible and join, using an overhanded French seam, a very narrow felled seam, or an ordinary seam closely overcasted.

2. If ruffle is to be edged with lace, join with narrow French seams, crease hem, open, and stitch lace ⅛″ below crease. Turn back and hem.

3. A hemmed and tucked ruffle should be joined by narrow seams and made continuous, then hemmed and tucked. The seams, above the tucks, should be overcasted. (French seams might be used if the material is not too heavy.)

Attaching ruffle to garment.—Divide ruffles and the bottom of each leg into four parts and mark divisions with pins placed at right angles to edge of material.

Place wrong sides together with seams and pins matching, draw up the gathers, distribute fullness evenly, pin, baste, and stitch. Remove basting, trim seams, and turn up. Cover the

raw edges with white bias binding, placed so that the lower edge just covers the stitching. Stitch as close to the edge as possible. The binding should be joined just back of the seam in the leg.

Placket.—For closed drawers, cut an opening over the right hip long enough to allow the garment to slip over the hips easily (9 or 10 inches will usually be sufficient). If an opening is desired on both sides, the cuts may be made shorter. Placket No. 1 or placket No. 2 may be used as preferred.

In open drawers the opening is in the back. The fronts should be lapped over the width of the facings and stitched down about five or six inches, making a V where the two lines of stitching meet in the center. In putting on the band the same general method is followed for both open and closed drawers. It should be lapped about an inch or an inch and a half.

Putting on band.—Gather the upper edge of drawers ¼″ deep. Cut a piece of material 2″ wide and 2″ longer than the waist measure. (Bands should always be cut *with* the warp because of the greater strength of the warp threads.) Measure 1½″ from end, allowing for the extension hem of the placket, and put in a pin. Find the center of the remainder and mark with a pin.

Pin the band to the drawers, placing the right

side of the band to the wrong side of the drawers with the allowance for the extension hem over that part of the placket. Pin at both ends, allowing ¼″ to turn under, also pin the center of the band to the center of the left leg. Distribute the fullness [1] evenly in the front, putting in enough pins to hold in place.

Baste band in place and stitch, having the gathers up so that they *may be kept* in place. Turn in the ends and fold over to the right side.

Baste down, being careful to see that the wrong side is perfectly smooth. Stitch as close to the edge as possible around the four sides of the band.

[1] Darts may be used to eliminate some of the fullness if desired. The fullness in the back should be arranged so that the larger part of the gathers come in the center of the back.

CHAPTER X

STUDY OF SILK MATERIALS

Silk.—The silk industry is supposed to have originated in China about 2700 B. C. The art was known only to the royal family for a long time, but gradually the knowledge spread and it soon became an important industry in China. Later it became known to the people of Japan and slowly it spread through central Asia, Persia, Arabia, Spain, Sicily, and along the African coast. Silk culture was practiced in Italy in the twelfth century and in France in the following century. Most of the silk of commerce is obtained from the cocoons of a certain kind of caterpillar called *Bombyx mori,* or mulberry silkworm, which feeds—as the name implies—upon leaves of the mulberry tree. There are other varieties of silkworm which cannot be cultivated; these are called wild silkworm. They produce an inferior grade of silk called *tussah.* From this wild silk is manufactured the pongee silks of commerce. Most of the raw silk on the market is produced in China, Japan, France, and Italy.

Throughout the succession of changes which takes place in the insect, the greatest care has to be exercised in regard to temperature, quiet, and food. After the moth lays the eggs they are collected and kept cool until time for incubation, which process takes place in heated compartments where the temperature is carefully regulated. The period of incubation lasts about thirty days and then the worms hatch out as tiny little things no larger than the head of a pin. The growth and development of the worm proceed rapidly. Its food is chopped mulberry leaves. There are four molting stages; each time the worm sheds his old skin, and emerges with a new one. This is caused by the body growing faster than the skin. At the molting time, the worm ceases eating and remains in a torpid state for a couple of days, rests a short time to regain strength, and then begins eating with renewed vigor. After the fourth and last molt the worm is 1¼″ long, but in the few days remaining before it spins its cocoon, it grows to 3″ in length. As soon as it has attained its full growth, which seldom exceeds 3″, it is ready to spin its cocoon. It stops eating, shrinks nearly an inch in length, loses in weight, turns pale in color, and seeks a place to which it can attach the cocoon. The web which it forms is composed of a secretion exuded from two glands in the body, which unite into one

common exit tube below the mouth, where also exudes another secretion which cements the two threads together. The double silk fiber is called *fibroin* and the silk glue is called *sericin*. This gum which cements the fibers together hardens upon contact with the air.

The worm forces the silk fiber out by contracting his body, turning his head from side to side, and throwing the fiber around himself in figure-eight loops, until, layer after layer, the cocoon is gradually completed—a process which requires about three days. The cocoon is ovoid in shape and is composed of one continuous thread which is 400-1300 yds. long. After the cocoon is finished the worm passes from the form of a caterpillar into a chrysalis, from which it rapidly develops into a moth. Unless the chrysalis is killed before the moth has developed the cocoon will be pierced and the thread broken, so live steam is applied which kills the chrysalis, and the silk can then be reeled off at any time.

The life cycle lasts about 55 days on the average: (a) 30-40 days as larva; (b) 15-20 days as chrysalis; (c) 6-12 days as moth. A moth lays about 700 eggs in three days; 30,000 eggs weigh 1 oz.

Silk reeling.—Silk reeling is accomplished by soaking the cocoons in warm water to soften the gum and then carefully unwinding the fibers,

twisting several together, according to the size of thread desired, and winding it into skeins. These skeins are put into canvas bags and soaked over night in warm soapsuds to further soften the gum which has stuck the fibers together, then they are hung across poles in a steam-heated room and dried. Following this the silk is wound upon bobbins and spun into thread.

The waste silk from the reeling is mixed with that from the outer part of the cocoons, known as "floss," and is subsequently spun into what is called spun silk. It is treated as a bundle of fine fiber-like wool or cotton, and is spun by textile machinery that is especially adapted to it.

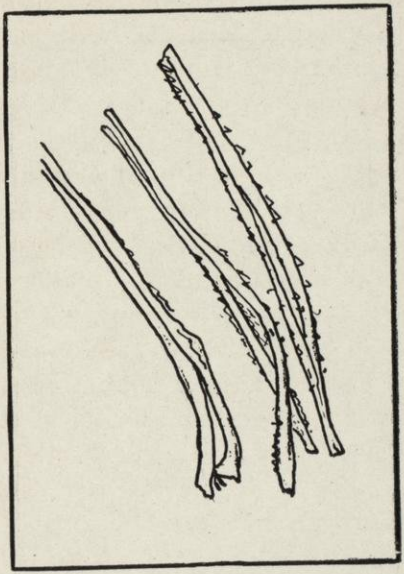
Silk dyeing.—Silk is dyed either in the yarn or in the piece. If dyed in the yarn, the gum is removed by soaking in boiling soap and water, then the yarn is washed in cold water. At this point weighting is often put in—tin, iron, or other mineral salts being absorbed by the fibers. Sometimes there is more weighting than silk, for silk has the peculiar property of being able to absorb certain minerals, and because of this they are much used to deceive the buyer into paying a higher price for silk than it is worth, as weighting makes silk both weak and tender. Silk will take up 50-200 per cent of weighting without arousing much suspicion. The silk is

dyed, the luster restored, and it is then ready for weaving, after which the material is singed to remove loose fibers, straightened, and sized with starch or glue to stiffen it.

Since 1624 several attempts have been made to rear silkworms in America. All have met with failure because of climatic or labor conditions. In some cases the mulberry trees were injured by early frosts and in all cases the low cost of labor in Europe offered a competition that it has been impossible to meet. It is interesting to note that the original Cheney Bros., well known silk manufacturers, made an attempt to raise silkworms in South Manchester, Conn. Some of the mulberry trees, planted at that time, are still standing. Importing the raw material and manufacturing it in the United States has been found to be the best business proposition. There are about 700 establishments for the manufacture of silk in the United States. Paterson, New Jersey, is the silk city of America, having more than 300 mills and employing 40,000 men and women. The manufactured silk that is imported now is confined to the costliest fabrics in broad silks, to fashionable novelties, and to church vestments.

Physical characteristics of silk fiber.—Under the microscope the silk fiber appears as a smooth, structureless filament very regular in diameter and very transparent. (See illustra-

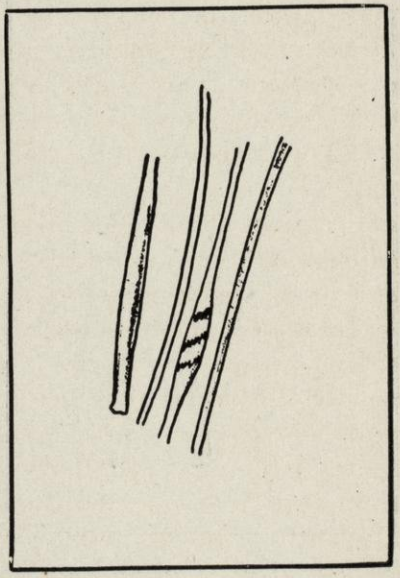
tions.) One striking characteristic of silk is its high luster, which, however, only appears after the silk has been scoured to remove the silk gum. Dyeing and mordanting also affect the



SILK WITH GUM STILL ATTACHED

luster more or less, especially when silk is heavily weighted, and therefore, after dyeing, silk usually goes through a lustering operation in which the hanks are stretched strongly by twisting and at the same time steaming under pressure. By this process much of the luster is restored.

Raw silk will absorb as much as 30 per cent of its weight in moisture and still appear dry. This property is called hygroscopicity, and because of it the amount of moisture in the silk has to be determined at the time of sale and



DEGUMMED SILK

allowances have to be made for it. The amount legally permitted is 11 per cent.

Another property of silk is that of being a poor conductor of electricity. It is, therefore, readily electrified by friction. Silk is the strongest fiber known, said almost to equal the

tensile strength of iron wire of equal diameter. It is also very elastic—raw silk stretching from 15 to 20 per cent its original length in the dry state before breaking. Weighting of silk causes a decrease in both elasticity and strength.

A property which is peculiar in silk is its "scroop"—the crackling sound it makes when rubbed or squeezed. This is the cause of the rustle which characterizes most silk materials, although weave influences the degree to a large extent.

Silk has a great affinity for dyestuffs, absorbing coloring matter very readily. Authorities disagree as to whether this is a physical or chemical process or a combination of the two.

Weighting of silk.—The practice of weighting silk is probably centuries old, for it has long been known that silk possesses a great affinity for tannin, but it is only within the last 25 years that weighting has been in general use.

The boiling off of the gum reduces the weight of the raw silk from 5 to 30 per cent. Since the price of raw silk is about $5.00 per pound it is not to be wondered at that ways have been devised to make up this loss. Harmless additions of plain sugar and sugar of lead were used in the beginning but the demand for cheap silks has brought about an exaggerated and injurious weighting. The throwster may leave an excess of soap and oils in the silk but most of the loss

is made up and weight added in the dyeing process. Silk is very absorptive, it being possible to weight or load it up to five times its boiled off weight. While this is a great advantage to the manufacturer it is unfortunate for the consumer, since the result is the mechanical weakening of the filaments. This may be explained in various ways—first, the stretching of the walls when taking in the metallic weighting weakens the fibers; second, the salts crystallize when exposed to the sunlight, thus cutting the delicate filaments; third, oxidation occurs in the course of time, with a consequent weakening of the fibers; fourth, perspiration causes deterioration because chlorine is freed which causes rotting.

The silk to be weighted is immersed in a series of solutions, with thorough washings between each treatment. The number of immersions is determined by the amount of weighting desired. To heavily weight a silk requires many dippings. Compounds of tin, lead, and iron in solution are most commonly used. White and light colored silks are weighted as well as black and dark colored. This is contrary to the opinion commonly held, but can be very easily demonstrated. Weighting reduces the strength of the fiber greatly. Strehlenart showed a black silk weighted to the extent of 140 per cent was only one-sixth as strong as pure crude silk.

