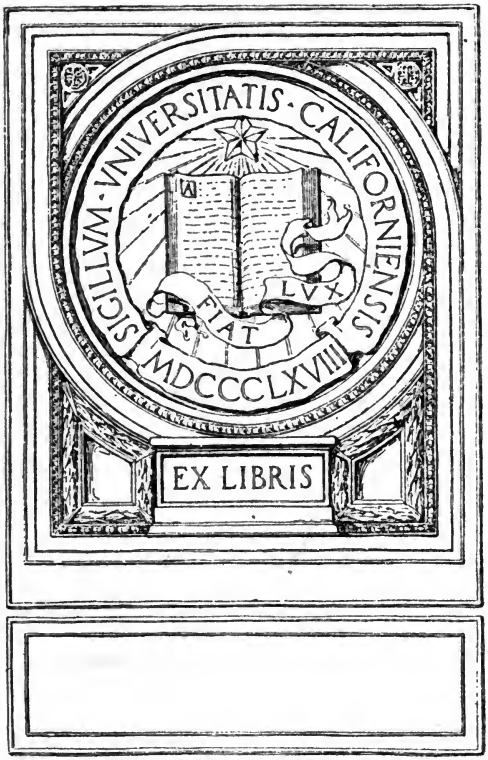
LAUNDERING

L. RAY BALDERSTON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LAUNDERING

BY

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TEACHERS COLLEGE, COLUMBIA UNIVERSITY

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PREFACE

(First Edition)

IN preparing this second book on the art and science of laundry work, the author has tried to overcome the many shortcomings of the little book called "Laundry Manual." Laundering up to the time of that book had not been considered worthy of a text-book, but later classes caused the demand. Through students and teachers, together with the work being required in many schools and colleges, the science has advanced to such an extent that it is almost impossible to keep abreast of the chemical, textile and mechanical side, to say nothing of the educational, economical and practical aspect of the subject. The whole viewpoint is broad and still growing broader; consequently the new book is starting on the journey which it is hoped the pioneer has prepared for it, to be of greater service to student, teacher and housekeeper.

The author wishes to thank all of the former friends who have used the "Laundry Manual," and hopes that the new book, "Laundering," will be even more helpful, because more up to date. Special thanks are extended to all who have so willingly given of their help and advice: to Miss M. J. McKeown, for the ever-helpful assistance in reading manuscript and writing the chapters on Bluing and Disinfection; to Dr. B. R. Andrews, for reviewing the manuscript; to Miss S. B. Vanderbilt, for her assistance from

the chemistry standpoint; to Mrs. Ellen McGowan, for reviewing the work on textiles and stains; to Professor Emma H. Gunther, whose aid in compiling has made the book possible.

To students, teachers and housekeepers the book is dedicated.

L. RAY BALDERSTON.
1914.

PREFACE TO THIRD EDITION

SCARCELY any subject in household arts has made greater strides in the past few years than that of laundering. Great changes in equipment for the laundry have been made, and dependent upon these, necessarily changes in methods must follow.

Much assistance is being given the rural worker today, whether she is a housekeeper, a teacher, or a county agent. The author has presented some suggestions on this line of work.

L. R. B.
1918.

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PART I

CHAPTER I

FABRICS

Animal: Silk.
Wool.

Vegetable: Cotton.
Linen.

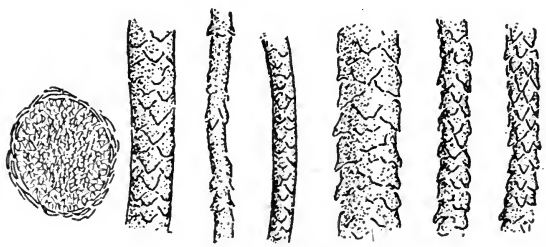
Those who would do the most delicate work and undertake the unusual problems in the laundry should make a study of the fabrics—enough to know their special characteristics and their reaction to changes of temperature and various chemicals.

Animal Fibers are more easily injured than vegetable fibers. They are easily scorched and usually beyond repair. Silk stiffens under heat and then breaks. This is especially seen where plaits in taffetas are pressed in the making of a dress. The animal fibers are affected by alkalis, the effect depending on the kind, the strength, and the temperature of the solution. With either fabric, a continued application of most alkalis will dissolve the fiber. In either case, the white fiber yellows. Strong soda, potash or chloride of lime will disintegrate it.

Wool and *silk* are animal fibers. The wool is a tubular fiber, but covered with tiny overlapping scales. Under the microscope these scales look like fish scales. When the fiber or cloth is wet, it expands and these scales project their edges. If the cloth is rubbed while wet, the scales interlock and the fiber shortens, with shrink-

age of the cloth resulting. This same interlocking takes place when the wool is subjected to great heat—either water or iron—to strong alkali solutions or soap, and to rubbing. Dilute acids are not so injurious to wools and have less action than on linens and cottons.

Silk is a fine, lustrous fiber, more delicate than wool. Under the microscope it is a double fiber before boiling off, but after that the filaments are separated into single structureless threads as we see in sewing silk and silk material. Silk does not shrink like wool, but is easily affected by alkalis, by concentrated acids and by heat



WOOLEN FIBERS.

From the study of wool and silk fiber we may determine the rule for cleaning woolen and silk fabrics:

Wash in lukewarm water—about 110° Fahr.

Soap used should be free from excess alkali and should be in solution.

Stains may be removed if dilute acids, which do not harm either fabric, will dissolve the stain. This only applies to white goods.

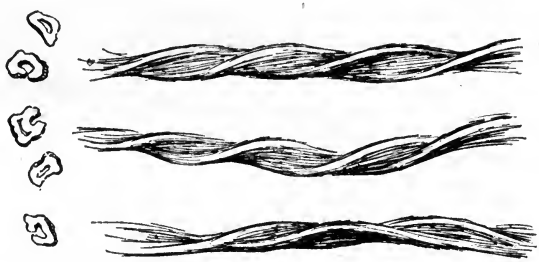
Chloride of lime bleach cannot be used with either fabric. Borax and ammonia may be used with either, as they are both such mild alkalis that they do little

or no harm—in fact, often make the washing easier, as they soften the water.

Irons should be warm rather than hot, and the fabric should be protected from the iron by cheese-cloth to prevent scorching.

Vegetable Fibers.—Cotton and linen, the vegetable fibers, are tougher than the animal fibers, and hence have greater resistance to chemicals, to friction, and to heat.

The *cotton* fiber is like a ribbon and may be distinguished from linen in that it is ribbon-like and inclined



COTTON FIBERS.

