

SECTION V

DIMENSIONAL CHANGE

RELAXATION SHRINKAGE

Why does it occur? Most fabrics are produced under tension. These tensions leave strains in the fabric. Unless these strains are fully released by the manufacturer before the fabric is made into a garment, relaxation shrinkage will ultimately occur. (23) Relaxation shrinkage is the tendency of the yarns to revert to their normal, unstretched dimensions. In many cases, sizings or finishes help keep the fabric in its stretched condition.

When does this occur? If a fabric has not been fully relaxed by the manufacturer, drycleaning and steaming in normal finishing will cause the fabric to continue its relaxation

and shrinkage. Usually several cleanings will be required to relax it completely. Laundering or drycleaning may partially or wholly remove any sizings or finishes which tend to stabilize the fabric dimensions. (24)

How may this be controlled? Many good methods are available to pre-shrink and to stabilize fabrics in textile manufacture. Many consumers have learned that the added cost for a pre-shrunk or stabilized fabric is a worthwhile investment.

(Reference: NID Technical Bulletins T-142; T-207; T-249; Fabrics-Fashions Bulletins FF-53; FF-109.)

FIGURE 174

When the tensions of weaving and finishing are released, a fabric will partially relax. Further relaxation may occur during use, wear or cleaning. This is called relaxation shrinkage. The illustration shows how the degree of shrinkage can be measured or determined by standard test methods.



RELAXATION SHRINKAGE—HYDROPHOBIC FIBERS

Why does this occur? It has been observed synthetic fibers such as Movil, Rhovyl, Saran, Rovana, shrink in perchlorethylene. This is believed to occur because of molecular orientation and consequently fiber relaxation caused by a slight take-up of the solvent by the fiber; hence shorter fabric dimensions.

When does this occur? Relaxation shrinkage occurs when the fabric is drycleaned in perchlorethylene.

How may this be prevented? Fabrics made of Movil, Rhovyl, Saran, Rovana should be drycleaned in petroleum solvent. If construction of the item permits, they may be wetcleaned.

(Reference: NID Fabrics-Fashions Bulletins FF-26; FF-31; FF-57; FF-94.)

SWELLING SHRINKAGE—HYDROPHILIC FIBERS

Why does this occur? When fibers pick up moisture they swell. This can cause shrinkage in rib-weave fabrics and in rib variations. These include some failles, Gros de Londres, epingles, grosgrains, bengalines, and ottomans. Shrinkage is usually greatest in the rib-weave fabrics made of wool, rayon, cotton, acetate, or a combination of any of these. Shrinkage of rib-weave fabrics is due to two causes: (1) the fabrics are not relaxed; (2) the fiber content and weave construction makes them susceptible to swelling shrinkage. (25) Usually rayon or acetate yarn is used in the warp or lengthwise direction of the fabric. The heavy crosswise rib is usually made of rayon and cotton. These rib fibers swell more than acetate when wet.

When they swell, they pull the ribs close together and shrinkage occurs.

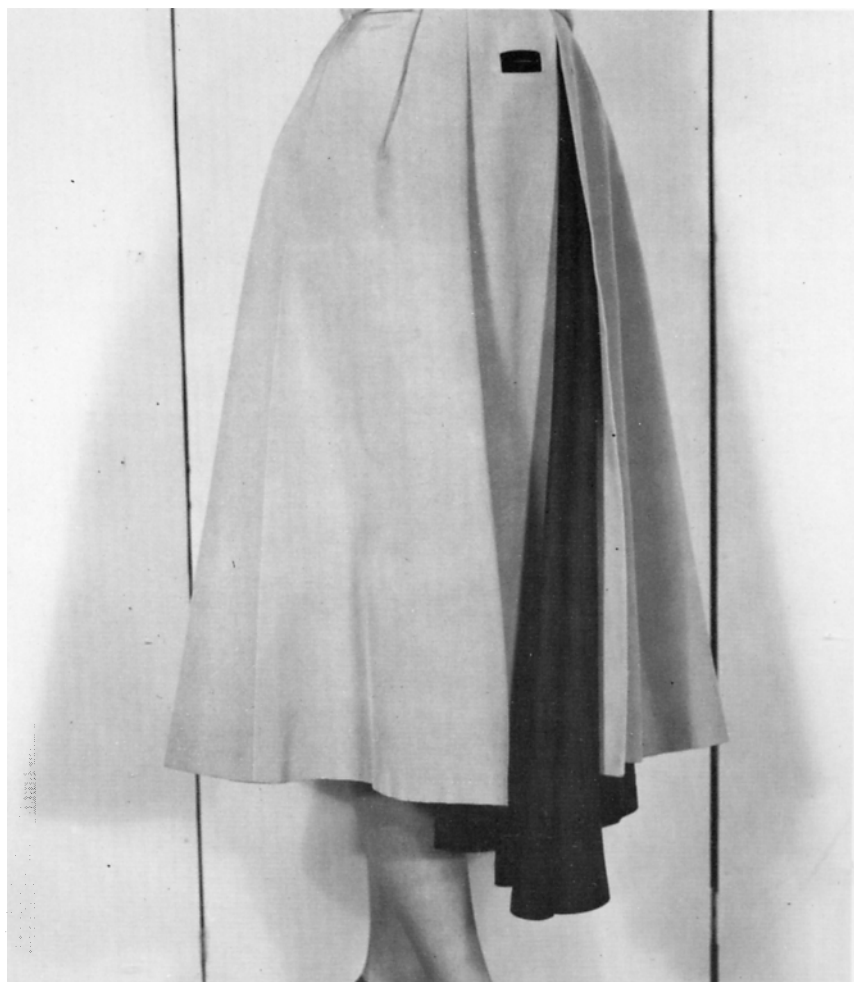
When does this occur? Shrinkage may occur when these garments are drycleaned, wet-cleaned, or laundered. Some may shrink even when steam is used in finishing them.

How may this be controlled? Fabrics may be preshrunk by methods available in modern textile finishing plants, though the relaxation of rib-weave fabrics is more difficult than that of others. This group of fabrics should be cleaned in solvent with low relative humidity. Wetcleaning or laundering results in the risk of excessive shrinkage.

(Reference: NID Technical Bulletin T-283)

FIGURE 175

The light ribbed-weave fabric was even in length with the black taffeta insert in this dress before it was drycleaned.



SEE FIGURES 176 and 177
on P. 536.

FIGURE 176

Shrinkage caused the puckering of the seam line where the black taffeta fabric joins the light ribbed-weave fabric.

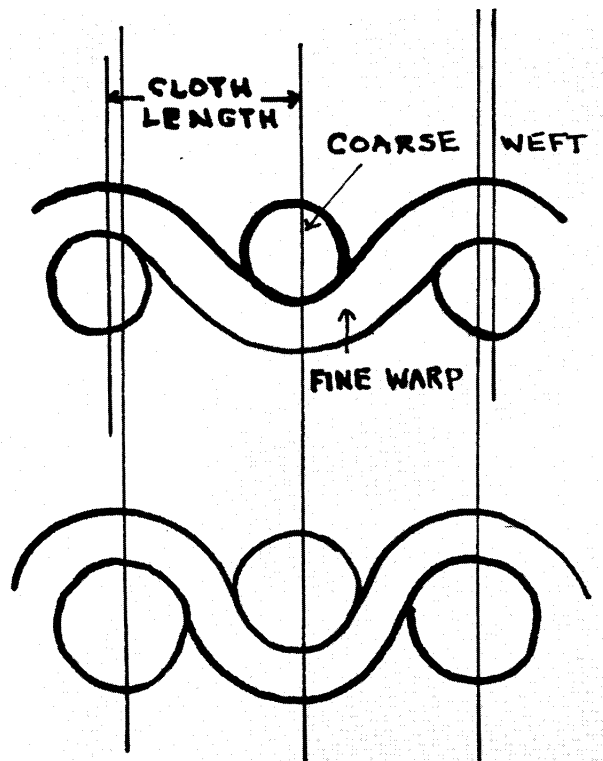
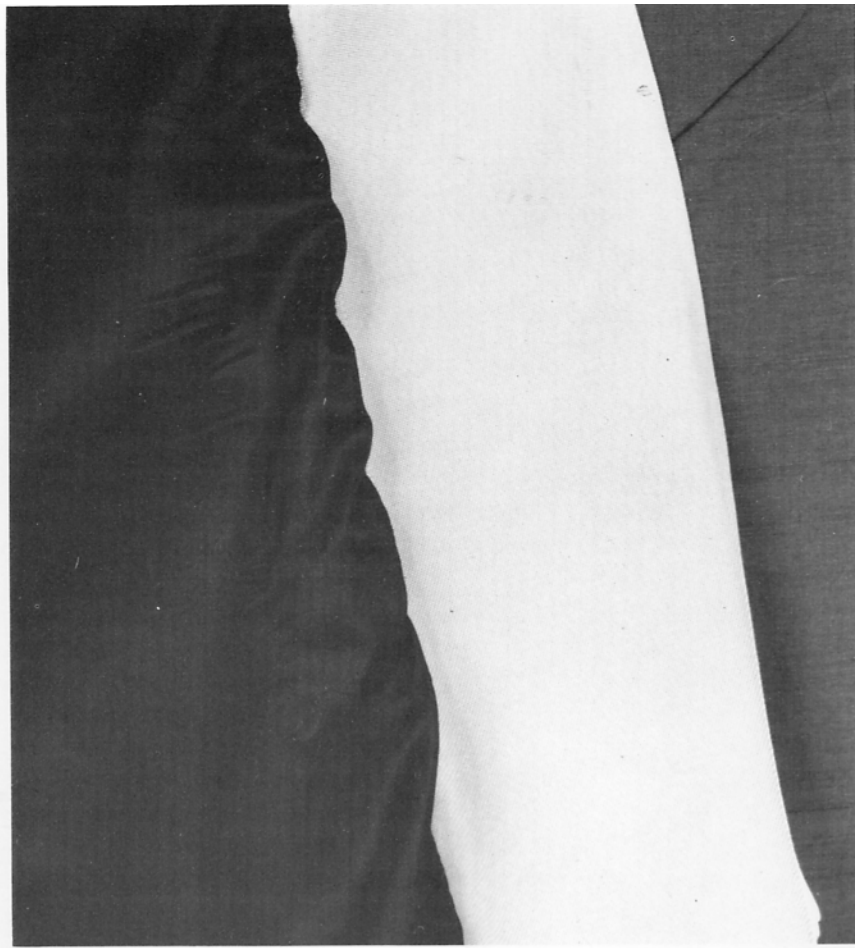