Even a very weak solution of common salt has a pronounced deteriorating effect upon silk that has been weighted with metallic compounds. The salt in the perspiration undoubtedly partially accounts for its disintegrating effect upon silk. The action of sea water also illustrates the effect of a salt solution on weighted silk.

The practice of weighting silks with metallic salts is responsible for the small holes which frequently appear in present-day silks. It also accounts for the splitting, which is so common, as well as the fact that it is difficult to find a silk today which has satisfactory wearing qualities. The silkworm has not lost the art of spinning good silk but the manufacturer has taken advantage of this peculiar quality of silk. While this has made it possible to sell silk fabrics at a much lower price than formerly, it has also produced a condition where it is almost impossible to find silk of the firm taffeta type, at any price, which is free from weighting.

What is needed is a textile law requiring proper labeling of material offered for sale. To quote from an article in Harper's Weekly, "There is at present an agitation in the silk trade to bring about the marking of all silk to show its degree of purity, so that the innocent consumer may be able to buy silk with some degree of intelligence. It is pointed out that, while there are conditions when the adulteration

is not harmful, when the wear is not essential, a law of this kind would greatly increase the standard of quality."

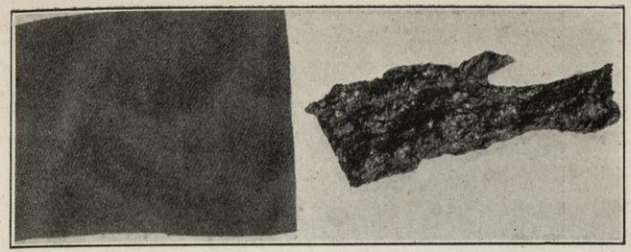
We will not attempt to decide whether the public or the manufacturer is most to blame for the present condition. However that may be, it should be possible to purchase good wearing silks, if one is willing to pay the price.

The simplest test for the detection of weighting in silk is that of burning the fiber. Pure silk when held in a flame burns quickly, melts and runs together, leaving a small quantity of carbon. If burned long enough at a sufficiently high temperature, this residue entirely disappears.

Weighted silk when burned simply blackens and remains in practically the original form. A longer burning would again decompose the black carbon but still leave the mineral matter, usually in the form of a grayish or reddish ash, depending on the mineral used.

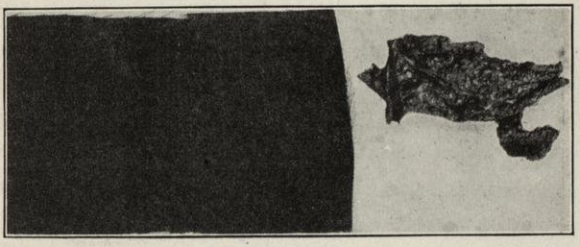
Sometimes the threads one way will be weighted while the others are pure, and less often a piece will be found which has a few weighted threads woven in a design while the bulk of the material is pure silk.

The simple burning with a match is a most practical household test. As a general rule, the less weighting the greater service may be expected from the material. Where the threads



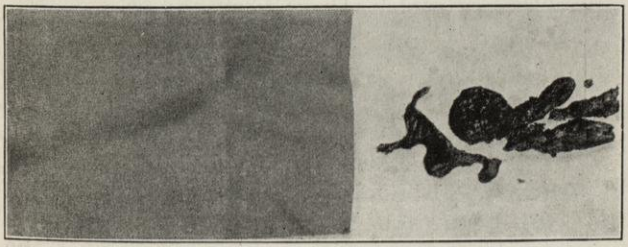
Before After

Chiffon Taffeta



Before After

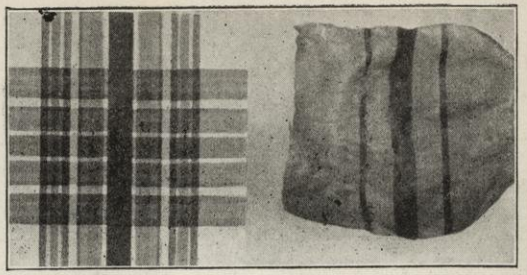
Messaline



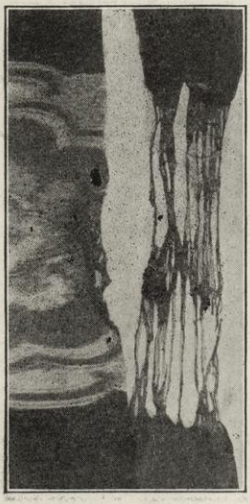
Before After

Charmeuse Messaline

PURE SILKS BEFORE AND AFTER BURNING



Original Residue
Taffeta, 10 inches—65 cents per yard

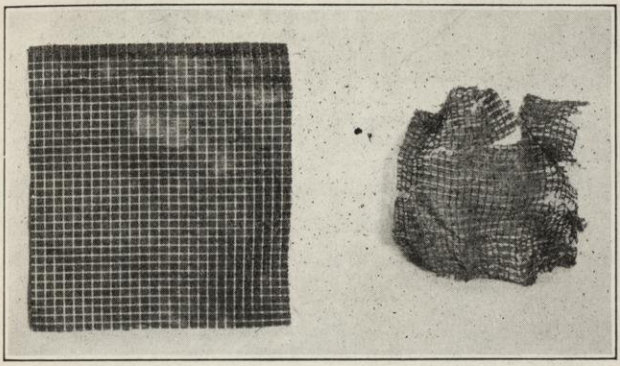


Original Residue
Messaline, 21 inches
$1.50 per yard

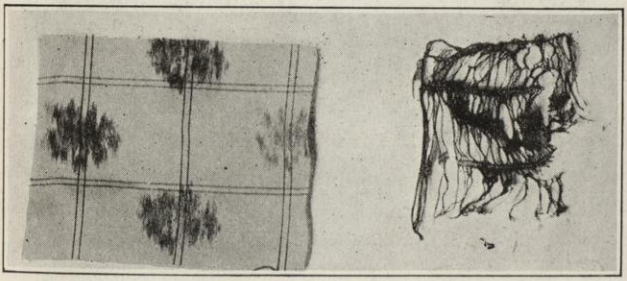
Original Residue
Taffeta, 36 inches
$1.50 per yard

WEIGHTED SILKS BEFORE AND AFTER BURNING

one way are weighted, this rule does not hold good, because if the threads in one direction give way, the material loses its usefulness.



Original Residue

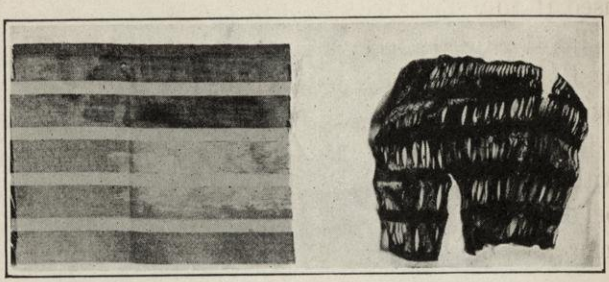


Original Residue

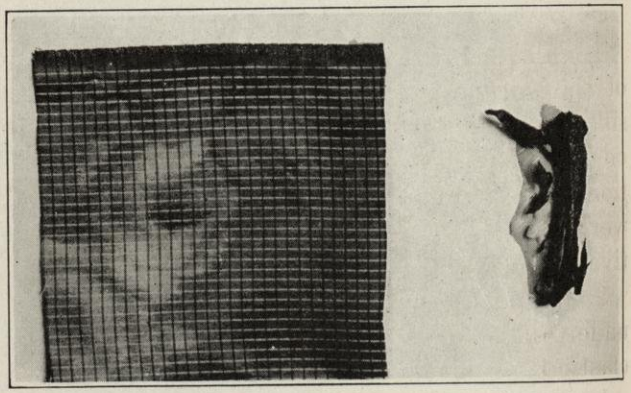
WEIGHTED SILKS BEFORE AND AFTER BURNING

Collect samples which illustrate different ways of weighting. Crepe de chine, crepe meteor, charmeuse, messaline, and foulards are

seldom if ever weighted. Occasionally the taffeta type of silk is found unweighted.



Original Residue



Original Residue

WEIGHTED SILK ABOVE, PURE SILK BELOW, BEFORE AND AFTER BURNING

Wash silks are often part cotton. Perhaps the most common mixture is a cotton warp and silk weft. By exposing the warp and weft

threads separately the difference can often be readily detected. The following test may be used if there is any question.

Treat sample with concentrated hydrochloric acid (HCl). Silk will dissolve much more quickly than any other fiber.

Other silks have been found to be adulterated with linen also. This is not common and may be detected by using the same test and the microscope.

Suggestive Review

1. Silk—growth and manufacture. History of the spreading of the industry. Where are silkworms raised today? Why is their culture on a commercial basis restricted to these sections? Attempts in the United States—why were they unsuccessful? Compare wild and cultivated silks.

2. Properties of the silk fiber—appearance under the microscope, heat conduction, luster, elasticity, tensile strength. Weighting of silk—how accomplished, why continued, effect on the fiber. Burning test using samples of pure silks and silks showing various types of weighting.

3. Artificial silk—how manufactured, where used, why can it not be used to a greater extent in place of real silk.

Review mercerized cotton—compare microscopical appearance of mercerized cotton and silk.

4. Collect as many samples of common wool and silk materials as possible and have a drill to review and teach the names, prices, and uses. This will give an opportunity to emphasize and perhaps make clearer the important points discussed in this and previous lessons.

5. Review—Compare microscopical appearance of cotton, wool, silk, and linen. Have pupils draw the various fibers. Special emphasis should be placed on: the *twist* in cotton which is a great aid in spinning, the *nodes* in linen because the fiber is made up of a number of cells, and the *scales* on wool fibers which affect the heat conduction and shrinkage of woolen materials.

6. Review—Compare heat conduction of the fibers studied. Call attention to the added warmth of a material with a napped surface: fluffy blanket with one which has become matted with careless washing or wear; outing flannel with smooth cotton material of the same weight. Difference is due to the number of air spaces which act as nonconductors of heat.

Conduction of heat is rather difficult for children to understand. Some of the following illustrations may make it clearer. We say a substance is a good conductor of heat if it car-

ries heat readily from one object to another. When the hand is placed on a piece of stone, metal, or linen cloth it feels cold under ordinary conditions, because they take heat away from the hand very rapidly. If the hand is placed on a piece of wood or woolen cloth, it feels warm because these substances take heat from the hand very slowly. We can think of it in this way: all substances are made up of small particles and in some materials heat is passed on very rapidly from one particle to the other while in others much more slowly.

7. Using samples of materials, of as many different kinds as possible, have pupils tell name, what such a material should cost, and its uses. By making a drill or game of this exercise the children will be more interested.

8. Similar to exercise 7, except that the emphasis is placed on a consideration of quality—which would wear well and why, which are not worth the price asked.

CHAPTER XI

EMBROIDERY AND FINE NEEDLEWORK

Embroidery.—Embroidery, once used mostly as a pastime for leisure hours, has grown into an art of real commercial value. In mastering the technique of the work there are several points to be considered: (a) the material upon which the work is to be done; (b) the purpose for which it is to be used; (c) the design; (d) the choice of stitches best suited to material and design.

Embroidery hoops for general use should be from 4″ to 4½″ in diameter, and should fit snugly. If they are loose, wind them with clean, white cloth. Should the embroidery come so near the edge of the material as to make it impossible to fasten it in the hoops, baste firmly to it a piece of clean muslin wide enough so that the material may be placed in the hoops and drawn down snugly.

In embroidering, change the place of the needle on the thread often to save wear on the silk. Notice the twist of the silk, tension, and stitch direction.

To transfer patterns.—As the directions for stamping are included in the various perforated pattern outfits, only the use of the transfer or carbon paper need be described. Put the article or cloth to be embroidered upon a smooth, flat surface and lay the transfer paper right side down upon the cloth. Over the carbon paper lay the pattern to be transferred, and, being very careful that it is not moved from its position, trace the outline by going over each line with a fine sharp pencil or stiletto. Remove the transfer paper and the design will be found transferred to the material.