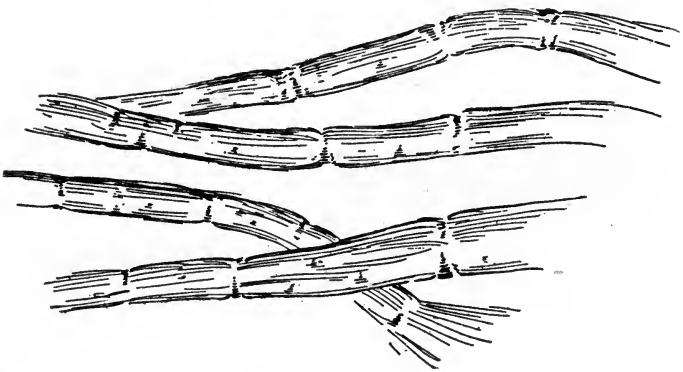
to twist, while *linen* is tubular like the stem of a plant and the broken fiber is straight or brush-like at the end. Linen is not so flexible as cotton and will break under too heavy repeated pressure on the folds, as is shown in the cracking of table linen from the continual foldings. Concentrated acids and alkalis will in time destroy either fiber, but dilute acids and alkalis can be used to remove stains and bleaches, provided the contact is not long and at too high a temperature, and provided all chemicals be either neutralized or thoroughly washed out. In either case the chemical must be rendered inactive.

With this knowledge we are ready to formulate a rule for washing cottons and linens:

Cotton and linen may have stains removed, if color plays no part, by using either dilute alkali or dilute acid.

All chemicals must be thoroughly removed.

Soaps may come in direct contact with fiber; a slight amount of rubbing will not injure these fabrics. Cotton and linen can be bleached if one is careful to use solutions of proper strength and if the chemical is neutralized or



LINEN FIBERS.

washed out. A good rule may be used here—*many short applications are better than any one long-continued one.*

Cotton and linen may be boiled and may be starched and ironed with a hot iron because the fibers are tough enough to allow this treatment.

Mixed Fabrics and Adulterations.—In attempting to clean a fabric which is made of two fabrics, it is always wise to consider the fiber that is the most delicate, and wash as for that fabric. For instance, a garment of silk and

cotton had better be considered as all silk. Silk and wool is an easy combination, as the same treatment suits either.

Imitation fibers are, like any fraud, hard to deal with. Artificial silk may not resist heat, so if one is in doubt as to the purity of the silk, water used in washing should be cool rather than warm. Imitation brocades are only stamped patterns, and, of course, disappear with the finishing gloss in the water. Cheap imitation mercerized cloth is no longer shiny after leaving the wash water, for the starch or dextrine gloss used to give the appearance of mercerization is dissolved in the water. Real mercerization, a finish which is given to the individual fiber, is lasting in its effect, becaues the fiber is chemically mercerized by caustic soda while under tension.

CHAPTER II

METHODS OF CLEANSING

STAINS AND REMOVAL

We have already realized the need of knowing the character of the fabric we are to clean; and determining that, the next we must know is the character of the soil or stain. Soil is any material foreign to the fabric in its pure or fresh state.

SOIL.

A. Organic.

1. Animal. Stains from
   1. Meat and its products.
   2. Blood.
   3. Egg.
   4. Milk and its products.
   5. Fats.
   6. Body (perspiration, oily secretion, body excretions, dead skin).
   7. Bacteria.
2. Vegetable. Stains from
   1. Vegetables.
   2. Fruits.
   3. Oils.
   4. Mildew.

B. Inorganic.

Stains from
   1. Medicine.
   2. Ink.
   3. Paint.
   4. Minerals.
   5. Acids.
   6. Alkalis.
   7. Wagon grease, machine oil.
   8. Dust.

An unknown stain is not always easy to classify, but with experience many deductions can be made which help towards the classification.

Most of the so-called animal stains are held in by albumin or fat. The albumin type of stains is inclined to remain on the surface, as the albumin coagulates quickly and prevents absorption—a pronounced example is an egg stain.

A fat stain, whether animal or vegetable, is likely to make a white fabric translucent, often has an odor, and with dark silks or wools is made more noticeable by darkening the fabric, or showing the dust it has gathered.

Meat juice stains usually combine a fat with albumin. Albumin dissolves in cold water, and fat stains may be washed out with cold water and soap, so a valuable rule presents itself: *When in doubt always use cold water.* It does no harm, and may do wonders. Any water stain remaining is easily steamed out.

Vegetable stains are held in by sugar and fats. The sugar causes the fabric to stiffen and glaze, while the fat stain is neither stiff nor glossy, but more translucent. Cold water dissolves sugar—hot water does it more quickly, so if one is sure it is fruit juice or punch, hot water is a most efficient reagent. Depend on cold water if cream or any fat is mixed with the sugar. Again we may repeat—*When in doubt use cold water.*

The third type of stains is the most difficult type and requires the most knowledge and care. These stains are hard because at the outset, owing to various manufacturing formulæ, the composition of any of the materials may be unknown and complex. For example, ink may give an acid or alkaline reaction, and, in either case, its opposing chemical should be used. Paints may have all kinds of pigments; medicine may be a mixture of many. It is with these stains

that chemical and textile knowledge reaps the greatest reward and where patience is the crowning factor. As a class these stains are not soluble in water. So chemical solvents must be used if they are to be removed.

Mildew is an organic or vegetable stain of a fungi nature. It attacks the cloth first on the surface and if found early enough may be washed off easily. In later stages it may be bleached out by Javelle water or by a solution of chloride of lime, or by potassium permanganate and oxalic acid. A still later stage will be found impossible to remove because it has attacked the fiber to the point of destruction.

The fabrics and the soil have been classified; it remains to classify the method of removal:

By 1. Solvents. 3. Detergents.
2. Absorbents. 4. Bleaches.

Solvents.—The discussion on soil shows us that water is the main solvent. Acids and alkalis may be solvents because they convert the solid substance into a liquid, or the insoluble into the soluble state, and the stain passes out with the wash water which is used to rinse out the chemical.

Soap increases the cleansing power of water in cases of grease by the suds it produces with water.

Other solvents are:

1. Alcohol.
2. Benzine.
3. Chloroform.
4. Ether.
5. Oxalic acid.
6. Hydrochloric acid.

Absorbents.—These are most often used when the fabric is not to be wet, either because it is new or because water is injurious to its color or its finish. Absorbents act like blotting paper and must be used as such, bearing

in mind that as fast as they absorb and are saturated, so fast must new absorbent be used. A list of absorbents follows:

1. White blotting paper.
2. Unglazed paper.
3. Unglazed cloth.
4. Dry starch.
5. Fuller's earth.
6. Meals.
7. Magnesia.

Apply usually on both sides, so the absorption may be rapid. The above absorbents are best used for greases. Egg for example would not be removed this way.