FIGURE 177

A cross sectional view of 3 ribs in a rib-weave fabric. The upper diagram shows the fabric in a normal condition. In the lower diagram, the rib yarns have increased in moisture content and swelled, causing shrinkage. (25)

FELTING SHRINKAGE

Why does this occur? Felting shrinkage may occur in fabrics made of wool and hair fibers. The wool and hair fibers possess a natural tendency to shorten and mat together. This is called "felting" shrinkage. (23) Any fiber that has a scaly surface structure has a natural tendency to felt. The tendency to mat is more pronounced in angora than in wool or other hair fabrics. Woolen fabrics containing small percentages of angora shrink much more readily than do all-wool fabrics. Soft, loosely woven wool fabrics, especially those of high-grade wool fibers, have a tendency to felt more than hard-finished wool fabrics.

When does this occur? Felting shrinkage can result from: (1) excessive mechanical action during drycleaning and drying; (2) high temperature along with tumbling action in drying; (3) high relative humidity of the solvent during drycleaning. (24)

How may it be controlled? Recommended drycleaning plant practices for handling these specialty items will usually control this problem. Once a fabric has become felted, it is impossible to stretch it back to its original size.

(Reference: NID Technical Bulletins T-71; T-142; T-293; T-316)

FIGURE 178

Specialty wool and hair fibers have an exceptional tendency to shrink and mat. This angora sweater shrank to one-third its original size. The drycleaner should have cleaned it by hand methods.



SHRINKAGE IN PRESSING OR FINISHING

Why does this occur? Some fibers and some fabric constructions—particularly wool mohair and thermoplastics—are softened when steamed and pressed. As a result, they relax and shrink during pressing rather than during drycleaning. Some knitted fabrics made of Orlon, Dynel, Rhovyl, Movil, as well as some wool jerseys, have been found to shrink excessively when steamed. Drapery fabrics made of Dynel, Saran, Rovana may shrink in steam finishing.

When does this occur? This type of shrinkage occurs in commercial drycleaning and laundering establishments when these items are

finished on modern steam and air finishing equipment.

How may this be remedied? Many wool fabrics sold as piece goods are not pre-shrunk during textile manufacture. It is a good practice to have these fabrics steamed to relax them before they are made up into garments. Fabrics made of the heat-sensitive fibers should bear identifying labels to insure proper handling in the drycleaning plant.

(Reference: NID Technical Bulletins T-108; T-306; T-308; T-318; Fabrics-Fashions Bulletins FF-6; FF-26; FF-31; FF-35; FF-36; FF-57; FF-78; FF-93; FF-94; FF-99.)

SEE FIGURES 180 AND 181 ON PAGE 539

FIGURE 179

Some manufacturers state clearly on hangtags that fabrics should not be steamed. This information should be on permanent labels attached to the garment.

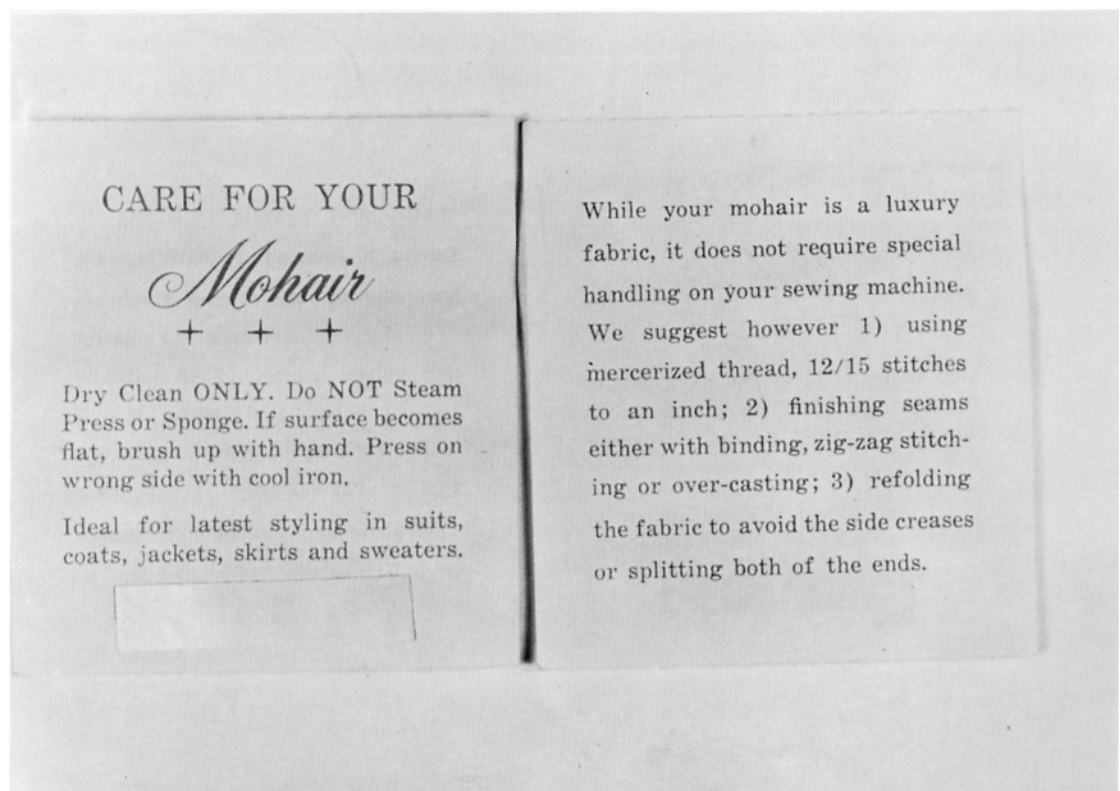


FIGURE 180

This Angora-like sweater handled according to good dry-cleaning practices for 100% Angora, shrank to a degree that it was no longer wearable. Why? The imported sweater is made of 50% Angora, 50% Rhovyl, a solvent-sensitive and heat-sensitive fiber made in France.