To launder embroidery.—Make a strong suds of Ivory soap and tepid water and wash the article by rubbing and squeezing it in the hands. If the embroidery is in colors do not rub the soap directly upon it. Rinse quickly in clear tepid water, roll the article in a dry towel and squeeze until all the water is out, then shake well and roll up in a dry towel until ready for ironing, which should be almost immediately.

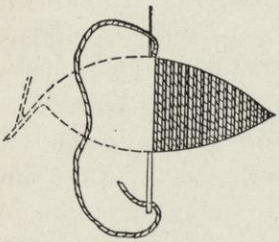
Make a thick soft pad by folding up an old blanket, and cover it with fine, smooth muslin. With a hot iron rub over this muslin cover until it is so hot that the hand cannot be laid upon it; place the article to be ironed upon it, face down, and cover it with a smooth, dry cloth; press with a medium hot iron until the article

is nearly dry, then remove the cloth and the article, and once more iron over the muslin pad until it is very hot, replace the article and press until dry with a medium hot iron. Turn the article over and hold the iron close to the raised parts of the embroidery to dry it out. Keeping the muslin hot on which the embroidery rests brings out the luster.

Embroidered flannel is used most for infants' petticoats and sacks, and it forms a most effective decoration and finish. The most satisfactory stitches for this work are the satin stitch, buttonholing, and outline stitch. There are numerous *outline stitches,* the simplest being formed in the following manner: Working away from you always, bring the needle up through the cloth at the end of the line to be outlined and take a short stitch forward directly on the line allowing the thread to fall to the right each time; take a new stitch above the last one, bringing the needle out at the top of the last stitch each time, in this way forming an apparently unbroken line on the right side of the material, while the back resembles machine stitching.

Buttonholing on flannel is accomplished in this manner: First pad well, within the outlines of the scallops, by using either an irregular running stitch which leaves most of the cotton on the surface, or by filling in with a chainstitch.

Be careful to keep *within* the stamped outline, using but little padding where the design is narrow. For the buttonholing use a heavy silk and take the stitch from the top to the lower stamped line, working from the left to the right. The satin stitch is a flat laid stitch, covering the surface of a figure from edge to edge. It may



SATIN STITCH

BUTTONHOLE SCALLOPS

be made over padding or directly upon the fabric, depending upon the nature of the work. In flower designs the satin stitch may begin at the center of each petal and be worked toward the edge, if desired; in leaves a stitch radiating from the midrib will be found more effective.

In embroidering initials and monograms the work is much more effective if it is well padded. Great care must be taken, however, that the padding is regular and smooth, for much of the appearance of the finished work depends upon it. A short irregular running stitch or a chain-

stitch may be used. Be careful to pad *within* the stamped outline, and always in a direction opposite to that which will be taken by the embroidery stitch. Where the latter widens increase the number of lines of padding, having one line fit close against the other, and where the letter grows narrower lessen the lines of padding. Finish all the padding before beginning to embroider.

In making the satin stitch it is usually more pleasing if taken straight across the space instead of obliquely. Set these stitches covering the padding close together, but do not crowd them so that any of the threads are pushed out of position.

For embroidering the single lines of the initials either a very fine satin stitch or a fine outline stitch may be used.

The satin stitch is most generally used for embroidering initials and monograms, and is also very effective for all kinds of waist and lingerie decoration which is done in white.

Eyelet embroidery is used both alone and in combination with French embroidery, and, if well made, is unusually beautiful. The size of the eyelet and the evenness of workmanship determine almost entirely its attractiveness. Eyelets may be round, oval, or pointed, the stitch in each case being the same.

To open a round eyelet use a bone stiletto.

Set the point of the stiletto in the center of the circle and push gently through until the opening is sufficiently large. With the point of the needle turn the edges of the opening back and under, then with a fine running stitch outline the design; this prevents the edge of the eyelet from fraying. After the eyelet is opened and outlined, set the needle for the stitch just outside of the outline of the eyelet. Bring the point out in the opening and pull through. Repeat until the eyelet is completed and fasten the thread at the completion of each eyelet by running the needle back under the last three or four stitches and pulling through. Clip. The stitch employed for eyelet work is simply the overcasting stitch. It should be pulled up firmly and evenly at each stitch and should take up the least possible amount of material.

Hemstitch.—Draw four or five threads where the bottom of the hem is to come. Make a ¼" first turning, then fold hem over on wrong side to the edge of drawn threads and baste down carefully, so there will be no danger of the hem losing its position. Much care must be exercised in arranging the corners neatly and evenly. They must be overhanded on the edge. Holding the hem toward you, make the stitch in this manner: decide upon the number of threads to be taken up and keep to that number—the eye is able to determine without count-

ing each time. Four or five threads will usually be sufficient. Beginning at the left side, fasten the thread in the fold of the hem without a knot.

1. Put the needle under the number of threads selected and bring it out without catching it in the threads or hem. Put it back over these same threads and under again as at first, but this time, in coming out, put the needle through the edge of the folded hem beside the last thread, and pull down snugly. Continue in this manner. At the corners more threads will have to be taken up as they are double. Remove bastings when through with the hemstitching.

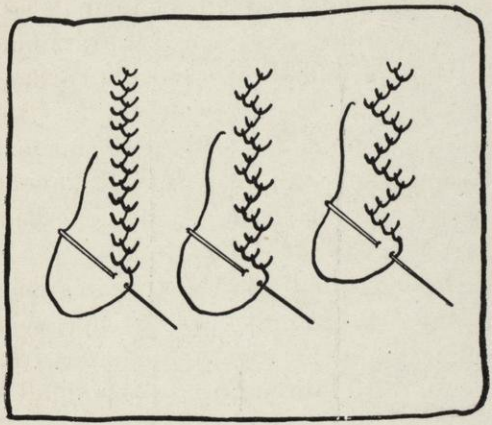
2. With the thumb on the thread, place the needle under the number of threads selected, bringing it out over the thread, and draw up tightly. With the thread up, take a small stitch in the fold of the hem.

Try both methods on a scrap of cloth, choosing the one you think is the better or easier.

Featherstitch.—Knot thread and bring needle up through material. Hold the thread down over the line of direction with the left thumb. Insert needle a little to the left of this line and take a short slanting stitch toward the right, draw the needle out while the thread is held down smoothly by the left thumb; then hold down the thread on the center line and take a stitch of equal length on the right side, slanting toward the left, and draw it out as before. If

the stitches are kept at right angles to each other, it may help to make them regular.

A double or triple combination stitch may be made by taking two or three stitches to the left and right each time.

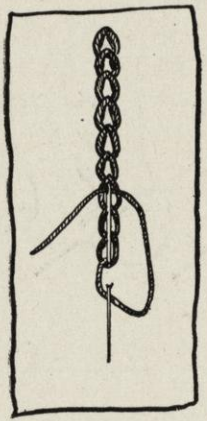


FEATHERSTITCHING

French knots.—Fasten the thread and draw through the cloth at the point where the French knot is to be made. Hold the needle in the right hand and the thread in the left. Wind the thread around the needle from three to five times, depending upon the coarseness of the thread and the size you desire the finished knot. Keep the loops in place on the needle by holding the thread under the left thumb. Insert the needle very near where the thread was drawn

through. This brings the thread around the loops, holding them in place.

Chainstitch is worked toward you, holding the cloth over the left forefinger. Fasten the thread at the upper edge and bring the needle through from underneath. Hold the thread to



CHAINSTITCH

the left with the thumb, insert the needle where the thread comes out and bring it through ⅛″ below, and over the thread to form the loop. Continue in this manner, always inserting the needle inside the loop of the last stitch, and being careful to make the stitches the same length each time.

Rolled hem.—Take the straightened edge between the thumb and forefinger of the right

hand; then, with the thumb and forefinger of the left hand, roll the material forward, making a *very small* hem, which securely covers the raw edge, however. Roll about an inch, then hem finely; continue rolling and hemming. The hem easily unrolls so it is better to roll but a short distance; then hem, to keep material fresh.

Rolling and whipping.—This furnishes a very neat method of gathering and finishing a raw edge. It is really a rolled hem secured by a thread which may be pulled up to gather the material into the desired space. Roll the hem according to directions given above. Use a thread which will be heavy enough to stand the strain of pulling up. Fasten it at the right end, and use the overcasting stitch, having the thread go over the hem and not through it. After finishing a couple of inches pull up the thread the desired amount. Proceed as before.

CHAPTER XII

LAUNDRY PROBLEMS

Reasons for washing.—Some one has said: "The state of civilization may be judged by the soap bill of the nation." That there is some truth in the statement we will all admit, I am sure. During the past decade there has been awakened a new interest in the subject of laundering which is a hopeful sign.

Judgments may differ as to whether ironing is a necessity or a luxury, but there would be no disagreement as to the necessity for washing.

It is not simply to satisfy the sense of the æsthetic that the periodic washing has become an established custom in the home. There is a sanitary reason which a few words of explanation may help to make more clear.

The skin acts as a heat regulating apparatus through evaporation of the perspiration, and also serves in some measure to eliminate the body's waste products. These materials are absorbed by the clothing, and after a time the

pores of the cloth become clogged. This condition prevents proper absorption and evaporation of moisture from the body, thus increasing the warmth of the body in summer and making it colder in winter.

The following may be given as the three main reasons for washing:

1. To remove dirt and to open pores of cloth.
2. To dry cloth and renew its absorbing power.
3. To destroy any bacteria present.

In order to understand laundry methods it is necessary first to learn something of the nature of the things to be laundered and how these respond to the cleansing agents commonly used. The purpose is not to discuss methods so much as the underlying principles which, if understood, will aid in the choice of the best method.

It has been learned by experience that cotton, wool, and silk must be treated differently if the best results are to be obtained. It may be of interest, therefore, to determine why this is true.

Acids destroy the vegetable fibers—linen and cotton—much more readily than the animal fibers—wool and silk. When using acids on cotton materials, as in removing stains, this fact should be kept in mind. Remove the acids as quickly as possible, rinse thoroughly in clear

water and in a dilute solution of ammonia or borax. The organic acids, as acetic in vinegar, oxalic in tomatoes, citric in lemons, etc., have little if any action on the fibers unless allowed to dry on. If dried, moistened, and ironed, the fibers will be destroyed.

Dilute alkalies have little if any effect on the vegetable fibers according to present data. As many of the washing compounds, if properly used, come under the above class, the fact is of great interest to the laundress. They should be used with great care, however, on delicate fibers.

Strong alkalies, even though cold, have a softening effect on the wool or silk fibers, entirely disintegrating them in a very short time. A dilute boiling solution will also dissolve the wool. This fact is made use of in the test distinguishing wool from cotton, and explains why strong soap should not be used in washing woolens. Dilute alkalies weaken silk and destroy the luster.

Water.—A plentiful supply of water good for laundry purposes is an important factor in successful laundering. Good drinking water and good water for the laundry may not necessarily be identical. The mineral matter held in solution may be of value in the body but very detrimental for cleaning processes. A good water for the laundry should be clean, soft, clear,

odorless, free from discoloration, free from iron, and free from organic matter.

Hard and soft water.—Because water is a very good solvent, on its way to us through the rocks and soils it often collects soluble substances of an undesirable nature. The characteristic known as hardness is due to the presence of lime salts gathered in this way. When soap is used with hard water, a scum forms on the surface which is composed of an insoluble lime soap. This has no cleansing properties so simply wastes the soap which has been used. If the available supply of water is hard, the problem of the housekeeper is to find some means of removing the lime or of reducing its ill-effects.

Temporary and permanent hardness.—According to the nature of the lime salts present, water is said to be temporarily or permanently hard. Temporary hardness is caused by the presence of carbonate of lime, and such water may be softened by boiling. The sediment present in almost any teakettle illustrates this.

Permanently hard water contains sulphate of lime and can only be softened by the use of some chemical. The cheapest and best of these are alkalies, known as washing soda, borax, and ammonia.