Detergents are solvents because most prepared detergents have some grease solvents, such as ether, alcohol, gasoline. A detergent usually is a soap solution, which cleans by its lather, combined with some grease solvent so that the garment is quickly cleansed.

Any cleansing solution containing ether or chloroform may fade color, as some dyes dissolve in their presence. It is wise, therefore, to test the effect of a detergent on a sample of the goods or on a hidden part of the garment. Diluting the solution may be all that is necessary to prevent fading. Again, the water used with the detergent may leave a water spot or ring; this is easily removed by steam—see chapters on Stains and Recipes.

To use detergent: Apply cleaning fluid with a soft cloth or clean sponge; or preferably use a piece of the same goods as that to be cleaned. Place the same material under the stain and keep in mind the fact that the detergent cleans by dissolving, and consequently the dirt is passing to the absorbing material underneath. Therefore, remember this—that the under piece must be changed very frequently. The reason for using

material like the garment for cleaning is that if there is any bleeding of color the cleaning cloth will add color rather than subtract.

Bleaches may be called the heroic cleaners, and for that reason are accepted and used as the last alternative. Bleaches, whether used on stained white goods, or on a colored fabric, remove color by oxidation; therefore they should be considered only in connection with white clothing. Most effective bleaches are oxygen bearers; this oxygen in the presence of heat or moisture is set free to do its work by decolorizing. Bleaching should always be left to the last, as at no time is it justifiable to use strong chemicals when sunlight, soap and water, or borax will do the work. The bleaching should be done on clean, wet fiber; clean, because often the washing process will remove the stain; wet, because oxidation or bleaching is best done with moisture. Dew and frost furnish naturally the moisture, otherwise the laundress must apply moisture by sprinkling the garment before laying in the sun. The only time one should consider bleaching colored material is when the colored pattern has been washed and has faded to such a degree that the garment would look better if all trace of color were removed.

List of bleaches:

1. Sunlight and moisture.
2. Oxygen, air, ozone.
3. Ammonia.
4. Borax.
5. Sulphur.
6. Chloride of lime.
7. Oxalic acid.
8. Potassium permanganate with oxalic acid.
9. Hyposulphite of soda.
10. Hydrogen peroxide.

The first two in the list we may call nature's bleaches and may consider harmless for cotton and linen. Wools and silk will yellow in sunlight.

Sunshine is the simplest method of bleaching and is also the safest. To bleach with sunshine, the garment should be washed clean, then spread while wet in the sun. The sun, together with the oxygen of the water, is most effective in its work. This method requires the least knowledge and the most time, but no destruction of fiber results. Often the garments are spread in the dew. This dew takes the place of sprinkling the clothes. With either process we are dependent upon the oxygen supplied by the moisture.

Borax and **Ammonia** are often used as mild bleaches. They may be added to the water and if used in the final rinse, will do much to whiten the fabric. Their great power is as a solvent of grease which may be holding the soil in the fabric.

Sulphur may be used to bleach woolens, but must be handled with great care, as its burning not only involves the danger of fire, but sulphur fumes should not be inhaled. A large barrel or box out of doors may be used as the bleach room. Sulphur bleaching indoors is not advisable. Stand a sulphur candle in a pan of water in the bottom of the barrel, suspend a number of strings from each side of the barrel, and on the stretched strings lay the clean, wet woolen garment (white, of course) and let the fumes from the burning candle pass up and through. A cover over the top will make the process more complete. After bleaching, wash to remove sulphur odor. The time depends on degree of discolor-

ation to be removed. To test, remove cover of barrel for a few minutes before looking in and then examine. Re-cover for further bleaching.

Chloride of Lime is the bleach most often used in the laundry. It is rarely used alone, but is combined with washing soda, the combination producing Labarraque, more commonly called Javelle. Javelle should be used as a perfectly clear liquid, and always with water. Heat increases its bleaching action, which is due to the chlorine, which when set free unites with water and releases oxygen, the real bleach. It is wrong to boil clothes in bleach, because under high temperature the bleach is most destructive to cotton and linen fiber. A good bleaching temperature is 110° F. Javelle must not be used for woolens and silks. See recipe for Javelle, page 26.

Oxalic Acid. See pages 26, 65.

Potassium Permanganate. See pages 26, 60.

Hydrosulphite of Soda and **Hydrogen Peroxide** are also oxidizing agents, the former being especially suited for silks.

CHAPTER III

METHOD OF REMOVING STAINS

Working outfit for stain work:

1 dropper for each chemical.
1 cup.
1 bowl.
White blotting paper or cloth the color of fabric.
Soft cloth.
Soft brush.
Chemical.

Before beginning to work on the stain, the worker must ask, and as near as possible decide, these questions:

What kind of fabric is stained?
What is the stain?

In both cases experience helps to answer, but often a third element is present, and that is the color of the fabric. It is wise to test a bit of the colored fabric by using a sample of the goods, some inner seam or underneath part of the garment, and in that way test the action of the reagent; and that test having been made, the worker or owner must decide which is the least noticeable—the stain with its color, or no color from the removal of the stain. Water rings need not hinder, for if they are all that remain after the stain is removed, they may be easily and quickly removed by steam.

Removal of stains on white cottons and linens is, comparatively speaking, a known quantity; on white silks and wools it is harder and less sure, but usually worthy of trial. On colors there is always a risk, always need of much care and

deftness, always the use of dilute solutions and very rapid work. Often it is preferable to have the stain removed; even if the white spot remains, it may be retinted. This retinting can be done with water colors or carefully mixed dyes, and must be done after each cleaning.

Knowing the fabric and the stain, prepare to remove the stain by spreading stained portion over a bowl, moisten the stain with cold water, and then with a dropper or stirring rod apply the right reagent. Follow quickly with warm water, not hot, and keep in mind that *many short applications* are surer and safer than long-continued use of chemicals without rinsing.

If all concentrated chemicals are diluted by an equal quantity of water, they are strong enough to dissolve stains and need not harm the fabric. (See Recipes.)

When the stain has disappeared, one of two things must be done and done well: Either wash the spot treated and its surroundings until the chemical is entirely removed, or neutralize the chemical by an opposing chemical, and then rinse. After removing stains, wash the spot with soap and water and then rinse.

In some cases two chemicals are needed; one follows the other in right rotation as prescribed in stain-removing list, but it is always wise to wash between reagents with clear warm—not hot—water. Do not use bleaches unless as a last effort, and do not use on colors—remember that the word bleach means no color.