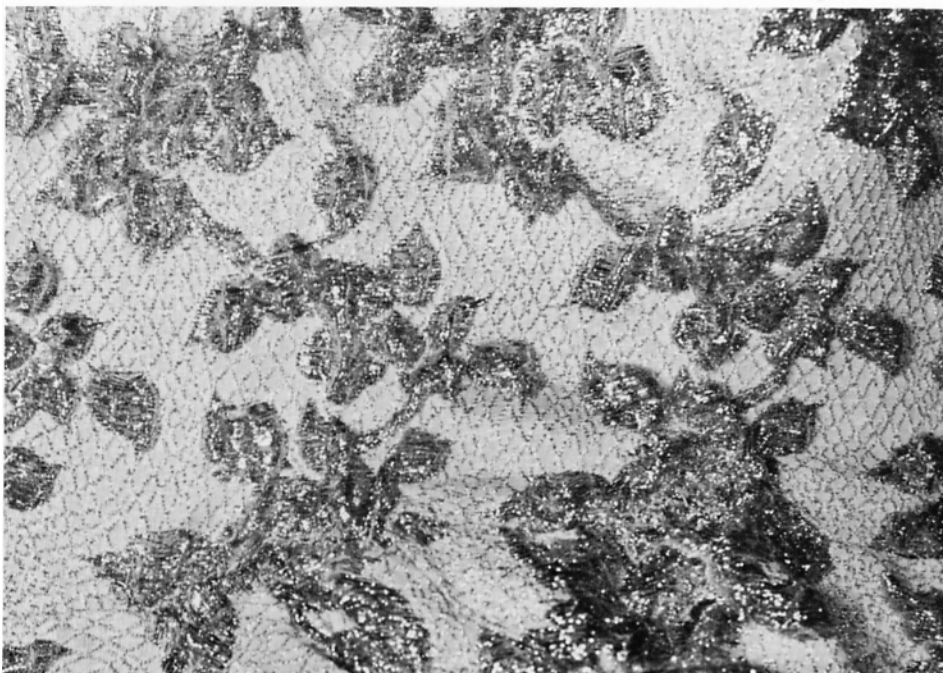
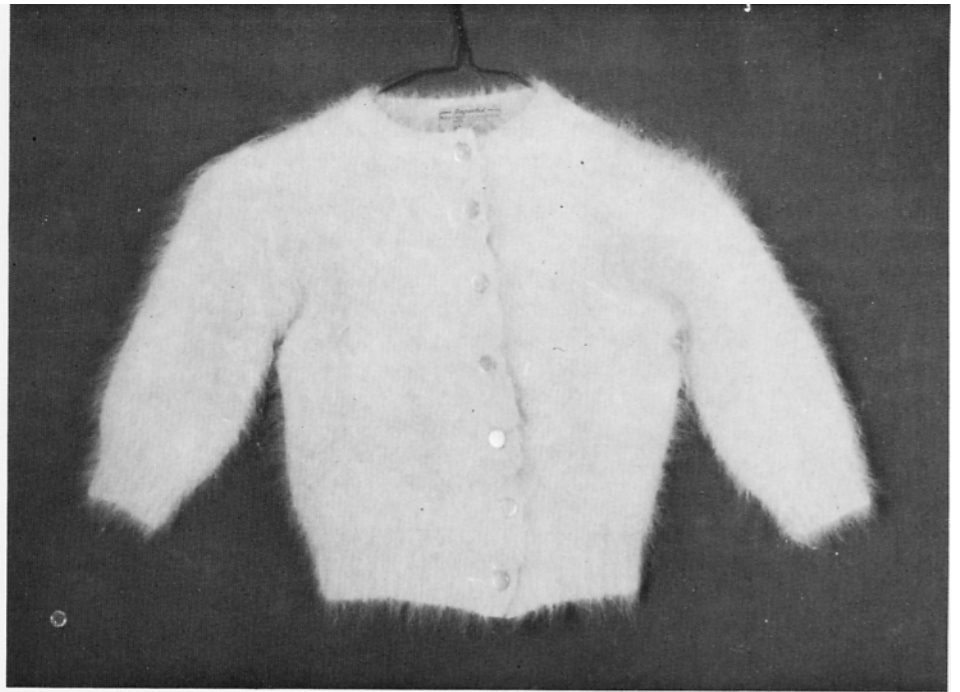


FIGURE 181

This brocade fabric is made in Japan. The white background fabric is polyvinyl chloride in both the warp and filling direction. The gold metallic yarn forms a diamond and floral design. Finishing caused shrinkage to the degree the dress was not wearable.

PROGRESSIVE SHRINKAGE

Why does this occur? Relaxation shrinkage and swelling shrinkage seldom reach their maximum in the first drycleaning. These forms of shrinkage continue through successive drycleanings. This is called progressive shrinkage. (24)

When does this occur? Progressive shrinkage may not become noticeable until the third or fourth drycleaning in an overstretched, sized

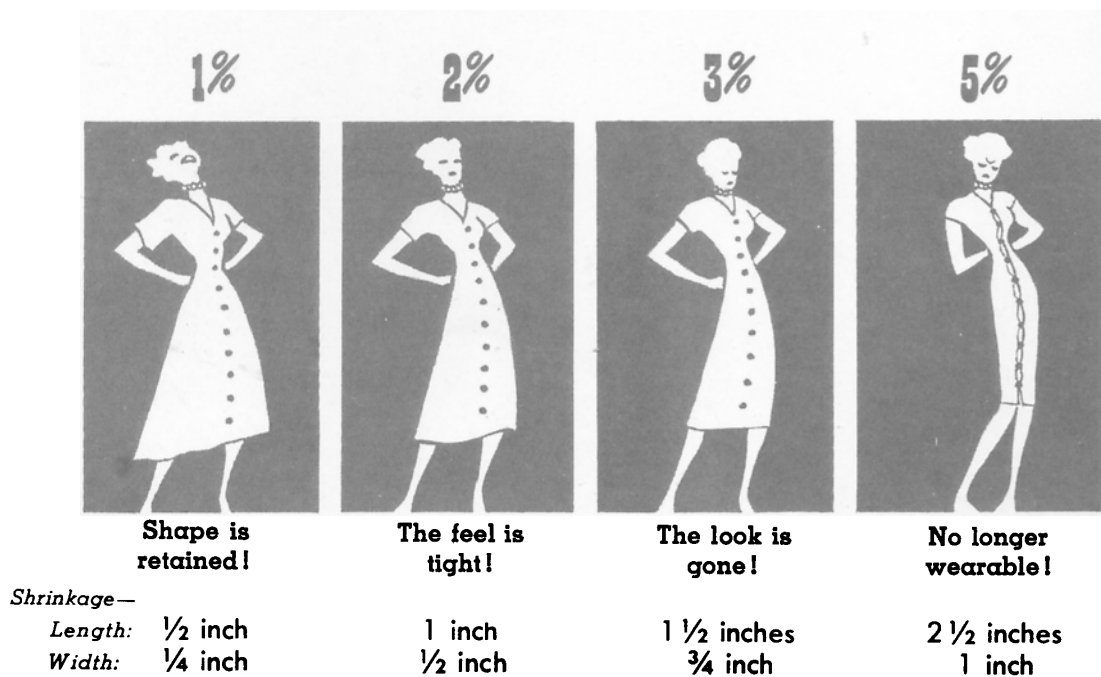
fabric. Some fabrics may continue to shrink a little each time they are drycleaned. Maximums have been reached in tests anywhere from the second to tenth drycleaning.

How may this be controlled? Progressive shrinkage may be controlled by relaxing or pre-shrinking fabrics before they are made into garments.

(Reference: NID Technical Bulletin T-142; T-257)

FIGURE 182

Shrinkage may be progressive with successive dry cleanings.



SHRINKAGE OF BIAS-CUT GARMENTS

Why does this occur? Bisymmetrical circular-cut skirts may shrink (1) in the center front and center back, or (2) at each of the side seams, depending on (a) the construction of the fabric, and (b) the relative direction of the warp yarns and the filling yarns to the cut of the garment. The majority of fabrics shrink to the greatest degree in the warp or lengthwise direction. If a skirt is cut with the filling yarns of the fabric at the center front and center back, it will shrink at each side seam. If the warp yarns are parallel to the center front and center back and the side seams parallel to the filling yarns, the

skirt will shrink at the center front and center back.

When does this occur? Bias-cut garments may shrink in drycleaning, wetcleaning, laundering, or steam pressing.

How may this be controlled? Pre-shrinkage of fabrics before garment construction will control this problem. Depending on the fabric construction, a finisher in a drycleaning plant may recover some shrinkage loss by steaming and shaping the fabric on a press. Many fabrics do not respond to this technique.

(Reference: NID Technical Bulletins T-68; T-201; T-206; T-305)

FIGURE 183

Some bias-cut skirts shrink in the front and back; others on the sides, depending on the fabric and the way it is cut.



FIGURE 184

A small amount of shrinkage in a bias-cut garment is sufficient to distort it to the degree that it is no longer wearable.



SHRINKAGE IN FABRIC COMBINATIONS

Why does this occur? In some cases, two different fabrics that have very different shrinkage characteristics may be combined in a garment or household item. For example, a drapery fabric or a dress fabric may shrink more than its lining fabric. The reverse might also be true.

When does this occur? After a lined drapery is drycleaned, the outer drapery fabric may shrink more than the lining fabric. Puckering of the lining results and the drapery fabric may need to be lengthened. In some jackets, the lining fabric may shrink and the outer fabric remain stable. This also causes

puckering. Some dress designs combine a taffeta, satin, or peau de soie fabric with a net or non-woven lining fabric. The slightest difference in shrinkage of the two combined fabrics may be very noticeable in the puckering along the seam lines and hemline.

How may this be controlled? Only fabric combinations which do not differ in their shrinkage characteristics should be combined in garment design. This would help to eliminate this problem.