Washing soda, which is most effective for ordinary use, should be used in the following pro-

portions unless the water is very hard. For each gallon of water, use two tablespoons of a solution made by dissolving one pound of washing soda in a quart of boiling water.

Borax is especially good for colored goods and wool and even though more expensive it may be economy to make the extra expenditure in those cases.

The only satisfactory method of getting rid of iron is to add washing soda to the water and then let the water settle five or six days before using.

Soap.—Soap making, which was formerly a very common household process, is at present almost unknown. The lye which was obtained from wood ashes and the waste fat from various sources made a soap containing many impurities and of uncertain quality.

Soap may be made of any fat with caustic alkalies or lye. Chemically, lye is a hydroxid of either potassium or sodium, two closely related substances having similar chemical characteristics and producing compounds of similar nature.

When lye is mixed with fat, it breaks up into the fatty acids and glycerine of which it is composed. The lye unites with the fatty acids to form a new compound, called soap, and glycerine is left as a by-product. This process is called saponification. As can readily be seen,

the nature of the soap formed will depend, first, on the nature of the fats used, whether these are hard or soft, clean or rancid; second, on the kind of alkali used, whether caustic potash or caustic soda; third, on the nature and amount of impurities contained in both fat and alkali; fourth, on the completeness of the process of saponification. If the operation of soap making is not properly conducted, the reaction between the fat and alkali is incomplete and a soap is produced which contains free fat and an undue amount of free alkali. Such soap is greasy, unduly caustic, and a poor cleansing agent. Resin is often added to cheap soaps and while a small amount is of value in that it whitens the clothing, the presence of large quantities should be considered an adulteration.

It is not economy to use cheap and poorly made soaps in the laundry. Try soaps manufactured by reliable firms and choose the one which is most satisfactory. A common mistake is to think that one kind of soap will answer all purposes. In the manufacture of soap when just sufficient alkali is used to completely saponify the fat present, the product is known as a neutral soap. If an excess of alkali is used, either a medium or strong soap is made, depending on the amount of free alkali left in the soap. The neutral or mild soap should always be used for woolen materials, delicate colors, and frail fab-

rics. A medium soap is best for durable colored goods and a strong soap for most of the white materials. Much of the ordinary dirt on clothing is held by a fat of some sort. Soap in solution emulsifies the fat, thereby releasing the dirt. Any free alkali present unites with the fat to form soap which in turn aids in removing more of the fat. This shows why it is advisable to use a strong soap when there is much grease present.

Soap substitutes and accessories.—Soap is the best cleansing agent for all around use in the laundry, but there are other substances which may often be used to good advantage. Turpentine, kerosene, gasoline, and paraffin are useful because of their solvent action on fats. In dissolving the fat much of the dirt is set free. An objectionable odor may remain after using, unless the clothes are very thoroughly rinsed.

Most of the washing compounds on the market contain soap, an alkali, and turpentine, paraffin, or Fuller's earth. The best powders contain large amounts of soap and small amounts of alkali.

What has already been said concerning the action of alkalies should serve as a guide to the laundress in choosing a washing compound if she desires to use one.

Bleach.—Percil or sodium per borate is the

most valuable household bleaching agent, as there is little if any harmful effect on the material. It is also useful in washing white or light silks, as it prevents yellowing.

Bluing.—After repeated washing, white materials gradually acquire a yellowish tint unless very carefully rinsed and bleached in the fresh air and sunlight. Bluing has come into use to counteract this. The abuse of bluing is that it may be used to cover up the results of careless work.

Indigo, orginally of plant origin, but now manufactured artificially, was formerly the chief source of bluing compounds but is little used at present.

Prussian blue is the most common source today. It is very cheap, gives a good color, and is readily soluble. The objection to its use in the laundry is that it is an iron compound which is decomposed by alkalies, yielding iron rust. If clothes are not carefully rinsed until free of all soap and other alkali used in washing, contact with the bluing will result in tiny rust spots on the clothes.

Aniline blues give good, clear colors. Some may be used successfully alone, while others require an acid to develop them. Acetic acid or vinegar is preferable to oxalic acid, as the former is volatile and has less action on the

fiber of the cloth. These blues actually dye the material and should, therefore, be used with much care.

To test for the presence of iron in bluing.— Prepare about a teaspoon of a strong solution of the bluing you wish to test. Add an equal amount of ordinary household ammonia and allow to stand from 15 to 30 minutes. A reddish brown precipitate shows the presence of iron.

Most of the liquid blues on the market are of this type. If a satisfactory bluing, free from iron, is not available the objectionable results of Prussian blue may be overcome by the use of an acid rinse to neutralize the alkali. Two tablespoons of acetic acid or about a third of a cup of vinegar to a pail of water will be sufficient under ordinary circumstances. (The amount of alkali present in the rinsing water varies greatly and, therefore, no absolute rule can be given. A smaller amount might often be sufficient.)

Ultramarine blue is also an iron compound, but it does not decompose with alkali. It is what we often buy as the ball bluing and is insoluble in water. Water, however, causes it to break up into very minute particles which spread through the liquid and give it a blue color. The water must be stirred and one must

be careful in using it that the clothes do not get streaked.

Test four or five different kinds of bluing for iron (small samples may undoubtedly be obtained from your friends).

To set colors.—It is always a safe precaution to set the color in most wash fabrics, and it is decidedly worth while for delicate colors. Any substance which will act as a mordant and cause the dye to be more completely impregnated in the fiber of the cloth will serve the purpose.

Salt acts as a mordant[1] for the substantive dyes which are most commonly used for cotton and linen and, therefore, may be used to advantage in the household to aid in making the colors fast. A handful of salt in a dish of cold water, however, is not sufficient.

The material or garment must be placed in a strong, *hot* solution and allowed to stand until the water is cool to obtain the best results. If the material is to be shrunken before making up, the salt may be added to the bath and "two birds killed with one stone."

Because salt is cheap and on hand in every household, it is probably the best for all around use. The effect of brine is said not to be lasting. There are other mordants which may be

[1] A mordant is a substance which will unite with the material and then with the dye, thus making the color more permanent.

used with equally good results and possibly better in some cases.[1]

Sugar of lead is good for all colors except pink and blue.

Saltpeter is good for pinks and blues.

Vinegar is said, by good authority, to be best for pinks.

Alum is recommended for greens, mauves, purples, etc.

The following proportions should be used:

To one gallon of water—

½ cup mild vinegar
or 2 cups salt
or 1 tablespoon alum
or 1 tablespoon sugar of lead (poison).

The value of rinsing a blue garment in a strong bluing solution to counteract the faded appearance is appreciated by many. Other delicate colors would often profit by a similar treatment in a dye solution of the same color. By having bottles of various colored dye solutions at hand, little extra time would be consumed.

They that wash on Monday, have all the week to dry.
They that wash on Tuesday, are not so much awry.
They that wash on Wednesday, are not so much to blame.

[1] Experiments show that one application is not sufficient for permanent results. The color should be set before every washing.

They that wash on Thursday, wash for shame.
They that wash on Friday, wash in need.
They that wash on Saturday—oh they're sluts indeed.
OLD ENGLISH PROVERB.

Forget, if possible, prejudice in favor of Monday and determine whether it is not more sensible and convenient to have the weekly washing done on Tuesday rather than on Monday as has so long been the custom.

First the clothes should be gone over, locating spots and rents which need attention. "A stitch in time saves nine," is applicable here as a small hole may be much increased in size during the washing process.

Soaking clothes over night is felt by many to greatly reduce the labor necessary in removing the dirt.

Saturday has many special duties already and most housekeepers do not want to take the time for these preliminaries. It is not justifiable to take Sunday for it, and, therefore, Tuesday seems to be the more logical day for the laundry work.

Before continuing to wash on Monday, therefore, consider your individual case and be sure and have a better reason than that of custom only.

Many garments worn Sunday would suffice for another day's wearing if the laundress could wait for them until Tuesday.

Suggestions on hanging clothes.—Be sure the clothesline is clean.

Clothes should be hung wrong side out as far as possible with the threads of the material straight.

Sheets and other large straight pieces should be hung with the hems together and the hemmed ends pinned to the line to prevent whipping in the wind.

Arrange as far as possible to hang garments so that the wind may blow through them. They will dry more quickly and with less injury to the clothes.

Make a cheesecloth bag in which to dry dainty small articles as doilies, embroidery, and fine handkerchiefs. The bag may be hung on the line.

Skirts will sometimes keep their shape better if hung by the waist band instead of the hem. A safe rule to follow is—hang the garment in as nearly the natural shape as possible.

It is very difficult to iron a garment properly which has been badly hung.

It is worth while to shake and straighten articles before hanging them on the line and also when they are taken down. This will save time in the preparation for ironing and also in the actual ironing.

Additional suggestions.—Much time may be saved by the busy mother in the home if knitted

underwear, hosiery, many of the towels, etc., are not ironed. The absorptive power is lessened by smoothing with a hot iron, and if they have been boiled and dried in the air and sunshine further disinfection should not be necessary. Sheets properly hung and carefully folded when taken down may be made to look very well if the upper end is simply pressed a little.

The housekeeper and home-maker, confronted as she is with innumerable demands upon her time, must choose those tasks she considers most worth while if she is to be an efficient worker.

An aluminum sprinkler, which may be used in any bottle of convenient size, is a valuable aid in sprinkling clothes. It makes a fine spray and accomplishes the desired end very quickly. It may be purchased for ten cents.

Warm water is absorbed more quickly than cold and should always be used when the clothes are to be ironed soon.

If any member of the family has a cold, the handkerchiefs should be disinfected in some way. Boiling for half an hour will do very well. This may prevent the cold from being passed on to the rest of the family.

Machinery for the laundry.—In this day of power machinery, when men on the farm, and everywhere in fact, are doing all of their hard

work with its aid, we still find the majority of women washing by hand as their grandmothers did. "In the good old way," do we say? Not if "we" happen to be the ones who are doing the work. As to who is at fault, may be a debatable question. Perhaps it is the woman who will not insist that she be given these mechanical aids, and it may be a selfish man who refuses to furnish the necessary money. Mr. Allan L. Benson in an article in the October, 1913, number of *Good Housekeeping* says women have not machinery because they lack "nerve."

There are four types of washing machines which may be described briefly as follows:

1. The "Dolly" consists of a milking stool which revolves in the center of a tub of clothes. This agitating of the clothes forces the soap and water through them and thereby removes the dirt. This may tear the clothes.

2. Another machine uses a perforated revolving cylinder which holds the clothes and an outer one for soap and water. The better machines of this type are arranged to automatically reverse the action or are arranged with divisions to prevent knotting of the clothes. If well filled with water and not overloaded with clothes, no harm can come to even delicate fabrics.

3. No cylinder used. This type cleans by

oscillation, or rocking the clothes in soap and water. Very satisfactory.

4. Suction washers. The principle involved here is that of pressure and suction. There is a lever attached to metal cones. These are pushed down against the clothes, then suddenly lifted away from them and out of the water. A suction so caused draws out the dirt which has been loosened by the pressing.

The following table gives the prices of the various types:

	Hand	Water Motor	Gasoline Motor	Electric Motor
1	$10.00	$12.50 to 16.00	(See top of page 186)	$50.00
2	$12.00	$37.50		$75.00 to 275.00
3				$100.00 to 125.00
4	$1.00 to 3.50	$16.00		$85.00

Note.—Most of these prices were obtained from an article by Miss L. Ray Balderston in October, 1913, *Good Housekeeping.*

Many of the ordinary hand machines may be connected with a gasoline engine at very little expense. A gasoline engine (1½ horse-power) costs $40 equipped on a truck.

To use washing machines most efficiently there should be plenty of hot and cold water easily accessible; also a drain in connection with the machine to carry off the dirty water.