Ink stains on white woolens may be removed by the oxalic acid and Javelle method *only*, as the oxalic acidulates the wool and keeps the alkali bleach from its natural action of yellowing and dissolving wool. If these treatments are long continued, they result most likely in a thinning of the woolen fiber.

Rules that a good worker on stains follows:

1. Know material.
2. Know stain.
3. Use dilute reagents.
4. Use a dropper.
5. Wash thoroughly.
6. Always use simplest reagents first.

STAINS WHERE WATER CAN PLAY NO PART

On some woolens and silks, grease spots may be removed by gasoline, naphtha, alcohol, benzine—all of which are grease solvents, or by fuller's earth, paper or starch, which are absorbents. The above solvents are inflammable.

The solvent method means that the gasoline, etc., dissolves the grease, setting it free in the gasoline, and it is free to run where it will, perhaps spreading, making a "gasoline ring." Much of this can be avoided by the use of clean white blotting paper or soft white cloth under the stain when it is rubbed by a cloth (preferably of the same material) on top. As fast as either cloth is soiled, a new pad and a new rubber should be used. Rubbing these stains until they are dry also helps prevent the gasoline ring. After the spot has been removed, it will be found that dipping the whole garment in gasoline or naphtha will remove traces of spots. Alcohol is a grease solvent, but, like ether, is a solvent of color as well. The absorbent method is best used when the stain is fresh and so easily absorbed. As fast as the absorbent agent shows grease or color, a new covering should be used. A warm iron will liquefy the grease and aid the absorbent in its work. Do not have iron too hot, as it will not only change the color of the fabric but often darkens a grease spot.

NOTE.—Care must be taken in the use of gasoline, naphtha, ether or benzine, as all are inflammable. Do not have a flame near.

Detergents given in this book and sold as grease cleaners usually contain ether and should be used most carefully, because ether is quite likely to fade color. Do not use detergents where water can not be used. They are of most service in "spotting" (technical term for removing spots) heavy suitings. Here, again, a cloth should be used under the stain while it is being rubbed on top.

JAVELLE WATER.

1 lb. washing soda,	½ lb. chloride of lime,
1 qt. boiling water.	2 qts. cold water.

Put the soda into an agate pan and add the boiling water. Mix the lime in the cold water. Let the mixture settle and pour the clear liquid into the dissolved soda. Bottle, and keep in a dark place.

Javelle water forms a very efficient bleaching liquid for unbleached fabrics, as well as for cotton goods that have become yellow with dirt and age. To remove stains from white goods, soak the article in equal quantities of Javelle water and hot water until the stain disappears; then rinse thoroughly in several waters, and finally in dilute ammonia water. Articles washed in Javelle water have a strong odor of the chloride of lime and the final washing in water to which ammonia has been added, will help to destroy this odor. Use 1 tablespoon of ammonia in 2 quarts of water. Javelle removes all stains and all colors, and therefore should not be used on colored goods. If articles remain too long in the Javelle water, the fiber will be injured.

OXALIC ACID.

1 oz. crystals,	¾ c. water.

Dissolve crystals in water. For dilute solution, add equal quantity of water.

POTASSIUM PERMANGANATE.

1 teaspoon of permanganate crystals,	1 qt. water.

Dissolve the crystals in water.

STAIN REMOVAL

Character of Stain.	*Reagent.*	*Method of Removing.*
Acid	Ammonia	Sponge with water containing a few drops of ammonia. Rub dry with piece of same material. (Too much ammonia will produce its own stain.) Sometimes fumes from bottle are enough to neutralize the acid color.
	Sodium bicarbonate	Cover both sides of stains, moisten with water, and allow to stand until acid is neutralized, then wash with clear water.
Alkali	Warm water	Wash thoroughly to dilute chemical.
	Warm water and dilute acid	Wash with warm water to which lemon juice, vinegar or cream of tartar has been added.
Aniline dye	Javelle (for white goods only)	Apply Javelle, and follow immediately with boiling water. Thorough rinsing will prevent Javelle from affecting fiber.
	Potassium permanganate and oxalic acid	Apply potassium permanganate, then wash with warm water, apply oxalic acid, and then wash. Any brown from permanganate may be taken out with oxalic acid.
Argyrol	Salt and ammonia	Apply to fresh stain.
Balsam of Peru	Kerosene	Soak in kerosene. Wash out grease stain.
	Alcohol	Use as kerosene.

Character of Stain.	*Reagent.*	*Method of Removing.*
Blood	Warm water	Wash in warm water until stain disappears.
	Warm water and ammonia	Ammonia assists in dissolving the blood.
	Warm water and naphtha soap	Rub with naphtha soap and soak in warm water.
	Warm water and raw starch	If heavy or new goods, as a new blanket, make a paste of raw starch and warm water. Spread on stain, and as fast as starch is discolored, make a new application.
Bluing	Boiling water / Boiling water and acid	Wash in boiling water. Boiling will draw out the spots of blue formed from imperfect bluing. Vinegar or dilute acid will assist, if necessary. This is effective for ball or block blues.
	Javelle	Same as for aniline dye. A yellow cast may remain if the bluing has been an iron compound. This yellow cast or these spots may be taken out as iron rust. (See Iron Rust.)
Brass	Lard / Olive oil	Rub in either lard or oil, then wash in warm water and soap.
Chocolate	Borax and cold water	Cover with borax, wash with cold water. Boiling water will remove trace of stain.
Coffee	Boiling water	Spread stained part over a bowl, pour boiling water on it from a height so as to strike the stain with force.
	Borax or gylcerine	Covering the spot with glycerine or borax will often assist in removing a stubborn stain.
	Javelle	As a last resort, Javelle water may be used.
	Potassium permanganate and oxalic	Use as for aniline dye.

Character of Stain.	*Reagent.*	*Method of Removing.*
Cream	Cold water Warm water and soap	Wash in cold water, then in warm water and soap. Remove as grease.
Dust	Yolk of egg and alcohol	Brush out loose dust. Cover the stain with a paste of yolk of egg and alcohol. Let dry, and scrape off. Warm water and a cloth will remove adhering egg.
Dye	Cold water (for woolens and silks)	Wash spot in cold water.
	Javelle (for linens and cottons)	Use Javelle as suggested for aniline.
	Potassium and oxalic	Use as suggested for aniline.
Fruit	Boiling water	Use same as for coffee stains.
	Borax	Borax will assist in removing stubborn stains.
	Javelle (for cottons and linens)	Use Javelle solution and boiling water in equal quantities and immerse stained portion, allowing it to soak a few minutes, then rinse thoroughly with boiling water. This is best for peach stains, if alcohol fails.
	Borax and ammonia (for woolens, silks and colors)	Borax and ammonia used instead of Javelle, which destroys these fabrics and colors.
	Oxalic acid	Apply a few drops of oxalic. Rinse well with hot water.
	Potassium permanganate and oxalic	See aniline dye.
Glue	Warm water	In case of colored goods, warm water will dissolve the glue.
	Vinegar	Apply vinegar with a cloth until stain is removed.