(Reference: NID Technical Bulletins T-182; Fabrics-Fashions Bulletin FF-17)

SEE FIGURES 186 AND 187 ON PAGE 543

FIGURE 185

Note that lining fabric is sewn into each seam and the hemline.



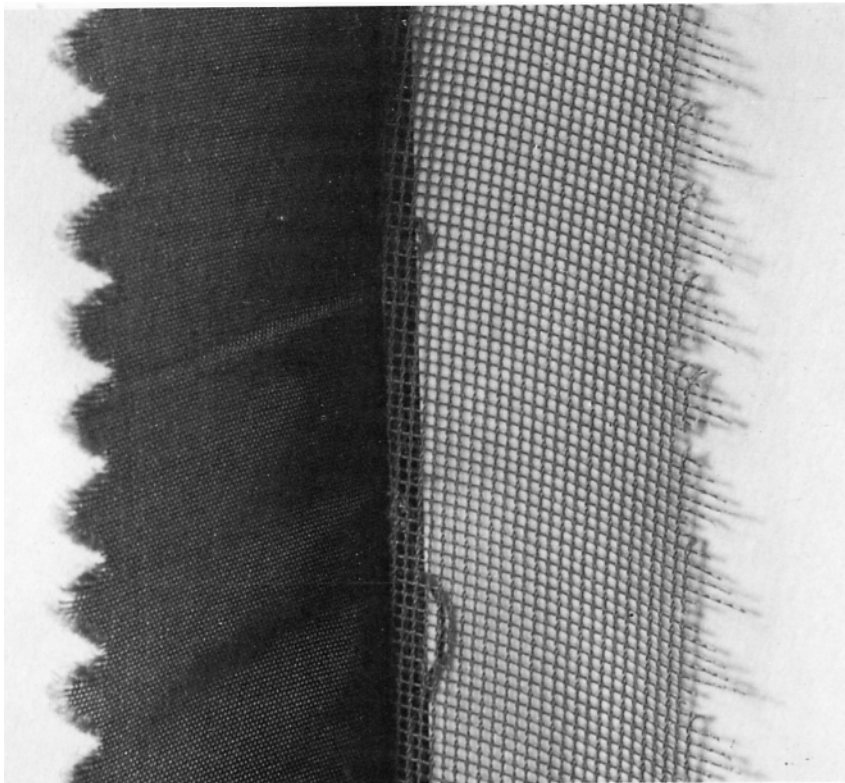


FIGURE 186

A seam showing marquisette lining fabric seamed to the taffeta dress fabric.

FIGURE 187

Shrinkage of the lining has caused the dress fabric to pucker between each gore of skirt. This type of garment construction cannot be finished satisfactorily.



LOSS OF SHAPE—STRETCHING

Why does this occur? Some fabrics have the tendency to stretch as well as to shrink. In fact, in some fabric constructions when a fabric shrinks in the lengthwise direction, it will stretch in the crosswise direction. Wear alone may stretch some fabrics out of shape; for example, bagging at the knees and the seats of trousers, or stretching of a knit garment in wear.

When does this occur? If some garments are hung to dry while they are dripping with water or solvent, they may be stretched out

of shape. This is particularly true of knits, though not confined to them. Some garments may stretch with manipulation in steam finishing, while the fabric is warm and moist from steam.

How may this be controlled? The tendency to stretch in most cases may be controlled by yarn and fabric construction. Proper care of fabrics in use and drycleaning will eliminate many such problems.

(Reference: NID Fabrics-Fashions Bulletins FF-3; FF-84; FF-104.)



FIGURE 188

Orlon knits stretch very easily when steamed. An original Orlon sweater is shown on the left; the identical sweater was stretched out of shape by steam finishing.

FIGURE 189

A hand-made or machine-made ribbon knit that is not supported with a background fabric becomes distorted quite easily in wear and in drycleaning.



APPARENT—NOT ACTUAL SHRINKAGE

Why does this occur? Frequently a person puts on weight without realizing it. This increased weight will make garments fit snugly. When this occurs, one is prone to believe that his garment has actually shrunk.

When does this occur? This apparent shrinkage occurs most often when a garment is drycleaned and then stored for a period of time before wearing. Snugness is noted when the garment is brought out for the next season of wear. A simple check can be made to determine if the garment has shrunk. If a

dress or suit fabric has actually shrunk, it will, in most cases, shrink to a greater degree than the lining, sewing thread, slide fastener, hem, and seam tape. If the garment has shrunk, the tape along the slide fastener, the seam line, or the lining will pucker. If the garment shows none of these tell-tale indicators, shrinkage has probably not occurred and an increase in the measurements of the wearer is most likely the answer.

(Reference: NID Technical Bulletin T-142)

FIGURE 190

Does your dress fit too snugly? Make a regular check on your body weight and body measurements. Experience has shown that a gain in weight is often the cause of a shrinkage complaint.



SHRINKAGE OF PLASTIC INTERLININGS

Why does this occur? Various types of materials are used for the interlinings of coats, jackets, and children's snowsuits. Recently some garment makers have used a thin sheet of polyethylene as an interlining material. Under certain conditions this material shrinks, resulting in puckering of the outer garment fabric and the lining fabric.

When does this occur? Drycleaning followed by the heat required for drying and finish-

ing, causes the plastic interlining to shrink excessively.

How may this be controlled? Polyethylene sheeting should not be used as an interlining material. Whether a garment is wetcleaned or drycleaned it must be dried and finished to remove the wrinkles. The heat required for finishing or drying in either case causes the polyethylene to shrink.

(Reference: NID Technical Bulletin T-322)

FIGURE 191

The outer jacket fabric is nylon; the collar a Dynel pile fabric; the upper portion of the lining fabric is a nylon pile fabric; the lower portion a quilted nylon lining fabric. All are dry-cleanable. The interlining that is hidden is made of polyethylene sheeting. This plastic sheeting shrank with the heat of drying, causing the jacket to pucker.



SHRINKAGE OF STITCHING THREAD

Why does this occur? Various types of stitching threads, regular or plastic, are used to make quilted and shirred fabrics. Complex designs are sometimes stitched with elastic-type threads. One such thread is made of a rayon and cotton core yarn wrapped with a plastic yarn of polyethylene. This type of plastic yarn shrinks excessively with heat. Some nylon threads used for stitching are heat-sensitive.

When does this occur? Heat of the drying and pressing operation causes such yarns to

shrink out of proportion and distort the fabric.

How may this be controlled? A decorative effect that is lost because of the wrong use of a stitching thread may make a garment unwearable. This type of problem can be corrected only by the selection of a stitching thread that is not heat-sensitive.

(Reference: NID Technical Bulletin T-328; Fabrics-Fashions Bulletin FF-86.)

FIGURE 192

The shirred design of this dress fabric is made by stitching with a rayon and cotton core yarn wrapped with polyethylene. Heat in drying caused this yarn to shrink.





FIGURE 193

This quilted nylon fabric was smooth in appearance until it was drycleaned.

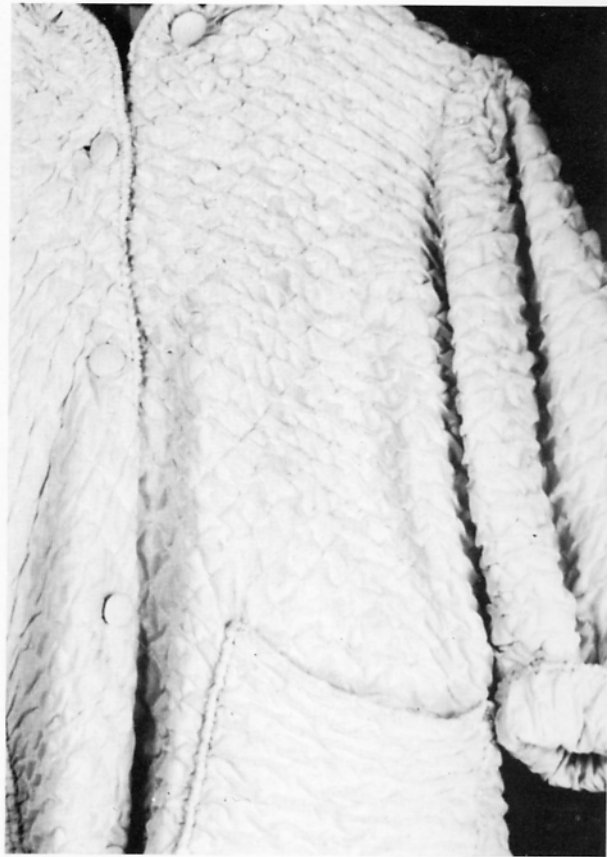


FIGURE 194

The nylon thread used to make the quilted diamond pattern shrank in drycleaning, causing the fabric to pucker and the garment to shrink.