Mangles.—A mangle is a device to save hand ironing of the flat pieces. It is a great time and energy saver for the laundress. Mangles are of two types in general, hot and cold. The cold mangle simply presses out the crease without giving a gloss. The sterilizing power of the heat is lost in this case. A very simple one which may be screwed to a table can be purchased for between $6 and $7. A stronger one with table attached may cost up to $25. The hot mangles may be heated with gas and operated by hand or motor power. These usually consist of a hot steel cylinder and a cloth covered cylinder between which the clothes are pressed. The cost varies from $25 to $75.

The electric iron is far more efficient and satisfactory to use than any other. If electricity is available, an electric iron should be a part of the laundry equipment.

Before leaving the subject of laundering, a few words concerning the use of power machines on the farm may not be out of place.

It would be so easy on many farms to make use of the gasoline engine in running a washing machine, wringer, and mangle with just as great saving to the housewife as to the farmer when it pumps water for the stock or grinds the feed. Some one has suggested that the farmer has installed power machinery because it has meant dollars in his pocket. This is not so evident when labor saving machinery is installed in the home. Are there not other things of more importance, however, than the dollar which has assumed such large proportions? The health, comfort, and happiness of the wife and mother is surely deserving of consideration.

It has been done, and, therefore, it can be again. A young Wisconsin farmer told about getting his wife a power washing machine for her Christmas present. He connected it himself and the total expense was under $25. He also had running water in his home. May his tribe increase.

Another solution of the laundry problem on the farm is that of a coöperative laundry in connection with the creamery. Fillmore County in Minnesota has such a laundry in operation. To quote from an editorial in the Sioux City (Iowa) *Tribune:* "The record of this coöperative laundry is noteworthy. About 750 farm washings are done each month and the monthly

cost to each family averages $1.96. There is probably an actual saving to each family through eliminating the expense of a washing plant in each home. But the other benefits far outweigh the money saving. Women and girls of the farm are relieved of a burden that has contributed largely to the dissatisfaction with farm life. They have more time to make the farm home attractive for the men and boys who thus share in the benefit. Social activities of this community will be stimulated and in the long run homes, schools, and churches will show increased efficiency through the release of women from the drudgery of the churn and the washtub."

Dry cleaning and removing stains.—The ordinary washing process is sufficient to get rid of most of the dirt in clothing, but some of the spots and stains require special treatment. The best and easiest time to remove such stains is as soon as possible after the misfortune has taken place. As this is not always possible it is wise to go over the clothes to be laundered to see if any special attention is necessary. Some stains are insoluble in water, or soap and water, or may be made so by the action of heat and thus become permanently set in the washing.

First, if possible, the nature of the stain should be determined. Second, find some sub-

stance in which the stain is soluble. With that accomplished, the removal will be a very simple process. It is not always possible to find a solvent and the next resort is something which will form a soluble substance. Should this also fail, the last possibility is the use of a bleaching agent. A bleaching agent should be used only when everything else fails, as it will remove the color and may weaken the fabric if not used with great care.

The various classes of stains will be taken up and methods of removal suggested. If one does not work well in your particular case try another. Always use some absorbent material under the spot so that the loosened dirt will be absorbed and not simply spread over a larger space. Use a soft cloth, rubbing gently and softening the outline as much as possible.

"When cleaning spots, run a thread around them so as to be able to find them easily after the garment is wet."

"Before using any cleaner try it first on the inside of a seam to see whether it will change the color."

To raise the nap of woolen goods place a wet piece of the same material over the spot and iron with a moderately hot iron. The piece will adhere and the nap raise when pulled apart. Needless to say if the nap is worn off, this will accomplish very little.

A round bottle filled with hot water is superior to a flatiron for pressing seams in delicate goods.

Grease.—Many times it is grease which holds the dirt, as has been suggested before. Special care is necessary in that case only when the material is such that it cannot be submitted to ordinary laundry processes.

Solvents.—

Alcohol.
Ether.
Chloroform.
Carbon tetrachloride (carbona).
Gasoline.
Naphtha soap and water.

Carbon tetrachloride ($C\ Cl_4$) is also sold under the commercial name of carbona. They are one and the same thing, but the carbona costs about one-half more. The great advantage lies in the fact that this compound is not inflammable as are most of the other solvents for grease, so it may be safely used around lights and fire. It is too expensive to use when immersion of the article is necessary.

Gasoline is the most practical reagent for use when the entire article needs cleaning. It must be used away from the fire to avoid any possibility of serious accidents. Place garment well covered with gasoline in a vessel which may be tightly covered and allow to stand several hours,

or over night. If the gasoline is warmed by being placed in a dish of hot water, the dirt will be dissolved out more quickly and easily. Especially soiled places may require a little rubbing to aid in loosening the dirt. Rinse in clean gasoline and hang in the open air.

A pure neutral soap may be used with gasoline the same as with water. It is necessary, of course, to rinse the garment thoroughly in clean gasoline after using the soap. A commercial cleaner—Putnam's Dry Cleaner, the only commercial compound of this sort known by the author to be on the market at the time of this writing—may also be used with good results.

The soiled gasoline should not be thrown away, as the impurities will settle to the bottom and the clean gasoline may be poured from the top.

It is economy to use plenty of gasoline, as the results will be more satisfactory and with proper care it may be used many times.

Wagon grease if dried on should first be softened with lard or oil and then washed in soap and water, or one of the solvents for grease may be used.

Paint and varnish.—Probably the best solvents are:

Turpentine.
Alcohol.
Ammonia.

Meat juice, blood, or mucus may be considered together as all are protein compounds and react to similar treatment. Heat will coagulate these substances, as it would an egg, and for that reason must be avoided.

(1) Soak in cold water, then wash with soap and water.

(2) Add ammonia or salt to water, then wash with soap and water.

Milk, cream, tea, coffee, and cocoa, contain fat, protein, and, in some cases, coloring matter. Use some fat solvent first and then wash in cold water. Soaking in borax water after removing the fat may sometimes be necessary.

Glycerine will aid in removing tea stains. Soak spot in glycerine and then wash.

Coffee and fruit stains.—Fruit stains are held in the material by pectin, a gelatinous substance which makes it possible for fruits to "jell" as we say. This is soluble only in boiling water, which also removes coffee stains. Spread stained surface over a dish, pour boiling water through it from a height so as to strike the stained part with force. Camphor is also found effective in removing fruit stains. In the case of old stains it may be necessary to use a bleaching agent, as Javelle water. This may be used only on white materials, as it will remove the color also.

Iron rust.—(a) On white. Wet the stained

part with borax and water, or ammonia, and spread over a bowl of boiling water. Apply a ten per cent solution of hydrochloric acid (muriatic), drop by drop until the stain brightens. Dip at once into water. If stain does not disappear repeat the process. After removing the stain, rinse well with ammonia to neutralize any acid that may remain.

(b) A ten per cent solution of oxalic acid may be used as above. Oxalic acid is not so detrimental to the fabric, but is a deadly poison even in the dilute solution and so should be labeled poison.

(c) Wet the stained part with a mixture of salt and lemon juice. Place in the sunshine. This is a much weaker reagent than the two preceding and, therefore, will take a longer time, and is often not so effective.

(d) The commercial ink eradicators may be used in some cases. Rinse thoroughly after using.

(e) Erusticator is a commercial product which may be used satisfactorily in removing rust stains. It is a chlorine compound and acts as a bleaching agent. Rinse thoroughly after using. At the present the author does not know of any others designed for the same purpose. There may be others, however.

Ink.—Ink is often difficult to remove as it

varies so greatly in composition. It is well to experiment with a corner of the spot before operating on the whole.

(a) If the stain is fresh, soak in milk. Use more milk as the old becomes discolored.

(b) Wet with cold water. Apply oxalic acid to the stain on white cloth, let stand a few minutes and rinse. Repeat until stain disappears. Rinse in water to which borax or ammonia has been added. This will neutralize the acid and prevent weakening of the fabric.

(c) Commercial ink eradicators are most effective as a rule. The removal is accomplished quickly and with little detriment to the material if carefully used.

Milk is the only reagent given which will not destroy color.

Iodine or medicine.—Iodine and many medicines are dissolved in alcohol and, therefore, it is the natural solvent to use in removing the stains. Ammonia, chloroform, and ether may also be used. Ammonia is very good for iodine stains. A dilute solution of caustic soda or caustic lye may also be used.

Grass stains.—It is the chlorophyl or green coloring matter in plants which is removed with difficulty. Alcohol is perhaps the best solvent.

Mildew.—Mildew is a true mold, and, like all plants, requires warmth and moisture for its growth. When the heat and moisture neces-

sary are present in a cloth, mildew grows upon the fibers. During the first stage of its growth, the mold may be removed, but in time it destroys the fibers.

(a) Soak in some acid, as lemon juice, vinegar, or buttermilk, and salt and expose to direct sunlight.

(b) Wet with paste of soft soap and pulverized chalk. Expose to sunlight.

(c) Javelle water may be tried in cases of advanced growth. Success cannot always be expected.

Javelle water as a bleaching agent.

1 lb. washing soda.
½ qt. bleaching powder (calcium hypochlorite).
1 qt. boiling water.
2 qts. cold water.

Dissolve soda in boiling water in a granite pan and let cool.

Dissolve bleaching powder in cold water, let settle, and pour the clear liquid into the soda; let settle. Pour off clear liquid, bottle, and put away in a dark place. This gives a 25% solution. Mixed with equal portions of water it may be used cautiously to remove spots. If materials are to remain in the solution for some time, it should be diluted to about a 2% solution. Wash thoroughly in several waters and lastly in dilute ammonia water.

To clean white shoes.—There are many preparations on the market such as: Albo, Buck White, Nuway, Bixby's White Shoe Dressing, and Whittemore's White Shoe Dressing, and many of them do very good work. Directions for use are given on the bottle or box. Bon Ami is inexpensive and is on hand in many households. It may be used as follows:—

Brush the shoes to remove any loose dirt and then apply a suds of Bon Ami and water with a small brush. When the water evaporates, the surface is covered with a thin coating of the Bon Ami. It does not, however, have the pasted appearance which many of the preparations give. While covering up the dirt, it also partially removes the soiled spots.

To clean white kid gloves.

(a) Art gum, if used frequently for slightly soiled spots, will keep gloves in wearable condition for some time, postponing the necessity for a thorough cleaning.

(b) A paste of gasoline and flour well worked into the gloves is effective. Care must be taken to keep the gloves away from fire until the gasoline has entirely evaporated.

(c) Carbon tetrachloride may be used.

(d) Putnam's Dry Cleaner with gasoline has been found very effective.

Sulphur dioxide bleaching.—Javelle water or chlorine in any form cannot be used for silk or

wool. For these the fumes of burning sulphur or these fumes dissolved in water must be used.

The garment should be wet or the special spots moistened and hung in some small enclosed space above a piece of burning sulphur. The sulphur candles to be had at any drug store are convenient for this use.

A cone of heavy paper may be used as the "smoking room."

To remove small spots, cut a small opening in the apex of the cone and hold the moistened spots above the opening so that they may be acted upon by the fumes.

To wash laces.—Fine, delicate laces should be dry cleaned rather than submitted to water at all.

To wash, use a warm suds of a mild or neutral soap to which has been added borax or ammonia. Squeeze rather than rub to loosen the dirt, as rubbing is injurious to the delicate threads. If the lace is carefully basted to a piece of cheesecloth, less care will be necessary. After rinsing thoroughly the lace should be stretched into shape on a smooth round bottle or pinned to a soft pad, being careful to see that all points are held in place. Lace may be stiffened by rinsing in a mixture of two tablespoons of alcohol to one cup of water.

Lace curtains should be brushed to remove all loose dust before placing in the soap solu-

tion. If curtain stretchers are not available good results may be obtained by pinning out on sheets, if care is taken to have the curtain straight and even.

To wash woolens.—The characteristics of the wool fiber and its reaction to acids and alkalies have already been given, so the reasons for the following precautions should be understood.

The temperature of the water is not so important as keeping the temperature the same throughout the washing and drying process. It is changes of temperature rather than any particular temperature which causes the shrinkage. Tepid or lukewarm water is recommended as that is at the temperature which can be most conveniently retained while drying. Never dry woolens close to a fire as the steam formed will cause the material to shrink.