Character of Stain.	*Reagent.*	*Method of Removing.*
Grass	Cold water (without soap)	Wash a fresh stain with cold water.
	Molasses	Rub with molasses, let stand a few minutes. Wash out in warm water.
	Alcohol / Ether	Alcohol or ether will dissolve the green coloring matter, when material cannot be washed.
	Javelle	Bleach out as for aniline stain.
Grease (oil)	Warm water and soap	Wash in warm water and soap.
	Javelle (for white cottons and linens)	Remove traces of grease stains by bleaching with Javelle.
	Potassium permanganate and oxalic	Old grease stains may be removed as aniline dye.
	Detergent	Apply detergent (page 46) for stains on heavy clothing.
	Ether / Alcohol / Benzine — for delicate fabrics	Apply these reagents with a cloth, preferably of the same material, rubbing the stain lightly until all the reagent has evaporated. (These reagents are inflammable.)
	Acetone / Benzol — in equal quantities	Apply as above.
	Fuller's earth or chalk	This may be used without fear of water rings appearing, or of changing color. Apply the powder to the stain and let stand several hours, then brush off lightly.
Indelible pencil	Alcohol	Dissolve color by soaking in alcohol. Then wash in soap and water.
	Lard, and soap and water	As for wagon grease.

Character of Stain.	*Reagent.*	*Method of Removing.*
Ink	Salt and lemon juice	Moisten with salt and lemon juice. Lay in the sun.
	Salts of lemon	Apply as a powder. Then pour on boiling water.
	Oxalic acid or Hydrochloric acid and Javelle	Apply a few drops of oxalic acid, follow with a few drops of Javelle, and rinse quickly with boiling water.
	Ammonium sulphide and hydrochloric acid	Apply ammonium sulphide, wash with water, then wash with very dilute hydrochloric acid. Can be used on colors.
	Ink eradicators	Use as directed on the box.
Indelible ink	Potassium permanganate	Use as for aniline dye.
Mimeograph ink	Concentrated ammonia	Apply concentrated ammonia to the stain. Wash, and repeat until removed.
Printers' ink	Lard or grease	Rub lard or grease in well, then wash in warm water and soap.
Waterproof ink		Treat as paint.
Iodine	Warm water and soap	Wash while fresh in warm water and soap.
	Ammonia (concentrated)	Use as for mimeograph ink.
	Alcohol	Wash with alcohol.
	Starch	Apply moistened starch, brush off and repeat until stain is removed.

Character of Stain.	*Reagent.*	*Method of Removing.*
Iron rust	Hydrochloric acid	Spread stained portion over a bowl containing one quart of water and one teaspoon of borax. Apply acid, drop by drop, until stain brightens, then dip stain at once into water. If not removed, use same method until stain disappears. Care should be taken to use either borax or ammonia in rinsing water.
	Citric acid and cream of tartar	Apply to spot, wash with hot water. Rinse thoroughly.
	Lemon juice and salt	Sprinkle stain with salt and moisten with lemon juice; lay in the sun. This method is slower and less likely to affect material. Either method will extract color.
	Any acid food juice, rhubarb, pineapple, grapefruit	Boil in water to get acid from food—apply to stain.
Kerosene	Soap and water (warm)	Wash in warm water and soap.
Lampblack	Kerosene Naphtha soap	Wet with kerosene, then wash with naphtha soap and warm water.
Lead foil	Soap and water (warm)	Wash in warm water and soap.
Leather	Soap and water (warm)	Wash in warm water and soap.
	Potassium permanganate and oxalic	Same as for aniline dye.
Machine oil	Cold water and soap	Wash in soap and cold water.
	Turpentine	Rub stain with turpentine. Wash out.
Meat juice	Lukewarm water and soap	Wash in lukewarm water, then follow with soap.

Character of Stain.	*Reagent.*	*Method of Removing.*
Medicine	Alcohol	Soak in alcohol.
Mildew	Cold water	If the mildew is very fresh, and has not attacked the fiber, it will wash out in cold water.
	Potassium permanganate and oxalic acid (cotton and linen)	Use potassium permanganate as for aniline dye.
	Javelle (cotton and linen)	Apply Javelle, then wash with hot water.
Milk	Cold water	Wash in cold water, then follow with soap.
Mucus	Salt and water Ammonia Soap and water	Mucus as found on handkerchiefs may be soaked in salt and water, then washed in warm water with ammonia or with soap.
Mucus mixed with blood	Salt and cold water	Two tablespoons salt, one quart cold water. Soak for several hours. Use double quantity of salt if articles are of thick material or badly stained.
Mud	Brush when dry	When dry brush with either brush or wool cloth.
	Soap and water	Wash in water and soap.
	Alcohol	Sponge with alcohol.
Paint	Soap and water	If paint is fresh, use at once soap and water if goods are washable.
	Gasoline Turpentine Benzine	Wash the spot in any one of these, remembering that they are inflammable. NOTE.—Old stains may be softened first with lard, oil or kerosene before using any of the remedies.

Character of Stain.	*Reagent.*	*Method of Removing.*
Paraffine	Warm iron and white blotting paper	Place blotting paper under and over the stain. Apply a warm iron and change blotting paper after each application of heat.
	Benzine (with clean cloth and blotting paper)	Rub the stain with a cloth, having the blotting paper underneath to absorb.
	Kerosene	Use as benzine.
Perspiration	Soap and water (for white washables)	Wash in warm water and soap, and if cotton or linen, place in sun to dry.
	Javelle water (for cottons and linens)	Use according to directions on white goods given above.
	Sodium hydrosulphite (for silks and wools)	Apply a dilute solution of sodium hydrosulphite and wash in water. NOTE.—To remove perspiration stains from colored goods with anything other than soap and water, means, in most cases, removing color. Re-dyeing is the final remedy. The odor may be removed by chloroform.
	Potassium permanganate and oxalic acid	Use as for aniline dye.
Pitch	Benzine, chloroform, ether, gasoline	Sponge the spot with solvent, keeping away from all fires.
Punch	Warm water	Wash in clean tepid water.