PICK AND PICK SHRINKAGE

Why does this occur? Pick and pick damage occurs during weaving of the fabric. Puckering of the yarn is due to uneven tension on the filling yarn during the weaving operation. When the fabric is drycleaned and finished relaxation shrinkage occurs and puckering results.

When does this occur? Textile weaving defects are not uncommon in textile mills. See pages 495-497. But sometimes the defects do not

become apparent until after the fabric is drycleaned and finished.

Who is responsible? This type of damage is caused by uneven tension on the yarns during the weaving operation and can be corrected only by the use of tension controls in the loom.

(Reference: NID Fabrics-Fashions Bulletin FF-56.)

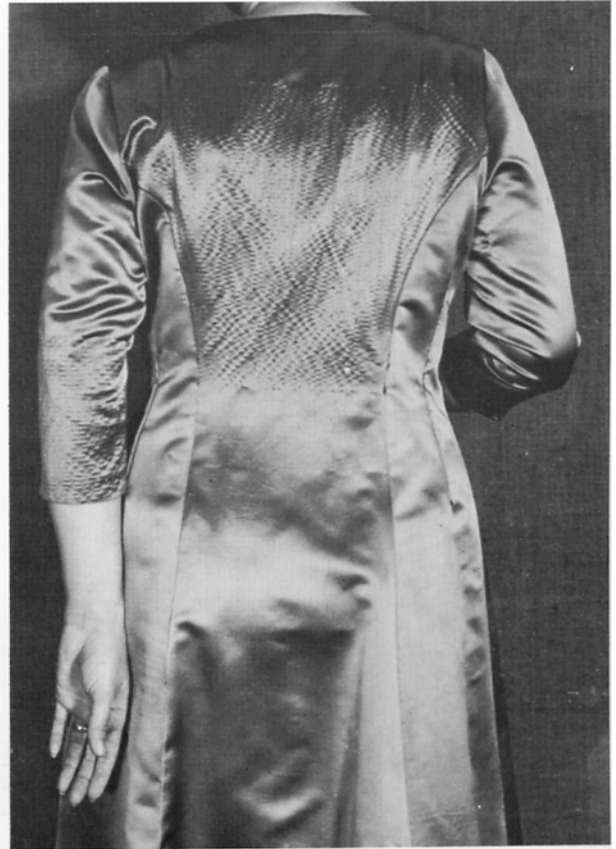
FIGURE 195

Rayon and acetate, crepe-back satin dress. Puckering occurred after drycleaning in front panel, at neckline, at waistline of side-front panel, and at left sleeve below elbow.



FIGURE 196

Same dress—back view. Note that puckering occurred in center back panel across shoulder area.



SHRINKAGE AND PUCKERING DUE TO YARN CHARACTERISTICS

Why does this occur? Novel textures may be created by weaving two yarns as one in a definite but irregular pattern. The two yarns so woven look like a slub yarn. Such fabric construction with some fiber content may cause a fabric to pucker in wear or drycleaning.

When does this occur? Garments made from such textured fabrics may show evidence of shrinking, puckering, and fuzzing of yarns in areas exposed to moisture and flexing dur-

ing wear. Such areas are the neckline of a coat, the shoulder area, or the knees of trousers. Puckering may also result from the use of moisture in cleaning this type of fabric.

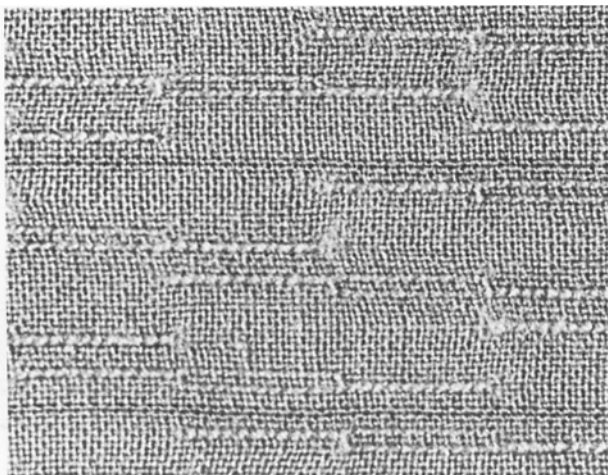
How may this be controlled? This is a problem of fabric design and engineering. Proper care in drycleaning can minimize shrinkage and puckering.

(Reference: NID Technical Bulletin T-255)

FIGURE 197

Differences in yarn characteristics in this fabric caused uneven shrinkage and puckering in areas exposed to moisture and flexing during wear. The condition is accentuated with drycleaning.

Original



Shrinkage in Fabric



FIGURE 198

This soft-finished imported men's wear fabric with a novelty weave shrank excessively because the relative humidity of the solvent was too high.

Original



Shrinkage in Fabric



SECTION VI

PHYSIOLOGICAL REACTIONS

DANGER FROM MOTH-PROOFED GARMENTS

After publication of Rachel Carson's *Silent Spring*, some consumers feared that mothproofing fabrics caused a hazard to the wearer. They reasoned that many garments so treated were in contact with the skin of the wearer for considerable lengths of time and that the chlorinated hydrocarbon insecticides may be absorbed to a greater or lesser extent through the skin.

Many drycleaners routinely mothproof clothing and household items being drycleaned.

The industry has been doing this for years and there is no record of a single case of a human suffering ill effects.

For anyone who has an apprehension about mothproofed chemicals already in clothing or household items, the chemicals are quite soluble in drycleaning solvent and will be readily removed in any drycleaning bath which does not itself contain mothproofing chemicals.

(Reference: NID Reporter N-269.)

SKIN IRRITATION

Why does this occur? Some individuals are sensitive and allergic to certain fibers, dyes, and finishing compounds present in fabrics. They may become sensitized the first time a garment is worn, but without any effect.

When does this occur? This sensitivity may vary with the season of the year and with the health of the individual. In some cases, the sensitivity of an individual to a given

fabric is first noted several days after a garment has been worn. The sensitivity may develop even after a considerable time lapse.

How may this be prevented? Fabrics, in general, new or drycleaned, do not usually cause skin irritation. When they do, an allergist should be consulted to determine the source of irritation and to prescribe a remedy.

FIGURE 199

Some people seem to be susceptible to skin irritations from various types of fabrics and fabric finishes. This may be determined by a patch test as illustrated.



SMARTING OF EYES

Why does this occur? Formaldehyde gas is liberated from some chemicals used to make certain fabrics wrinkle-proof and water-repellent. The break down of the resin finish liberates a gas . . . not sufficient to cause illness . . . but sufficient to cause headaches as well as burning and stinging of the eyes. The air is described as "irritating as the Los Angeles smog."

When does this occur? Cases are on record where some consumers have complained that shopping in certain stores or shops causes their eyes to smart and burn.

How may this be prevented? Fortunately, most manufacturers cure the resin finishes used on fabrics so they do not break down and cause physical discomfort. When this does happen, more circulation of air through the store or shop will relieve the condition.

SECTION VII

SPOT AND STAIN REMOVAL

INTRODUCTION

Drycleaning solvents alone will remove a considerable amount of insoluble soil, dust, and non-oxidizing fats and oils, but have little effect on some stains caused by foods, paints, inks, dyes, or oxidized fats and oils. After drycleaning, there still remain some spots and stains which the drycleaner must remove individually with special treatments.

The individual is responsible for the spots and stains which he gets on his garment. But he also expects to have his garments returned to him from the cleaner with the spots and stains removed.

Skill, specialized solvents, chemicals and

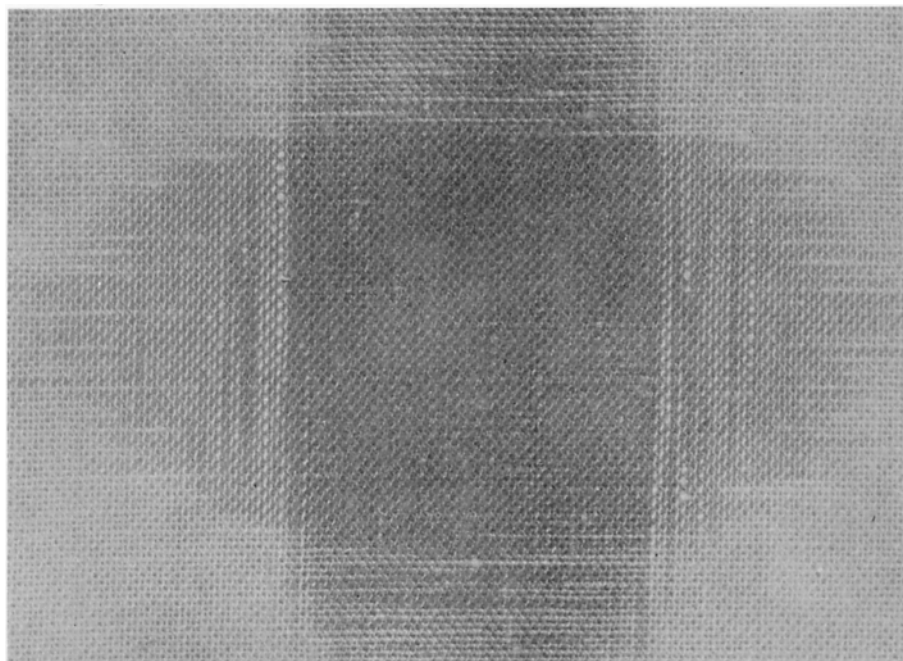
formulas are necessary to remove these spots and stains.