A neutral soap should be used in the form of a thin solution. Avoid rubbing soap on the fabrics. Many prefer ammonia or borax to soap and others use one or the other with soap. Borax or ammonia is especially valuable if the clothes are badly soiled or if the water is hard. Punch and knead the garment to loosen the dirt, but do not rub. Use as many waters as necessary, being careful to have the temperatures as nearly the same as possible. Put through a wringer which has been loosened, or

squeeze the water out with the hands. Avoid twisting as it also causes shrinkage.

The following method gives very good results with little effort. Dissolve 1 large bar of neutral soap in enough soft water to make 2 quarts of the solution. Keep in a fruit jar and use as needed. To this amount of soap use 1 cup of borax, or for small washings use eight times as much soap solution as borax. Place soap solution and borax in receptacle containing cold *soft* water and allow to dissolve thoroughly. Immerse clothes and allow them to stand over night or for several hours. Rinse in clean, cold, soft water and hang to dry in a cool or cold place.

Knitted underwear and hosiery are kept in the best condition by drying over frames which may be bought or made. A thin board cut in the shape of the garment works very well.

In the case of sweaters, shawls, or such articles as may stretch or shrink out of shape, pin to a sheet on the floor so that the garment corresponds to the original measurements.

Brush and shake blankets to remove all dust before putting in the suds. Do not attempt more than one pair at a time, as they are clumsy to handle. Work as rapidly as possible. The less time consumed in washing and drying the better. When almost dry, the blankets should be brushed to raise the nap and make them

fluffy. This not only improves the appearance, but also increases the warmth. The more air spaces which are enclosed among the fibers the less conduction of heat there will be and, therefore, the greater warmth retained.

Suggestive Review

1. Laundry problems: Why different materials must be treated differently when being laundered. What constitutes a good water for laundry purposes. How may hard water be softened. Explain the terms neutral, mild, and strong as applied to soaps.

2. Bluing—different kinds. Tests for iron in bluing. Why is the presence of iron objectionable. Use and value of the acid rinse. Setting of colors in wash fabrics.

3 and 4. Removal of spots and stains. Make the underlying principles clear. Emphasize the reasons for the various procedures. Have as much practice work in removing stains as possible.

5. Conveniences in the laundry. Power machines—kinds and cost. Coöperative laundries.

CHAPTER XIII

MAKING A SAILOR SUIT

Sailor suit.—The sailor suit is chosen as the typical dress to be made because the style is becoming to all, and it is a garment which is especially appropriate for school girls. It is comfortable, allows plenty of freedom, and the style changes but slightly from season to season. School girls of all ages, from the lower grades through college, may wear a sailor suit and feel properly dressed. The white linen, cotton, or wool suits make very appropriate "dress-up" dresses.

Material.—Choose any of the firm, heavy weight materials such as linen, suitings, Indian head, or pique. Any of these will make serviceable and attractive sailor suits. Dark blue or white is the color usually chosen since either launders satisfactorily. The lighter blues, and other colors as well, may be used but are more apt to fade.

Waist.—Take bust measure loosely, and choose pattern which corresponds or is a little larger. Compare your back waist length

with that of the pattern. An inch should be allowed in length for blousing. Modify pattern to make waist length longer or shorter as you find necessary. Follow directions given under Altering Commercial Patterns, on p. 210.

Skirt.—Take waist and hip measure and choose pattern which corresponds or is a little larger. The skirt should be gathered somewhat at the waist and should be full over the hips, so a little extra fullness will do no harm. The entire garment should be loose and comfortable, giving freedom for all parts of the body.

To estimate amount of material.—Place pieces of the corrected pattern on a flat surface, make a chalk line to indicate the width of the material, and decide how much will be needed. Do not forget the collar, which should be double. See directions for cutting.

Cutting.—The general rule is to place the larger part of the pattern at the cut end of the material. Try placing the various pieces until the most economical arrangement is discovered. Care should be taken at this point as a great deal of material may be wasted by careless cutting. Fold the material either lengthwise or crosswise, and cut pieces for right and left sides at the same time. Place largest pieces on goods first and fit in the smallest pieces as economically as possible. Occasionally, a considerable saving of material may be made by cutting

some of the pieces separately. Judgment must be used in such cases. Either shrink material before cutting or allow from 1¼″ to 1½″ per yd. for shrinkage.

To make the skirt.—*Seams:* Sew up side seams, using a flat felled seam about ¼″ wide, and fell down on the right side.

Placket.—The skirt should be fastened directly on the center front line. Turn back the right front, making a hem 1½″ wide on the wrong side.

Cut a piece of selvage 1¼″ wide and 12″ long, or if no selvage is available a lengthwise piece 1½″ wide and 12″ long. Use this piece in making a faced hem at the top of the left front. The finished hem should be 1″ wide and 12″ long.

Having the right sides up, place the right front over the left so that they lap the width of the hem. Pin or baste in place below the placket. Clip selvage at the bottom of the faced hem so that it will lie smoothly.

Begin at the top and stitch ⅛″ nearer the edge than the first stitching. Continue stitching to the bottom of the skirt. This second row of stitching fastens the right and left fronts together below the placket. Gather the back of the skirt, putting in two rows of running stitches ¼″ down from the top.

Belt.—Cut two straight pieces of goods 1¾″

wide and 2″ longer than the waist measure. Turn raw edges toward the wrong side to make finished belt 1¼″ wide and crease.

Place belt in front of you with the right side of the top part and the wrong side of the under part up and measure in 1½″ from left end and mark with a pin. This marks the center front. Find center of remainder and mark with a pin. This indicates the center back. Find balance points and mark on belt.

The point where the underarm seam should cross the waistline is called the balance point. To determine this point measure one-fourth of the waist measure minus ¾″, starting at the center back.

The side seams of the skirt should meet the waistline at this point, which makes them continuous with the underarm seam.

Pin and baste the under part of the belt to the skirt. The center back, center front, and balance points of belt and skirt should be together and the folded edge of the belt should just cover the lowest gathering thread. Pull up the gathers in the back to fit the space between the balance points on the belt. Distribute the gathers across the back, having the larger part of them toward the center. Place the upper part of the belt exactly opposite the lining belt so that one stitching will secure both. Baste in place.

Test the front, side, and back lengths of the skirt very carefully and turn up the hem. Try on before making the hem permanent, but there should be little change necessary if the measuring has been done carefully.

A yardstick, held perpendicularly with one end on the floor, will show very quickly and accurately whether the skirt is the same distance from the floor all around.

To make the waist.—Turn lower edge of yoke toward wrong side of the material ¼". Clip around curves so it will lie perfectly flat. Care should be taken to make good sharp corners and smooth curves. Baste in place. Place yoke on lower part of front with edge of yoke on traced line. Baste. Stitch as close to the edge as possible. Turn to wrong side. Turn under the raw edge, making a flat felled seam ¼" wide. Stitch on wrong side as close to the edge as possible. Put yoke on other side in same manner. Make flat felled seams on the shoulders ¼" wide, turning the seam toward front and felling down on the right side.

Sleeve.—If long sleeves are desired, measure bottom of sleeve and also take measurement around largest part of hand loosely. The difference gives the amount to be put into pleats. Divide this amount into six parts, putting three pleats on each side of center. Find center of sleeve and measure ¾" each way and put in

first pleats. Turn pleats away from center, forming a box-pleat. Place two pleats on each side of box-pleat, having 1¼″ between each. Put pleats in other sleeve in same way. Baste in pleats 4″ or 5″ up from the bottom. Stitch as close to the edge as possible, turn a square corner, stitch over 3/16″, turn another square corner and stitch down, keeping rows of stitching the width of the presser-foot apart. Stitch other pleats in same manner.

Finishing bottom of sleeve.—A faced hem may be used or a straight piece may be sewed on right side and turned back to form a cuff.

If *short sleeves* are desired the pattern should be cut so that the bottom of the sleeve comes just below the elbow. Gather and put into a band 2″ wide and 10″ long when finished.

Setting in sleeves.—Place underarm seams together, find center on top of shoulder, and mark with a pin. Mark center of sleeve in the same way. Beginning at the center with the pins together and the sleeve toward you, place cut edges together and baste. The sleeve should be held just easy. Stitch seam on the right side ¾″ from the edge. Trim sleeve part of seam, leaving ⅛″. Finish by felling down on sleeve, making the seam ¼″ wide when finished.

Seams.—Pin underarm seams and sleeves together with seam on right side. Care should be taken in pinning to make the armseye con-

tinuous. Stitch seam 3/8″ wide. Make a felled seam 1/4″ wide and turned toward the front. Sew other seam in same way.

Finish of the front.—Face back both sides, having edges of hems come on the center front line. Use selvage pieces 2″ wide, each of which is finished at the top with a narrow hem. Leave final stitching until later.

Collar.—Cut collar double. Place right sides together and stitch around outer edge, being careful to have stitching as straight as possible. Trim edge, cutting away surplus material at corners. Turn to right side. Be sure the corners are perfectly square. Trace a line through both thicknesses of the collar and 1/4″ from the raw edge. Find center of collar at back of neck, also center of neck on waist. Mark with pins. Place the underside of the collar and right side of the waist together with the pins matching. Pin or baste and stitch on the traced line. Trim seam. Turn under the raw edge of the top of the collar on the traced line. Pin or baste and stitch as close to the edge as possible.

To stitch fronts and collar.—Begin at the bottom of the right front at waistline and stitch along fronts and around collar as close to the edge as possible. Stitch again 1/8″ to 3/16″ from first stitching. Turn facing on left side of the front toward the center and fasten

securely at the top to keep in place. This lap is used for the fasteners.

Placing of pocket.—The top of the pocket should come 6″ below the shoulder seam and the upper corner 2″ in from the armseye. Place right side of facing to wrong side of pocket, pin and stitch, crease; turn to right side and crease again. Turn raw edge of facing under; baste and stitch as close to edge as possible; stitch also across top of pocket. Turn raw edge of pocket to wrong side and baste. Place pocket in position and baste again. Stitch as close to the edge as possible, continue across top 3/16″, then put in another row of stitching 3/16″ from the first row.

Putting skirt and waist together.—Put a gathering thread on the waistline which allows 1″ for blousing.

Put together with corresponding points of waist, belt, and skirt meeting at center front, center back, and balance points. Draw up gathering threads and fasten. Arrange gathers, leaving about 2″ almost plain under the arms and 3″ at center front. This will bring the greater number of the gathers at the center back and at the sides of the front. The upper part of the belt should just cover the gathering thread.

Turn in ¼″ at each end of belt, then baste belt in place. The upper edge of the lining belt

should come exactly opposite the outer edge so that one stitching will secure both. With the right side of the belt up, stitch around belt as close to the edge as possible. Snappers may be used to close waist and skirt at the front. Place snappers 2½" apart. The belt should be fastened with two hooks and eyes, since the strain is greater at the waistline.

Use of Commercial Patterns and Principles of Cutting and Fitting

I. **Taking measures.**

Waist.

1. Length of back—measure from highest vertebra to bottom of tape at waistline.
2. Width of back—measure from shoulder to shoulder across widest part of back.
3. Front length—measure from collar line to bottom of belt at waist.
4. Chest—measure from shoulder to shoulder across widest part of chest—usually 2½" below neck.
5. Bust—measure over fullest part of bust—raise tape line slightly in back—stand in back of person measured.
6. Neck—measure around neck at the collar line.
7. Underarm—measure from armpit to bottom of belt at waist.

8. Waist—snug.
9. Sleeve: inside—measure from large muscle at armpit to the bone at the wrist, with arm straight; outside—measure from top of shoulder over elbow with arm bent to outside wrist bone.

Skirt.

1. Waist.
2. Hip—9 to 10 inches below waistline or over fullest part of hips (loosely).
3. Front length—from top of tape at waist to floor.
4. Side length—from top of tape at waist over hips to floor.
5. Back length—from top of tape at waist to floor.