Character of Stain.	*Reagent.*	*Method of Removing.*
Resin	Benzine, etc	Treat same as pitch.
Scorch	Sunlight (for cottons and linens only)	Hang in sunlight, and slight scorch will be removed.
	Soap and water	Wash in soap and water and place in sun. NOTE.—Scorch on woolens and silks may rub off if only on surface.
Shoe Polish:		
Black paste	Lard or grease	Rub in well, then wash in warm water with soap.
Bronze	Hydrochloric acid and ammonia	Use acid and ammonia alternately. Wash with soap and warm water.
Tan	Oxalic acid and ammonia	Use oxalic acid and ammonia alternately. Then wash with soap and warm water.
Silver nitrate	Chloride of mercury and alcohol (for white goods only)	Apply chloride of mercury, alcohol, in proportion of 7 : 1 (poison) to stain. Then wash.
	Ammonia	Use ammonia in same way.
Stove polish	Cold water and naptha soap	If washed while *fresh*, the stain is easily removed.
Syrup	Warm water	Wash in clean tepid water.
Tar	Lard / Warm water and soap	Treat like brass.
Tea	Cold water	If with cream, cold water and soap.
	Hot water	If clear—hot water.

Character of Stain.	*Reagent.*	*Method of Removing.*
Tobacco	Hydrochloric acid and ammonia	Apply dilute hydrochloric acid, follow with dilute ammonia. Sponge with soap and water.
Urine	Warm water and soap	Wash in warm water and soap.
	Alcohol or Dilute citric acid	Sponge with either of these reagents. The place where the stain has been may be revived with chloroform.
Varnish	Alcohol Turpentine	Wet the stain with alcohol or turpentine and allow it to stand a few minutes, then wet again and sponge off with a clean cloth. Continue this until stain is removed. In case the color is affected by alcohol, sponge with chloroform; but for blue material use dilute vinegar.
Vaseline	Turpentine	Wash a *fresh* vaseline stain with turpentine. Soaking may aid the removal. Stain cannot be removed after it has been boiled.
Wagon grease	Lard or Olive oil	Rub either oil or lard on stain, then wash with warm water and soap. It will be found of help to keep a cloth or blotter under stain while rubbing on the oil.
Water spots	Steam	Have a little water in teakettle boiling hard. Shake spotted garment in the jet of steam until thoroughly moist. Continue shaking until dry.

Character of Stain.	*Reagent.*	*Method of Removing.*
Wax	Absorbent paper and warm iron	Scrape off all that is possible, then place blotting paper over spot and press with warm iron. This will soften wax and cause it to be absorbed by the paper. If there is color, as from colored candle wax, use alcohol to extract color after removing wax. Javelle may be needed to bleach the color.
Wine	Salt and boiling water	Put thick layer of salt on stain as soon as made, then treat with boiling water as fruit stains. Boiling milk may be used in the same way.

CHAPTER IV

WASHING AGENTS

Water.—Water is a solvent and a carrier, so is especially adapted to the cleaning of soiled clothes. There are two kinds of water—soft and hard. Soft water is most suited for washing, because it combines readily with the soap, easily making a lather which is the means of carrying off the dirt. Hard water may either be temporarily hard because its mineral matter is in the form of carbonates, or permanently hard with the mineral matter in sulphate form. Temporarily hard water is easily made soft by exposing the water to the air, or by boiling, which will expel carbon dioxide, causing the carbonates of calcium and magnesium to be precipitated. It is this precipitation which causes the crust to form on the inside of boilers and kettles.

The sulphates hinder the water from making suds, so that permanently hard water is unsuitable for washing, but can be made suitable by the use of sodium carbonate (washing soda). If this is not done, the soap will combine with these salts, and a scum forms which is a greasy, insoluble curd. This scum is called lime or magnesium soap, and will form in a boiler, a wash tub, or a washing machine unless live suds constantly exist. This lime soap streaks the clothes, often settles in between thicknesses of hem and tucks, and requires a garment to be rewashed. An abundance of soap will soften the water, but it will be at the high cost of the price of soap, while washing soda, a very much

less expensive agent, will soften it and will be inactive up to the amount required to soften the water. Whenever washing soda is used in connection with washing, it should be in the form of a solution, using only enough to produce lasting suds with the soap used.

Water when raised to a boiling temperature has great power as a disinfecting agent.

Water cleans by dissolving dirt;
by carrying away insoluble particles;
by forming an emulsion with soap;
by sterilizing at boiling temperature.

SOAP

Soap is considered today as an essential in every civilized community. Some one has said that the civilization of a country is known by its soap bill. Soap is not only a cleaner but it is a disinfectant.

As a cleaner, soap dissociates in water and forms suds which in turn act as an agent to carry off the dirt. This dirt is most often held in by greasy matter which is attacked by the alkali set free in the soap, and saponified by it.

As a disinfectant, soap is used in hospitals to sterilize hands and instruments; in laundries, to sterilize clothes; for toilet purposes, to sterilize skin; in homes, for dishes, refrigerators and all general cleaning. An experiment once made on various soaps from all kinds of places and uses showed the great power of soap to destroy germs. With all experiments made, no cultures could be grown, and soaps that were inoculated with germs possessed none after four hours.

Kinds:

Toilet. Laundry.

Kinds of Soap

- Toilet...... Vegetable fats
  - Palm oil
  - Olive oil
  - Cottonseed oil
  - Coconut oil
  - Maize oil
- Laundry..
  - Animal fats....
    - Beef
    - Pork
    - Mutton
    - Mixture
  - Vegetable fats..
    - Coconut Oil
    - Cottonseed oil
    - Olive oil
    - Palm oil
  - Mixture.......
    - Animal
    - Vegetable
    - Kitchen grease.

+ Alkali..
- Soda — Hard soap.
- Potash — Soft soap..

+
- Weighting........
  - Rosin .... Suds; Weight
  - Water .... Weight
- Extra cleanser.....
  - Borax, Sodium carbonate ... Soften water
  - Kerosene, Naphtha or benzine .. Dirt remover
- Abrasive material
  - Pumice, Sand .... To clean by scratching
- Color and scent...
  - Dye and foreign color
    - Esthetic reasons
    - To hide dirt; To hide resin
  - Perfume, Volatile oils ...... To hide rosin; To hide dirty fats
- Medicinal agents..
  - Resorcin, oil, tar, etc.; Carbolic acid — To treat skin; To disinfect

The required ingredients for soap are fat and alkali (soda or potash).

Quality of a soap depends on the cleanliness of its fat ingredient, upon the proportion of fat and alkali, and upon the kind and amount of foreign material.

The fat should be clean, whether animal or vegetable fat. The vegetable fats, making a milder soap, are most often used for toilet soaps. Any animal fat is used alone or mixed with others, and even kitchen grease may be used. This fat may be used for the cheap toilet soaps, but more often is the foundation for laundry soaps.