To know or recognize and classify various types of stains is not enough. The drycleaner must also have a knowledge of fabrics and dyestuffs and the effectiveness of the various reagents on the stains, fabric, and dyestuffs. Even more important is the ability to use certain techniques and skills in the removal of stains.

Before a spotter attempts to remove any spot or stain he must first identify the stain, which spotting method would be most effective, and whether wet or dry solvents should be used.

FIGURE 200

Shape is often a clue to stain identification. The formation of a cross indicates that this stain was caused by oil.



STAIN IDENTIFICATION

Of first importance is the stain identification. This is accomplished by observing:

1. Appearance of the spot or stain.
 - a. Color is often a clue. For example the red coloring of a lipstick stain; the brown coloring of an iodine stain.
 - b. How a stain appears on the surface of the fabric. For example, ink will penetrate a fabric's surface; paint will build up on a fabric.
 - c. Shape is often a clue. For example, oil stains will follow the yarns with the least degree of twist. If the yarns are of equal twist in both the warp and filling, a perfect cross will appear. See Figure 153.
2. Odor is frequently a tell-tale sign that may identify perfume, cold wave solution (faint odor of bromine), or medicinal stains.
3. Location is considered also. For exam-

ple, perspiration in the underarm area of a suit or blouse; food stains on ties and on dress and suit fronts.

4. Feel can also be a helpful method of stain identification. Egg, a type of albuminous stain, may be recognized by its stiffness; glue and adhesives are sticky; paint may be rough or smooth; and fingernail polish may feel built up on the fabric surface.

STAIN CLASSIFICATION

After a stain is identified, it must be classified as to whether it is removable on the dry side (with dry solvents) or the wet side (with water solutions). The following chart will illustrate classification as to removal of stains by dry-side spotting reagents, and those that require wet-side spotting reagents.

FIGURE 201

CLASSIFICATION OF STAINS

<i>Stains Removed With Dry Solvents</i>	<i>Stains Removed With Water Solutions</i>			
	<i>Albumin</i>	<i>Tannin</i>	<i>Reducing Sugars</i>	<i>Dye Stains</i>
Examples:	Examples:	Examples:	Examples:	Examples:
Paints	Blood	Coffee	Liquor	Wet Inks (Writing Inks)
Oils	Egg	Tea	Soft Drinks and Mixes	Berry Stains
	Milk	Beer	Fruit Juices	Leather Dyes
Dry Inks (Ball-point and marking inks)		Walnut Stains		Mercurochrome
Plastic Base Adhesives	Ice Cream	Tobacco		Merthiolate
Carbon Black	Gelatin	Grass		
Nail Polish	Animal Glues	Tannic Acid		

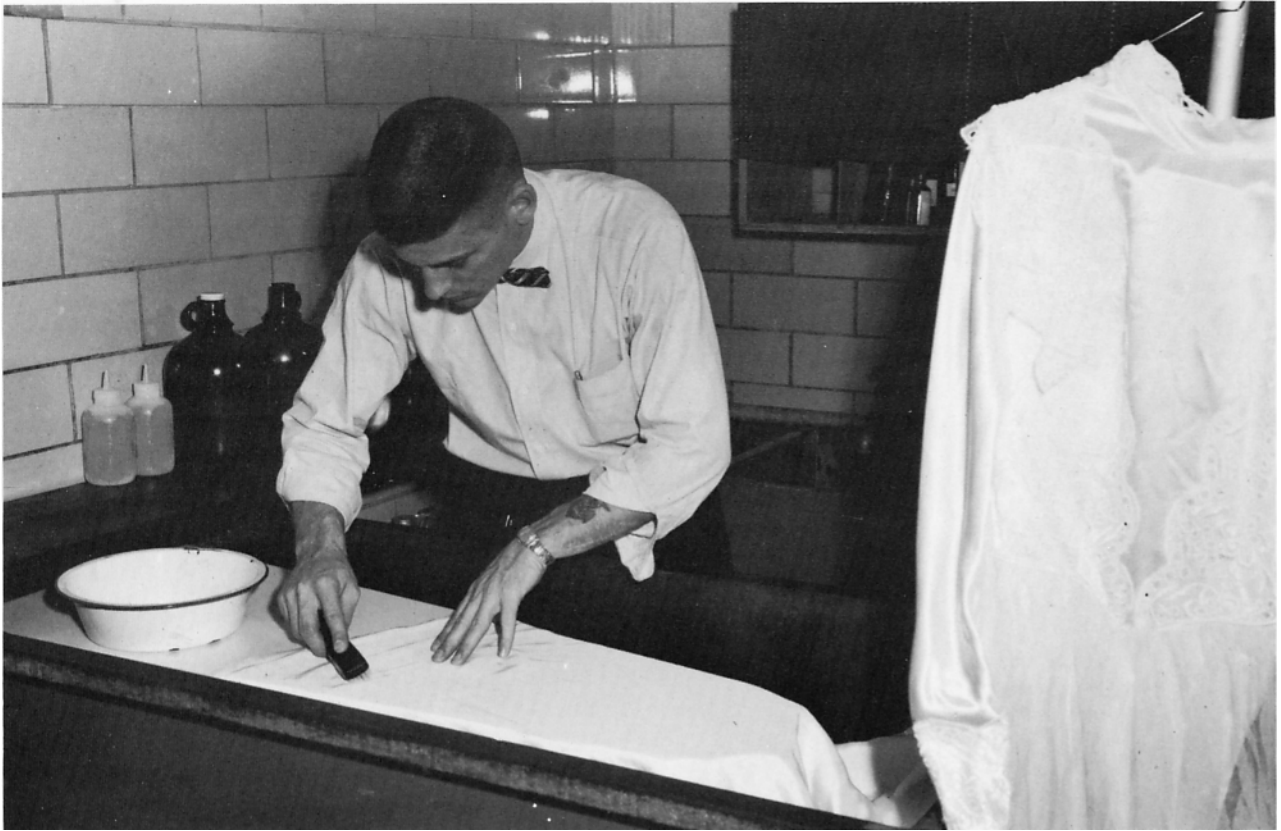


FIGURE 202

Some stains are removed before the garment is dry-cleaned. This process is called "prespotting."

METHODS OF STAIN REMOVAL

Stain removal may be accomplished by four methods:

1. *Solvent Action*

Solvent action occurs when one substance is dissolved in another.

For example: Sugar dissolves in water. The mechanical action of stirring hastens the solvent action on the sugar. Sugar is not soluble in dry solvents; no amount of stirring will dissolve it.

Thus in spotting, a suitable solvent must be selected for each type of soluble substance that is in the stain. If the wrong solvent is used, no amount of mechanical action will remove the stain. This explains why some stains can be removed only on what is termed "the wet side."

On the other hand, a suitable dry solvent must be used to remove oils or greases. This is known as stain removal on "the dry side."

2. *Lubrication*

Lubrication is a very important method of stain and soil removal, particularly in removing insoluble and chemically inactive substances.

An illustration of the physical action of lubrication is typified by the washing of one's hands. The soil is not dissolved but dislodged by lubrication.

3. *Chemical Action*

There are some stains which must be removed by chemical action. However, these stains are in the minority. In such instances, a chemical spot remover reacts with the stain or substance in such a manner as to produce a new compound. The compound does not have any characteristics of either the original stain or spotting reagent, and may be rendered invisible or soluble and easily flushed from the fabric. For example, in order to remove an iodine stain, a spotter will treat the stain with ammonia. This will result in the formation of ammonium iodide, which is a colorless water-soluble substance that can be rinsed from the fabric.

4. *Digestion*

Many stains require digestion for removal. Trade products used in commercial dry-cleaning plants contain enzymic materials. They convert complex insoluble substances into simpler substances that are more soluble and readily removed from fabrics.

DYES LIMIT STAIN REMOVAL

Ninety-five per cent of all the fabrics handled in the drycleaning plant have been dyed or printed with dyestuffs. It is impossible for an individual to identify dyestuffs in fabrics except by laboratory techniques. Since this is impractical from the drycleaner's point of view, he must learn to work with dyed textile fabrics and understand them well enough to eliminate most of the guesswork from spotting operations. However, the spotter must rely on simple tests for dye identification.