II. **Altering commercial patterns.**

Shirtwaist pattern.—Choose pattern which corresponds with the desired bust measure (choose type of pattern to suit the individual. Butterick and McCall patterns run large; Ladies' Home Journal and Pictorial Review run small).

Compare your own length of back with that of pattern. If back is too long, lay pleat across the pattern 3″ below the arms eye, thus taking out surplus length.

If too short, cut pattern at the same point below the armseye, and spread apart the necessary amount.

III. **Preparation of perfect fitting patterns.**

A. *Cutting.*

Cut back double, placing center back on lengthwise fold of material. Mark notches with chalk or tracing wheel.

Lay front pattern on cloth so that larger part of pattern comes at the cut end of the material. Allow about 1″ at the center front for adjustment in fitting. Mark notches same as for back.

Front shoulder should be ¼″ shorter than back—stretch front to fit the back.

B. *Fitting.*

Pin together down front, being careful to keep front straight with the thread of cloth. Tie tape around waist and adjust gathers. Have few or no gathers for a distance of 3 or 4 inches across center front and the same under the arm. Distribute gathers across back, placing more at the center.

The thread of the cloth running across the chest should be at right angles to the center front line. Pin to hold front in this position while fitting.

1. *Shoulder seam.*

For normal figure the shoulder seam should come 1″ back of the top of the shoulder. If the person is round shouldered this line is placed still farther back.

The correct placing of the shoulder seam frequently means that more material must be taken up from either the front or back.

The waist at the neck and shoulders should be perfectly smooth and flat.

2. *Underarm seam.*

The underarm seam should start directly under the shoulder seam, continuing straight to the waistline. The point where the underarm seam crosses the waistline is called the balance point. To determine this point measure one-fourth of the waist measure minus ¾", starting at the center back.

Take out any extra fullness there may be across the bust or back, at the underarm seam. The waist should lie smooth and flat around armseye and on either side of underarm seam.

3. *Neck.*

Take a straight piece of cloth 2½" or 3" wide and place around the neck so that it feels comfortable and so that the lower edge will come where the collar will look best and be most comfortable. Mark lower edge of collar line on waist. A seam allowance of at least one-fourth of an inch should be made beyond this line which represents the line of sewing.

4. *Armseye.*

If too tight—slash in material until armseye feels comfortable. When the waist is taken off, trim out portions, making a smooth curve. The

line at the armseye should slant out gradually as it approaches the shoulder seam.

If there is too much fullness at the armseye toward the front or back so that it stands out just in front or in back of the armpit, lay a small dart in the pattern, taking out the extra fullness.

CHAPTER XIV

CLOTHING

Hygiene of clothing.—At the present time much is being said and written about the conservation of health. How to keep well is of far greater importance than how to get well. It is not, however, only a question of being sick or well, as the terms are ordinarily considered, but of caring for the body in such a way as to keep it at the highest point of efficiency. Proper clothing is one of the means of attaining this end and is, therefore, worthy of careful consideration. While age, climate conditions, and the occupation of the wearer all affect the ultimate working out of the problem, nevertheless there are some general principles which will help in the determination of what is best, considering the conditions of daily life.

One might ask the question, "Why do we wear clothes?" Different answers would naturally be expected, as the use of clothing is quite different under different circumstances. To summarize, the use of clothing may be given (1) as a means of protection; (2) to satisfy our

sense of modesty; (3) to satisfy our instinctive love of adornment; and (4) that we may appear like others, or be in fashion. In cold climates the protection afforded by the clothing worn is of primary importance, while to the naked savage in Africa, whose only clothing is a string of beads, love of adornment heads the list. Adornment and fashion are of first importance in the minds of many, and are alone considered when choosing clothing. Fashion should not be ignored, but neither should the extremes of the designer be followed at the expense of proper protection or the sacrifice of the sense of modesty. Compliance with the demands of fashion is good up to a certain point. Unless dressed according to the prevailing styles the majority of people are uncomfortable, become self-conscious, lose their poise, and are unable to do their best work. One should strive to dress in such a way as to be unconscious of clothes. That is the condition which will make possible the largest amount of effective work. Some one has said, "To be well dressed is not vanity but sanity," and it is true when considered from the standpoint of the comfort and poise of the individual.

As mentioned above, age, climate, and occupation greatly affect the clothes problem. The infant, because of its proportionately large surface area, loses heat much more rapidly than

the adult, and, therefore, must be protected by warmer clothing. Wool next to the child is necessary through the second summer. Old persons frequently feel the need of wool, because, since they are less active, their circulation becomes sluggish and it is, therefore, more difficult to keep sufficiently warm. It is impossible to lay down any hard and fast rules, as individuals differ in their requirements, but as a general rule the normal adult does not feel the need of woolen undergarments. The warm houses and public buildings of the present time make it seem wiser to wear less in the house and then have a heavy wrap to wear out-of-doors.

The physical properties of textiles which were given in previous chapters should be reviewed, as those which affect the conduction of heat, absorption, and evaporation of moisture are of importance in considering the hygiene of clothing in general, and especially of underclothing. Wool and silk are poor conductors of heat, and linen and cotton better conductors. Wool feels warm to the touch because it does not take heat away from the body. Linen and cotton feel cool and, therefore, make pleasant clothing for summer. The amount of air enclosed in the meshes of the fabric affects the conduction of heat even more than the nature of the fiber. Still air is a poor conductor of heat, and a cotton or linen fabric, if loosely

woven or finished with a napped surface, is quite warm. Outing flannel is a good example of the effect of air spaces in increasing the warmth of a cotton fabric. Linen absorbs and gives off moisture rapidly, cotton and silk more slowly, and wool most slowly of all. The hygroscopicity, or the property of absorbing moisture without seeming wet, is high in wool and silk and low in linen and cotton. Wool may absorb 30 per cent of its weight of moisture without feeling wet.

Loosely woven linen makes an ideal material for summer underwear because it absorbs and gives off moisture very readily, thereby cooling the skin. The high price is prohibitive for most people, so the linen mesh underwear is not much used. A knitted cotton garment does very well, and the lower price makes these garments more popular than the linen. Linen and cotton can be laundered much more easily than wool and silk, which is another point in their favor for use in undergarments.

Wool would make an ideal material for cold weather undergarments because of its low heat conduction, if it did not hold moisture for so long a time and "felt" in washing. Both objections may be partially overcome, especially the latter, by mixing cotton, linen, or silk with the wool. Infants, invalids, and aged people who exercise little and do not perspire freely,

need the warmth of the woolen material, and for them the wool and cotton, wool and linen, or wool and silk garments are satisfactory. A light-weight woolen garment worn over a thin cotton one is found by some people to be a good combination. The cotton takes up the moisture readily and it is then taken up and given off slowly by the wool. This arrangement provides for the absorption of the perspiration and prevents the chilling of the body.

The average normal individual is more comfortable when clothed in cotton undergarments of various weights. Undergarments made of silk have a pleasant "feel" and the heat conduction is low. The price is prohibitive for most people, however, and it is, therefore, little used in undergarments.

It should be remembered that heavy and warm are not synonymous. A garment may be heavy and still not warm. Two light-weight garments are much warmer than one heavier one because of the layer of air between the two garments.

The requirements for outer and undergarments differ somewhat, as the garment worn outside should be such that the wind will not penetrate easily, while a loosely woven undergarment offers greater protection because of the spaces retaining heated air.

The importance of keeping clean the clothing

worn next the skin can hardly be overestimated. The sweat glands of the normal adult secrete about three pints of perspiration daily, and most of this must be taken up by the clothing. When the pores of the cloth become clogged, proper absorption and ventilation are prevented, which means that the body remains moist and exposure to a draft causes a chill. Some fabrics are naturally cleaner than others. Linen contains less natural oil than cotton, and, since the fibers are longer, has fewer protruding ends to catch dirt and bacteria. Experiments show that about three times as much dirt clings to cotton as to linen, and about twice as many bacteria are collected by the skin when cotton garments are worn. Cotton fabrics, however, may be easily laundered, and the high temperature and soap used are satisfactory disinfectants. Cotton garments may, therefore, be kept in a sanitary condition if changed frequently. Wool furnishes an excellent feeding ground for bacteria, especially when soiled, and the difficulty with which it is laundered makes an added objection to its use next the skin. Sleeping between woolen blankets, which cannot be washed frequently, is a most unsanitary practice, as the above statement indicates. Either sheets or cotton blankets which may be frequently washed should be used. Sheets should be long enough to tuck in well at the bot-

tom and fold over the bedding at the top at least a foot. This serves as a protection for the bedding which cannot be washed often.

Many girls and women are not sufficiently careful about frequent washing of corsets and shields. Corsets may be easily and thoroughly cleaned by the use of a small brush and plenty of soapsuds. After rinsing in clear water and drying in the sunshine, the garment is as fresh and clean as when new. Shields should be soaked a few hours in tepid suds, prepared with a pure neutral soap and soft water, and rinsed in cold water. Hot water makes the rubber brittle and should always be avoided. A brush may be used here also, but it should not be necessary if the shields are washed frequently. They should then be hung to dry in a cool place, never near the stove or over a register, as the heat will spoil the rubber. Shields may also be kept in good condition for several days if they are washed off each time the garment is removed. This may be done by using a cloth dipped in soapy water, and afterward one rinsed in clear water. Thus the shields need not be removed from the garment then. They must be removed frequently, however, and washed thoroughly.

The corset.—While it pleases fashion at present to have the waist large and the clothing worn loosely, in a few seasons the tendency may

again be toward the small waist and consequent tight lacing. In considering the subject of proper clothing, therefore, we cannot omit a discussion of the results of constriction of the waist and chest by the use of a tight corset. There may be a difference of opinion as to whether the present modes, allowing greater freedom of movement and a possibility of deep breathing, are the result of education along these lines or whether they are simply a whim of the designer. We trust and believe that the trend at the present time is toward more sensible and hygienic dress for women.

Dr. T. Sadler, in "The Science of Living or The Art of Keeping Well," says on this subject: "Corsets restrict the breathing; they weaken the abdominal muscles; they displace the internal organs, favoring constipation, and indirectly contributing to the causes of indigestion and congestion of the liver and pelvic organs. The corset is indirectly chargeable with the vast amount of the sufferings of womankind usually designated as 'Female complaints.'" The present day corsets, mentioned previously, cannot be charged with the evils spoken of by Dr. Sadler. The pressure in this case is low on the abdomen, where there are few organs, and serves as a support, holding the organs in place instead of causing the downward pressure. With the possible looseness at

the waist and above, there need be little if any interference with the circulation and deep breathing. The front laced corset is found to be more comfortable by those whose work requires that they sit most of the day. The pressure of the front steel on the nerve center causes discomfort in some cases and many doctors recommend the front lace corset because it does away with the steel in the front. Tight garters on any corset are bad because of the downward pressure which should always be avoided for reasons already given.

Corsets are not necessary for the woman with strong muscles unless she has a large accumulation of fat at the abdomen which needs to be kept in place. Unless all garments be suspended from the shoulder, however, which is not always convenient, the discomfort from the bands at the waistline may be much worse than a loose corset giving plenty of breathing space. Hanging all garments from the shoulders may cause an undue strain on the back. This again is something which each individual must decide for herself, keeping in mind the general principles of health and hygiene.

Shoes.—Shoes should protect the feet from hard or sharp objects and from heat and cold. It is important that the feet be kept warm and dry, as cold feet are frequently responsible for colds, disturbance of the bowels, and inflamma-

tion of the pelvic organs. A physician who has had large experience in a children's hospital said that cold feet were the cause of more colic in babies than any other one thing. Cold extremities prevent proper digestion. Wearing rubbers is not considered fashionable by some, but a pair of rubbers worn in stormy weather will save much discomfort and possibly several doctor bills. Rubber is impervious to both perspiration and air, and, therefore, should only be worn when necessary. The low sandal variety is best under ordinary conditions. The question of wearing low shoes in cold weather should not be overlooked. The blood vessels are near the surface in the legs and arms, especially at the joints, as ankles and elbows, and consequently insufficient covering of these parts means a chilling of the blood. This undue loss of heat in the extremities means a proportionate congestion in some internal organ, with a possibility of serious results. It should be remembered also that such a loss of heat means a loss of energy which might have been stored up for use in time of emergency or expended in accomplishing something worth while.