Foreign material is a term which may be applied to all substances not necessary to the actual formation of soap. These may be added to soaps to increase weight, to aid in cleansing, for medicinal uses, and for esthetic reasons.

1. Rosin.....to increase weight.
   Water.....to increase formation of suds.
2. Soda.....
   Borax..... } to aid in cleansing.
   Ammonia.....
   Kerosene.....by softening water.
   Benzine.....by cutting grease.
3. Sand.....
   Pumice..... } to aid in cleansing by scratching.
4. Medicines....
   Oils..... } for external treatments.
   Disinfectants.
5. Perfume.....for esthetic reasons.
   Color.....to hide dirty fats.

Weight Substances.—A certain amount of water—twelve to fourteen per cent—is good in a soap, as it keeps it sufficiently soft to cause it to blend readily with the water, and so quickly and easily to make suds. Excess water makes soap soft, and may be an adulterant, if in very large quantities, for then it will add considerable weight. When soap is purchased by the cake, the percentage of water seems of less moment, but should be guarded against when soap chips are bought by pound weight.

Rosin is prepared from crude pine turpentine by distillation. It is added to soaps because it produces a foam or false suds with water. To a certain extent this may clean, but as the suds are sticky and gum-like, it naturally forms gum layers on the boiler, and should the suds not hold, but a scum form, the rosin will cause the scum to adhere to the clothes. Rosin will be found in all yellow laundry soaps, and may be detected by the odor, and by a sticky feeling when handled.

Soda, Borax, and **Ammonia** are alkalis which may soften the water, and so increase the suds, or may saponify (or cut) the grease, and so set the grease free. Borax and ammonia are such mild alkalis, we might consider them harmless. Soda is used in carbonate form (washing soda). It is hard on the hands and injurious to wools, silks, and colors. It is better to buy a neutral soap, and when desired add soda in liquid form. It is not only cheaper but safer. Sodium carbonate may be qualitatively tested by this simple means:

Shave one tablespoon of soap. Place in beaker, or glass, cover with alcohol, about one cup. Place beaker over water bath. Heat slowly until all soap is dissolved.

Strain or pour through filter paper. All pure soap will go through paper with alcohol. What remains is excess soda or foreign material. (This test will not show resin.) Excess alkali is roughly tested by litmus paper. Always test the center of a freshly cut cake of soap. Use red litmus and see if it turns blue. A water bath may be made with a large pan and a weight or ring in the bottom upon which to stand the beakers, or glass.

NOTE.—Have low fire under alcohol so there will be no danger of fire.

Kerosene in soap loosens the dirt in the same way that kerosene in the boiler does. Good rinsing should follow to remove odor.

Benzine soaps are especially made and bought for spotting and cleaning. Benzine is a grease solvent. In the absence of benzine soap, use any water soap and benzine or gasoline.

Sand and **pumice** are abrasive materials and clean by scratching.

Medicine, oils and **disinfectants,** like resorcin, quinine, olive oil and carbolic acid, are used for bathing and disinfecting scalp sores and delicate or diseased skin.

Perfume and **color** should be accepted only in high quality soaps, as they may be used to cover up impurities in a cheap soap.

To make Soda Solution for Soap Making:

I. 1 lb. caustic soda, chemically pure.
6 pts. water.

Dissolve the caustic soda in water and if this proportion is rightly measured the soda will be of the correct strength, 17° Beaumé, when tested with a Beaumé hydrometer, to be combined with pure clean fat.

II. 1 can lye.
1 qt. water.

This is a household recipe and produces good results, but the soda is not of such pure quality.

Prepare the Fat by melting it and letting it cook slowly with water or raw potato until the fat no longer crackles. This means the water has all evaporated and has deodorized the fat by its vaporizing and carrying off some of the odor.

While still warm the fat whould be strained through fine muslin (the usual household way), or through fine charcoal or clay. This latter is a slow process but gives a whiter fat and hence a whiter soap.

To make the Soap use:

1 lb. clean fat, warmed.
14 oz. soda or lye solution.

Stir with an agate spoon or a stick until the consistency of honey and then mold.

To Mold.—Line an enamel pan or box with waxed paper, cutting the paper in strips so the corners will be smooth (like the paper in candy boxes). Pour soap mixture in box and let stand until well formed. Before it dries remove the paper as one would from a warm cake. Any coloring, perfume or extra cleansing material should be added as the soap is saponifying and before the molding consistency is reached.

To Store.—Soap should be kept until sufficiently dry to not become soft and pasty as soon as wet. For rapid work soap cannot be too dry; therefore it is wise if one stores a box of soap to keep the half to be used last, wrapped, and unwrap the first lot. For quick drying stand the cakes on edge, leaving a space between, and stack log cabin fashion.

Soap Solution for Boiling or for Washing Machine:

Dissolve 1 lb. soap chips in 5 gals. of water; or
1 cake of soap in 4 qts. of water.

Dissolve by heating at a low temperature. The color should be amber and not dark. Over-cooking soap makes the solution dark.

If the water is very hard or the clothes very soiled, one-half pound to one pound of washing soda may be added to the soap solution when soap is dissolved. Continue heating until all soda is dissolved. Soda "built in" to soap in this manner does little harm to any cotton or linen garment and is often not only a saver of soap where water is hard, but overcomes grease in table linen and heavy soil in dirty garments like overalls.

Soap Recipes:

BLANKET WASH SOLUTION.

I. Soap for washing blankets.

1 large bar Ivory soap.	2 tablespoons borax.
3 qts. cold water.	½ cup wood alcohol.

Shave the soap into the cold water and heat to boiling point. When cold, add borax and alcohol.

Put about one quart of this solution into the first tub,

one pint into the second tub for washing all woolens. All three waters should be of the same temperature. Follow the rules on page 94. This solution will wash four pairs of blankets.

II. Detergent.

1½ oz. white castile soap.	1 oz. ether.
1 oz. alcohol (wood or grain).	4 oz. ammonia.

Cut soap fine and heat in one pint of soft water until dissolved. Then add three quarts of cold water and the other ingredients. For cleaning black goods, use ¼ cup of this liquid in one pint of warm water. If this makes the article too stiff, add more water. For removing spots from woolen goods, as men's clothing, apply (only slightly diluted) with a sponge. It is always safer to test any cleansing solution with a piece of the material before attempting to remove stain, as the ether may affect the color.

Soap Substitutes:

Bran water.
Potato water.
Starch water.
Soap bark water.

Recipes in chapter on colored clothes, page 93.