The skilled spotter is familiar with the main classification of dyestuffs, namely, acid dyes, basic dyes, direct dyes, union and substantive dyes, sulfur and vat dyes, and acetate dyes. He is able to determine the spotting reagents he can and cannot use on these various dyestuffs.

FABRICS THAT REQUIRE SPECIAL CARE

Through experience, it has been found that certain fabric types present problems in spotting. Techniques and procedures have been developed to handle many of these problems. For example:

1. *Crepes*. Some types of crepe fabrics develop sizing rings when spots are removed. Frequently, the spotter can eliminate these rings by using special techniques. Some embossed crepes may lose their crepe effect on application of water.

2. *Ciré*. Cirés respond differently to spotting techniques. For example, one type of Ciré may lose little or none of its surface finish in drycleaning but lose all of it if a moisture-containing spotting reagent is used to remove a stain. In another type, the finish may be durable but the original luster may be lost when either wet or dry solvents are used to remove a stain.

3. *Gabardines (Wool)*. Many water-soluble stains do not show up on gabardine after drycleaning but do appear when steam is applied in finishing, thereby necessitating respotting and refinishing. Therefore, many spotters will spray all gabardine garments lightly as they are inspected in the spotting department. This makes the stains visible so that they may be removed before finishing.

Some wool gabardines and spun rayon gabardines are difficult to spot because the yarns are twisted very tightly and woven closely. Some of the sizings or dressings, if disturbed, may result in sizing rings.

4. *Marquissettes*. This type of fabric can stand only a small amount of moisture because of the heavy water-soluble sizings used in its manufacture. Only dry spotting agents can be used safely on this fabric.

5. *Metallic Fabrics*. Most metallic yarns are protectively coated with a film. Removal of the film in a small area gives the appearance of a spot or stain. It is impossible to correct this damage. Many agents used in stain or spot removal will remove the film or adhesive and affect the foil, metallic particles, or dyes used to produce colored yarns. The spotter's main problem is to choose a spotting agent which will not do this.

6. *Moiré*. The non-permanent moirés present a problem in spotting because wet solvents remove the design. Permanent moirés present no particular problem in spotting.

7. *Mousseline de Soie*. This is another heavily sized sheer fabric. The yarns are tightly twisted and spaced at an interval which allows the yarns to slip and shift when the sizing is disturbed.

8. *Nets and Laces*. Nets and laces are difficult to spot. They cannot withstand much mechanical action because the breaking of a single yarn may cause a large hole. Heavy sizing of some of these fabrics makes spot and stain removal difficult.

9. *Painted Fabrics*. Painted designs are often applied on textile fabrics. Sometimes the paint may penetrate the fabric; in other cases it may merely adhere to the surface of the fabric. Each type of painted design presents an individual problem. Use of spotting reagents containing ingredients which are active on paints may cause serious damage.

10. *Paper Taffeta — Taffetized Fabrics*. Many of the reagents which are used in stain and spot removal such as amyl acetate, will dissolve the finish used to produce paper taffeta and taffetized finishes on fabrics. If this happens, nothing can be done to restore the original appearance.

11. *Pile Fabrics*. Pile fabrics also require special spotting techniques. Velvets of the V-weave construction, if loosely woven and of short pile, present a problem because the mechanical action required to remove the stain may also result in removal of the pile.

Acetate pile velvets present some problems in spot and stain removal. Even the smallest amount of moisture with the tamping required to remove some stains causes distortion of the pile. Once the pile is matted, it cannot be raised upright again. Crushed velvets cannot be spotted satisfactorily with water. Water destroys the crushed appearance.

12. *Prints, Discharge or Resist*. Prints may or may not cause concern to a spotter, depending on the fastness of the dyestuff to moisture or the spotting reagents required to remove the particular spot or stain. Discharge prints give little trouble unless fugitive dyes bleed into the white areas. Difficulty has been experienced with discharge prints on weighted silk fabrics. Deterioration occurs in the areas which have been treated with the discharge paste. Satisfactory performance of resist prints is also dependent upon the particular dyestuff used to create the design.

13. *Prints, Pigment*. Pigment prints are usually fast to wet-side spotting reagents. They are affected by some dry-side spotting reagents.

14. *Prints, Solvent-Soluble*. Some prints are encountered in which the dyestuff itself is soluble in drycleaning solvent. Therefore, any reagent containing dry solvents cannot be used in spot or stain removal.

15. *Sateen*. Sateen is difficult to spot as white areas frequently result. Wet-side spotting agents dull the gloss. This fabric usually requires wetcleaning for effective soil removal and uniform surface appearance.

16. *Satins*. A spotter must use special techniques to remove stains from satin because of the floating yarns on the surface of the

fabric. If the stain or spot is deeply embedded in the floating yarns of the fabric, it is almost impossible to remove it without chafing the fabric. Some rayon satins have delusterized designs achieved by the use of a delustering pigment in combination with some adhesive substance such as coagulated albumin. Stains on these satins present a problem as either mechanical action or digestive action may remove the design.

17. *Sharkskins*. Acetate sharkskin is very susceptible to abrasion. Hence, a spotter must use special techniques to remove spots and stains from such a fabric.

18. *Surah*. Surah cannot be successfully spotted except on the dry side. Many garments that come into a drycleaning plant are stained with perspiration. The only way to remove perspiration stains is by the use of controlled moisture. Many garments of this type are affected by water before they ever reach a drycleaning plant.

19. *Taffeta*. Because of taffeta's smooth, crisp construction, it is necessary to avoid tamping or brushing over wrinkles, seams or folds as this results in crease marks and chafed areas. It is also difficult to rinse spotting reagents from this fabric type.

20. *Taffeta, Rayon*. Some of the rayon taffetas cannot be spotted with water as the sizing is disturbed, the yarns shrink, and the fabric becomes distorted. Dyestuffs in this type of fabric are sometimes very fugitive. Since this fabric can be spotted only with dry-side chemicals, any spots of a water-soluble nature cannot be successfully removed without resultant damage to the fabric.

RESEARCH ON STAINS AND STAIN REMOVAL

Some stains are invisible in a garment when sent to be drycleaned, but turn brown during drying or pressing. These have resulted in drycleaners paying countless claims and in the loss of customer confidence. Much time and money has been spent on researching this problem.

Common substances that contain reducing sugar, such as fruit juices, artificially sweetened soft drinks, ginger ale, Tom Collins mix, and cocktails, make stains that are sometimes invisible when fresh. However, especially on

wool, the heat required for drying and pressing fabrics caramelizes the sugar, causing a brown stain. Rarely can these stains be removed. This type of stain may develop after the garment has been drycleaned three or four times or after it has been stored for several months.

It is only natural for a customer to believe the brown stains are due to something which the drycleaner has spilled on the garment, since the stains were usually not visible when the garment was sent for drycleaning. This is not the case.

NEW STAINS

As new stains develop, the drycleaning industry makes every effort to discover the best possible method of removal.

The child's delight known as "Silly Putty" brings happiness to children but headaches to grown-ups. Some parents insist that their children work with the play-dough on newspapers, thus protecting home furnishings. Harassed mothers have found that the children get the material in their hair, clothes and over the furniture and rugs, too. Once the putty spreads and sets, it is difficult to remove. NID recommends the use of Energine in attempting to remove the stain in the home. The commercial cleaner has found that amyl acetate is effective in removing the stain from most fabrics.

Sometimes NID finds that some of the new stains cannot be removed without damaging the fabric. For example, some glues and paints contain an epoxy resin as a base. When the resin dries it becomes insoluble to water and to solvent. To date there is no known method of removal for this kind of stain.

Many individuals protect their garments with a polyethylene bag . . . the type the drycleaner placed over a garment when it was delivered or carried from his place of business to the home. Sometimes these bags are subjected to excessive heat, for example, carrying garments in a trunk across the desert or storage in a clothes closet that has a steam pipe. The polyethylene melts and stains the garment the bag was meant to protect. The only method by which this type of stain can be removed is immersion of the fabric in hot perchlorethylene. This method must be carried out in a laboratory. It cannot be done in the home or in a drycleaning plant because of the risks involved. Needless to say, the dye must be colorfast to this treatment. Otherwise the stain cannot be removed.



FIGURE 203

The removal of an ink stain requires skill, knowledge and patience.

With the introduction of ball-point pens, the spotter was faced with a new ink stain. During the past few years the problem of ink stains has become much more complicated. Until a few years ago, most writing inks were of the iron gallo-tannate type. Ink stains have always required skill and special techniques for complete removal. With the advent of new inks, removal requires not only skill and new techniques, but also time and patience.

Inks from ball-point pens are somewhat difficult to recognize. They are usually of standard colors and thus resemble other inks. If such stains are worked on with water first, they become set and cannot be removed by dry solvents.