The close fitting, extremely pointed-toed shoes with the absurd French heels cannot be too strongly condemned. High heels are especially harmful to young girls who are just developing into womanhood, and mothers should

"think twice" before allowing their young daughters to wear them. The natural shape of the foot should not be lost sight of in selecting shoes. It is unlike the hand in that the large toe, which corresponds with the thumb, is usually longer than the others, and instead of running straight ahead, as so-called "anatomical" shoes are built, slopes slightly outward. The shoe should, therefore, be somewhat pointed, slanting from both sides toward the center, although most of the slope should come on the outside, following the natural curves of the foot. The natural lines of the human foot are graceful and beautiful, and if we would only accustom our eyes to its real shape as displayed in properly fitting shoes, we would soon admire nature's work and cease futile attempts to improve upon it. Discomfort means lowered efficiency, and it is important, therefore, to have the feet, as well as the other parts of the body, comfortably clothed.

Experience with a large variety of materials has shown leather to be the best for general use. For shoemaking purposes, it is unsurpassed because it is tough, flexible, porous, and reasonably water-proof, and has a moderate degree of ventilation. It is not ideal because it retains heat and perspiration to an undesirable degree, has an unpleasant odor, and cannot be kept clean, to say nothing of sterile. The same pair

of shoes should not be worn constantly, since they do not become thoroughly aired and dried out during the night. It is more satisfactory and economical to have two pairs of shoes for ordinary wear, and change frequently.

Just a word about the selection and care of stockings. It would be ideal from a hygienic standpoint if white hosiery could be worn all the time, but for obvious reasons this is not convenient. The dye used in black or colored hose may cause trouble if the skin is bruised and broken. Numerous incidents could be cited of blood poisoning being caused in this way. Sometimes it has meant being laid up a few days, and occasionally even the loss of a limb. How to prevent such a situation is the question which interests us. Something may be told about the permanency of the dye by moistening the handkerchief or any piece of soft white cloth and rubbing the stocking. If the cloth is stained the stockings will crock when worn. Tight or ill fitting shoes frequently cause blisters which result in trouble. If the shoe rubs at the heel and begins to redden the skin, a thin piece of velvet pasted in the shoe, with the napped side next to the stocking, will prevent friction. Stockings which are too short are uncomfortable and do not wear well because of the constant pressure. On the other hand, if they are too large the surplus forms in creases

or folds which are also uncomfortable. The "happy medium" of a perfect fit should be arrived at if possible for the sake of comfort and economy. For the person with sensitive feet the right and left hose, which are now manufactured, are advisable but are unnecessary for the individual with normal feet.

One-piece garments.—From the inside out, one-piece garments are best from a hygienic standpoint. They are more comfortable, as all who have tried both will testify. Extra bands and layers of material are eliminated. Such garments may be worn loose, since they are held in place, always looking neat and trim. Union suits are constantly gaining in favor, also combination suits, princess slips, and one-piece dresses. Fashion is partially and perhaps largely responsible for the trend in that direction, but however that may be, we trust that the condition may become even more prevalent in spite of changes in fashion.

Collars.—High, tight collars interfere with the circulation and may affect the eyes. Exposure of the throat and chest in cold weather is unwise for the average individual, as it means an undue loss of heat and energy. It is just as unwise, however, to bundle up the neck with heavy furs or mufflers. This excessive covering of the neck and chest causes the skin to perspire freely and become tender so that the least ex-

posure to cold results in congestion, thus increasing the possibility of sore throat, colds, and pneumonia.

Hats.—Large or heavy hats are uncomfortable, either because of the weight or the difficulty with which they are balanced. Nervousness and an unnatural position may result because of the effort to balance and maintain the poise. Tight hat bands affect circulation and cause discomfort. Men err on this point more frequently than women but when the mode in vogue calls for the close fitting hat for women, it is well to have this possible danger in mind.

Garments worn at night.—It hardly seems necessary at this time to refer to the wearing of garments at night which have been worn during the day, but lest there be some who have never thought of the necessity of airing, especially the undergarments, it is mentioned here. The discussion concerning absorption and evaporation of perspiration explains the reasons for this. The union suit, shoes, and stockings should be placed where they will be thoroughly aired during the night. The dress or waist should be hung either wrong side out, or at least with the inside and shields sufficiently exposed so that they are well aired.

If one is not sufficiently warm without the underclothing at night, a separate suit should be used. Aside from the reasons already sug-

gested, the added bodily comfort is an important fact. For greater warmth sleeping garments of wool or heavy cotton flannel may be worn.

Appropriate dress for various occasions.—The gown should always suit the occasion. The school girl and the business woman should attire themselves simply, becomingly, and neatly. The fancy lingerie, lace, or chiffon blouse, very low necks, short sleeves, party slippers, plumed hats and jewelry, are all out of place in the correct business or school costume. The simple tailored suit, with a tailored or a very plain shirt waist, good sensible shoes, and a simple small hat are much more fitting. The sailor suit is always appropriate for the school girl.

The reception or party gown is out of place at a Sunday service. Clothes worn to church should be simple and inconspicuous. It is much better to be underdressed than overdressed.

Simplicity and immaculate neatness should characterize the dress of the traveler. It should be free from all unnecessary ornament and should be inconspicuous in color.

The dress of the individual must be suited to the community in which she lives. The elaborate evening gown, perfectly correct at a formal city reception, would be entirely out of place in a small country town.

Economy of dress.—Unless one's circum-

stances are such that a suit or a dress may be discarded after wearing a few times, novelties in color and style should be avoided. The selection of color is important, not only from the artistic point of view, but also where the money side is being considered. The woman who is spending only a small amount on her clothes cannot afford to wear vivid, striking, or queer colors nor extreme or ultrafashionable modes. She should adopt a color scheme limited to those colors that are becoming and that harmonize. Use a staple color, as navy blue, a soft brown, or green as a foundation with gloves, hats, neckwear, and other accessories in harmony. The economy of this is evident, as fewer garments will serve all occasions. Navy blue is a safe color to choose as it is becoming to almost every one and can be purchased in all standard materials. The woman with brown eyes or red hair will find brown, green, or black most becoming, and therefore most suitable.

What is a bargain.—Is there anything which so delights the heart of a woman as being able to take advantage of a bargain? Everything placed on the counters where a bargain sale is advertised is not necessarily a real bargain. The salesmen have discovered that many women do not exercise their judgment when attending such sales and have learned to take advantage of this. The following incident illustrates this

fact: A clothing store in Michigan had a slight fire, and some of their goods were mussed and soiled by the water and smoke. To get rid of these damaged goods a fire sale was advertised. The people thronged to get the bargains offered, and continued to come after all the sale goods had been sold. The merchant did not like to disappoint the crowds, so had the clerks take new, fresh materials and wipe the floor with them to make them look like the others, and then for their trouble the price was raised a few cents. The crowd eagerly snapped up "the bargains" and went away happy.

When attending a sale of any kind, one should look for legitimate reasons for the reduced price. Broken lots and odd sizes must be gotten rid of, even at a sacrifice. Soiled garments do not sell readily at the regular price, and the merchant is glad to make a reduction to get rid of such garments. In such a case, if the garment be one which can be laundered and the reduction more than covers the cost of laundering, this may be termed a legitimate bargain. The same may be said of mill ends, remnants, samples, and novelties such as belts, bags, and collars. Seasonal sales also furnish an opportunity for economical purchases. For example, the January white goods sales have become an established custom in many stores. Real bargains may be found at such times.

Rubber goods and silks, which deteriorate rapidly, are frequently put on sale in order to dispose of them quickly. Sale silks are seldom economical, and unless you are allowed to test a sample and find the silk unweighted, beware. A weighted silk which has been in stock for some time will seldom wear long enough to pay for making up. A young woman bought such a silk and after keeping it a few months took it to the dressmaker. The waist was cut out but never basted together, because when the pleats were laid it split in the creases. Occasionally there will be found in the lot, an unweighted silk which is really a bargain.

Another danger encountered in bargain sales is the temptation to buy things that are not needed at the time, and with no prospect of an early future need. A story is told of a woman who was fascinated by sales of all kinds. She frequently brought home purchases which greatly amused the family. One day, after attending a second-hand sale, she returned with a door plate on which was engraved the name Thompson. When asked what use she expected to make of a door plate with Thompson on it, she replied that she thought one of her daughters might marry a Mr. Thompson and then she could give it to them. Perhaps this seems almost unbelievable, and yet women are constantly buying things for which they have as lit-

tle need. Benjamin Franklin said, "Buy what thou hasn't need of, and ere long thou shalt sell thy necessaries." This does not refer to buying staples in quantities. It is wise to put in a supply of thread, needles, pins, tapes, bias bindings, and such things that are frequently needed. This will save the inconvenience and loss of time caused by numerous shopping trips when these things happen to be needed. Staple cotton materials, hosiery, undergarments, and such other materials and garments not largely affected by fashion may be purchased in quantities out of season when the price has been reduced. Suits, coats, etc., may be purchased late in the season at about half price. If one is willing to wear plain tailored styles, which do not change so radically from season to season, instead of the extremes, fads, and novelties, it is possible to dress well on a smaller amount of money. A person of small means should not attempt to keep up with all the fads, as they soon lose their attractiveness and, therefore, necessitate frequent changes, if one is to appear well dressed.

Buying staples in large quantities and buying out of season necessitate an income beyond the amount needed from day to day. Unfortunately those who need most to economize are unable to take advantage of such methods of economy.

There are many who, either because the income is small or because of a lack of planning, buy on the installment plan. An investigation made in New York City showed that from 20 per cent to 100 per cent more than regular price was paid when the installment plan was used. It is unfortunate that those who need to economize most, frequently shop in this way.

Care of clothing.—Proper care of clothing plays an important part in the clothes problem if one wishes to appear well dressed on a small or even reasonable amount of money. The appearance of the most beautiful garment is greatly impaired if mussed, spotted, or minus a hook, eye, or button. On the other hand, a simple dress of inexpensive material if in good repair and correctly put on, gives one a well dressed appearance. The careful brushing of clothes which have been worn on the street is a point frequently neglected, but is one which adds much to the appearance and life of the garment.

Clothing budget.—A consideration of the proportion of the income which should be spent for clothing, and how that amount may be most wisely used, is of value. Such a study gives us the benefit of the experience of others and makes us think about the garments which will be best suited to our needs. This planning will naturally reduce expenditures, as any one

knows that haphazard buying is extravagant. For the person on a salary there is quite an advantage in planning the purchases from month to month and year to year. In this way it is possible to avoid having an undue proportion of purchases come in one month or one year. If this is not considered, a suit, waist, hat, shoes, and gloves may all be needed at the same time without sufficient money to pay for them. The same is true of garments for the year. Coats, suits, furs, etc., should be distributed so that all are not purchased from one year's salary.

Studies of thousands of family and personal clothing budgets show that the amount spent for clothing varies from 12 to 17 per cent of the money received. Circumstances vary the amount which must be spent. For example, a teacher or a woman in business, who must always be well dressed, must spend more money for clothing than the woman in the home who is most neatly and properly attired for at least part of the day in a simple cotton house dress. The climate also affects the kind and amount of clothing needed. There is a value in keeping one's clothing account from year to year, since it shows what purchases have been made, and a study of it in comparison with other clothing budgets may show how better results could

be obtained for the same or a smaller expenditure.

Suggestive Review

1. Hygiene of clothing. Functions of clothing. Undergarments, quality suited to individual, importance of keeping clean. Bedding and bedroom ventilation. Hygiene of corsets, shoes, hats, dressing of neck, etc.

2. Appropriate dressing for school girls and business women. Suitable clothes, etc.

3. Bargains—legitimate bargains, so-called bargains which are frauds.

4. Proportion of income spent for clothing. Value of keeping accounts.

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