HOME REMOVAL OF STAINS

Stain removal from modern fabrics is complex and requires special tools and skill the average individual does not have. The same stain on two different fabrics may behave quite differently, depending on fiber content, dye,

and finish characteristics, as well as construction of the fabric. There is no one procedure, or even a few basic methods of treatment, for dealing with the hundreds of different types of stains on the variety of fabrics used in wearing apparel and household items.

Several precautions should be kept in mind, in approaching any removal problem in the home:

1. Stains on washable fabrics are removed at home more easily than stains on drycleanable fabrics. When there is a question about your ability to cope with a stain, it is advisable to consult your drycleaner.

2. Carbon tetrachloride is widely used as a domestic spotting fluid. It is nonflammable. But, remember: *Carbon tetrachloride is toxic and must be used only in well ventilated places. Exposure to heavy concentration of fumes may cause death.* (26) (27)

3. Test the effects of water or drycleaning fluid on a sample of fabric before you attempt to remove a spot or stain from a garment.



FIGURE 204

Specialized equipment for spot and stain removal is used in commercial drycleaning plants.

4. Chlorine bleach, hydrogen peroxide, or any other bleach should not be used on colored fabrics except when they are known to be truly fast to such treatment. Do not use a chlorine bleach on silk or wool fabrics.

5. Remove as much of a built-up stain as possible by scraping, before you apply a spotting fluid. Do not harm the fabric.

6. All stains should be removed as soon as possible.

7. Do not press stained fabrics. The heat of pressing causes many stains to become permanently set.

8. Do not use soap on any beverage, fruit, or nut stains. If heat is applied later, the alkali in the soap may set them.

9. *Do not put any faith in old remedies, such as applying milk on ink stains. The milk can be more difficult to remove than the ink.*

10. Use any clean soft fabric, such as cheesecloth, to apply the spotting fluid.

11. Place a white blotting paper or terry cloth towelling underneath the area to be spotted to absorb the spotting agent and the staining substance as it is flushed from the fabric.

12. If the fabric has a tendency to ring, fold a piece of cheesecloth to five or six thickness. Saturate with dry solvent and then squeeze out. Brush lightly and rapidly from the center of the wet-out area to the outer edge and perhaps one or two inches beyond. Continue until the ring disappears. The following table suggests methods of dealing with the more common types of stains. If there is any doubt about your results, however, it is best to see your drycleaner even for washable fabrics. The small charge for his skill in dealing with stain removal problems will protect the value of the entire garment.

STAIN REMOVAL CHART

Washable Fabrics

Drycleanable Fabrics

Blood

1. Soak in lukewarm water and synthetic detergent.* If yellow stain remains apply hydrogen peroxide bleach.**

1. Treat with cold water to which table salt has been added in the ratio of one ounce per quart. The salt helps prevent color bleeding. Rinse and dry by blotting with towel.

Candle Wax

1. Remove excess with dull knife. Place towel under stain. Wet thoroughly several times with carbon tetrachloride.***** Dry and launder in heavy suds. Use hydrogen peroxide bleach if color of candle remains.

1. Remove excess with dull knife.
2. Sponge with carbon tetrachloride.*****

Chewing Gum

1. Remove excess with dull knife. Soak affected areas in carbon tetrachloride.***** Work with fingers.

1. Same.

Chocolate or Coffee

1. Rinse in lukewarm water.
2. If brown stain remains, apply hydrogen peroxide bleach.**

1. If colorfast, sponge with lukewarm water.

Fruit and Berry

1. Launder with a synthetic detergent.*
2. Apply white vinegar.**** Rinse thoroughly.
3. If stain remains, use peroxide bleach.**

1. Apply a liquid synthetic detergent to affected areas. Rinse locally.
2. Apply white vinegar.**** Rinse.

Grass

1. Sponge with carbon tetrachloride.***** Dry thoroughly.
2. Wash in synthetic detergent.*
3. Bleach last traces with hydrogen peroxide.**

1. Apply same procedure locally if color will withstand treatment.

Grease and Tar

1. Place towel under stain. Pour carbon tetrachloride***** through stained area.

1. Same.

Ice Cream, Milk, and Cream

1. Soak in lukewarm water and detergent. Rinse and launder in usual manner.

1. Sponge with carbon tetrachloride.*****
2. If stain remains, sponge lightly with water if color is fast.

Iron Rust

1. Apply patented rust remover as manufacturer directs.***

1. Same.

STAIN REMOVAL CHART—(Cont'd)

Washable Fabrics

Drycleanable Fabrics

Ink

1. Pour carbon tetrachloride***** through stained area. Repeat if bleeding of ink continues.
2. If stain does not bleed, dry-treated area and then wet out with water.
3. Apply synthetic detergent* and white vinegar.**** Rinse.
4. The rust remover*** mentioned above is also useful on ink stains and may be tried either alone or in combination with above treatment. Rinse thoroughly.
5. Apply household ammonia. Rinse.
6. Bleach remaining traces with hydrogen peroxide.**

1. Send to drycleaner.

Lipstick

1. Turn garment inside out and place stained area over absorbent towel.
2. Pour carbon tetrachloride***** slowly through stained area until bleeding stops. Dry. Launder in hot, soapy water.

1. Same.
2. Apply carbon tetrachloride***** treatment only.

Mercurochrome, Merthiolate, Metaphen

1. Launder in synthetic detergent* solution.
2. Apply household ammonia. Rinse.
3. Repeat if stain does not come out.
4. Bleach any remaining traces.

1. Send to drycleaner.

Mildew

1. Launder and use chlorine-bleach** if color and fabric permit. Rinse thoroughly.

1. Send to drycleaner.

Mud

1. Allow to dry. Brush lightly using stiff-bristle brush.
2. Launder.

1. Dry and brush.
2. Dryclean.

Paint

1. Soak in carbon tetrachloride***** as soon as possible.

1. Same.

Perspiration

1. Launder.

1. Sponge with water, if color is colorfast.

STAIN REMOVAL CHART—(Cont'd)

Washable Fabrics

Tea

1. Rinse in lukewarm water.
2. If brown stain remains, bleach in hydrogen peroxide.**

Water Spots

1. Launder.

* The types of household synthetic detergents found best suited to stain removal are those represented by Dreft, Surf, Joy and other basically similar products. Joy is a liquid detergent.

** Ordinary medicinal 3%, 10-volume hydrogen peroxide, obtainable at any drugstore, is the strength best suited for treatment of stains where this type of bleach is called for. Use prepared chlorine bleaches only when necessary and in strict accordance with manufacturers' recommendations.

*** A patented preparation containing rust-removing chemicals may be bought for treatment of ink and rust stains at your local drugstore.

**** White vinegar is an inexpensive source of acetic acid, which is often required to either neutralize alkaline conditions or cause a necessary reaction with the stain. White vinegar will not harm any fabric that can withstand water.

***** In using carbon tetrachloride, beware of its deadly fumes. (26, 27) Keep the room well ventilated or work out of doors. In pouring it, place a towel under the stained material and pour small amounts from the bottle so that the towel soaks the fluid and loosened soil will come out of the fabric. To soak in carbon tetrachloride, pour a small amount in a bowl and dip the stained area into it. Avoid wetting skin with this toxic fluid. Observe with care precautions on the label of the bottle of carbon tetrachloride.

Drycleanable Fabrics

1. Sponge with water, if color is colorfast.

1. Wipe very lightly with damp cloth.

RECOMMENDATIONS FOR CLOTHES CARE

The proper care of clothing is a small investment of effort that can pay big dividends in wear satisfaction and longer service. Here are several suggestions:

1. Do not wear the same garment every day. Alternating several garments results in much longer service life for each. Also, you give the fabric time to recover from wrinkles and to return to its original shape.

2. Completely air your garments after each wearing and before you place them in your clothes closet.

3. Place your garments on properly formed hangers (not wire ones). Do not crowd them in your closet. Protect them by placing in a garment bag.

4. Do not let your clothes get excessively soiled. Have them drycleaned frequently so that soil does not become deeply embedded.

5. Use perfumes, cosmetics, anti-perspirants, hair wave preparations, nail polishes and removers, medicines and all other chemical

products with extreme care not to let them contact your clothing. Some contain color- and fiber-damaging ingredients that do permanent harm.

6. Mend seam breaks, tears, and holes as soon as they are noticed. They might otherwise become larger and impossible to repair.

7. When you take your clothes to be drycleaned, tell your drycleaner what the stains are. He can do his job more efficiently with such knowledge. This is most important with liquid stains (ginger ale, tea, etc.), because the artificial sugars and tannin products present in them may develop into visible, permanent discolorations when they are pressed.

8. Do not store any item that has not been drycleaned first. Most stains tend to set permanently with time. Soiled fabrics invite insects.

9. Keep hang tags which bear care information. Pass this information on to your drycleaner.

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