STARCH AND STARCHING

Starch is of vegetable origin, found in the seeds, roots and tubers of vegetables and in the seeds of grains. From the cookery point of view we have many starches, but the laundress chooses only those which give a desired degree of stiffness and at the same time a pliability.

One wants a body which will resist moisture with clear good color as well as gloss or finish.

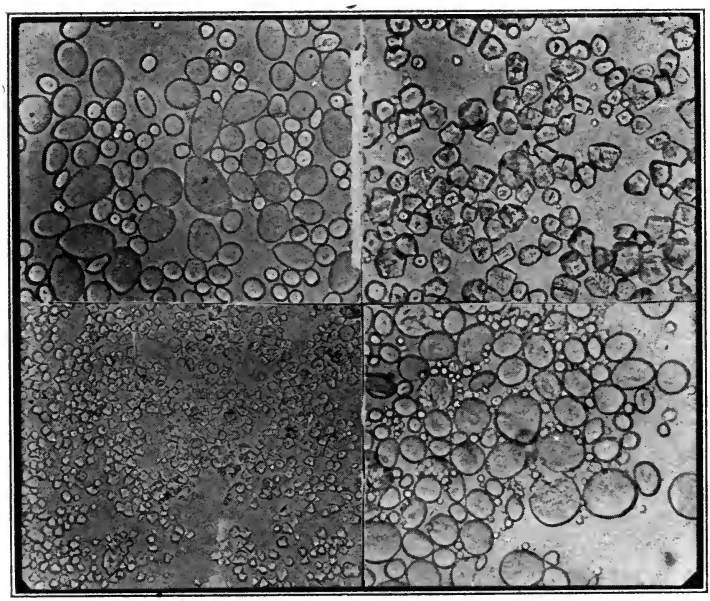
Kinds used:

Corn.
Wheat.
Rice.
Mixed or "blended."

Corn starch is the most commonly used because of its cheapness and because the other, have not been sufficiently considered. As the industry has advanced we find packages of wheat and rice starch on the grocery shelves and mixed or blended starches in the laundry supply houses. Today starches are rated according to their ability to make a paste which penetrates the fiber and at the same time resists moisture. This power to make a paste is called viscosity. Corn has the greatest viscosity and so plays an important part in the blended starches, where it furnishes the resisting power to the fabric while wheat gives pliability. The "blending" proportion or recipe varies for the work the starch is to do. The rule is about two-thirds corn to one-third wheat when blended for collars, cuffs and shirt bosoms, while two-thirds wheat and one-third corn is more often the ratio used for body clothes. Blended starches are used by the launderer. He buys the starch blended (even to having borax and paraffine added), or he buys two kinds and blends in his own way. Wheat has a lesser viscosity, while rice has the least. In all fine lingerie work today the expert launderer is using rice starch. It may be expensive, but gives just the new finish to the fabric. All starch is in the form of minute granules which are tasteless,

odorless, white and distinguishable from each other only by a microscope which shows each granule to have its characteristic shape and size.

Solubility.—Starch granules are insoluble in cold water, swelling only with moisture; when heat is applied, the



cellulose covering bursts, forming a thick, sticky mass which is the paste used.

To Make.—Starch paste may be made in two ways, but in both the principle is the same. In either case cold water must be added to the white powder to separate

the grains, as they are so fine they mass together when dry, and lump if heat is added before the granules are separated. Heat is applied in one of two ways. The home method of making starch is to add the right amount of boiling water to the cold water and starch, while the commercial method and one good for large quantity work is to pour into the measured water, which is boiling, the mixture of cold water and starch granules. The borax, alum and fat may be added to the cold water mixture. The granules begin to break at 120° F.; all are broken at 212° F. Starch should be boiled gently for fifteen minutes, care being taken to prevent burning.

Directions for Use.—Use the starch hot and strain first before using; this prevents using lumpy starch and starch with a skin. In commercial laundries starch is kept hot in steam kettles. This same idea may be used in the home by standing the saucepan in a pan of water, or, if the quantity warrants, by using the fireless cooker.

A little bluing is usually added to the starch paste, because the hot starch extracts some bluing from the garments.

To Starch.—The garments should be free from excess moisture, which would dilute the starch and make the degree of stiffness irregular, and the garment should be wrong side out. This prevents any possibilities of irregularly made or used starch from showing on the surface after ironing. Work the paste well into the fabric, then wring out all excess starch and end by rubbing the left-over starch well into the pores of the

fabric. Starch well cooked and rubbed in will give little trouble if the irons are clean and hot.

Clear Starching is used for lingerie work and lace curtains, and means that the starch paste is only thick enough to produce a new appearance in the fabric. Rice starch is best for this, or we may dilute wheat or corn starch by adding more water and reducing either to almost a watery consistency. The starch paste is so thin for clear starching that it will not permit of further dilution; so the clear-starched garment is rolled for one-half to one hour and ironed "out of the starch," *i. e.*, without drying and sprinkling.

Heavy Starching is used for collars, cuffs, and shirt bosoms where we want a heavy garment to resist moisture and soil and not to crack easily. All corn starch, or corn and wheat starch in proportion of two to one, is best suited for this work. This starch, on cooling sufficiently to handle, is like a very soft jelly. The collars and cuffs and bosoms are dried and then starched. The starch is rubbed in until every thickness is wet with starch and each is glued to its neighbor. The dried garment has been forced to take up enough starch to be thoroughly wet, stripes of the pattern are straightened now, blisters are worked, surplus material caused by bad making or cutting is pushed to the part where it may be hidden, and with a damp cheese-cloth all shining starch on the surface is wiped off. The properly heavy-starched garment should be hung straight, without folds or mussing, and is then ready for the glossing and smoothing of the hot iron. Three-fourths of the work of the ironer has been done by the starcher. This whole process is quite like that of

mounting a photograph where straightness, smoothness and no blisters are essential.

Uncooked Starch requires much greater work in the ironing, for in this method the iron really makes the paste by cooking the starch as it passes over the collar or cuff. It will be found that the fiber absorbs the uncooked starch readily and consequently will make it a stiffer garment. Because of the difficult ironing after this method we find most experts making a heavy starch as described on page 50.

A cold starch is being used today in most commercial laundries. It is a mixture of cooked and raw starch. The cooked starch helps to keep the uncooked from settling and hence separating.

Starch Accessories.—Borax, paraffine, wax, lard, may be called starch accessories.

Borax and alum increase the color, pliability and gloss of the starch. Alum thins the starch without affecting the strength of the mixture.

The waxes and fats should be white, and are used to make a smoother starch, one that will not adhere to the iron so easily. Butter is not suitable because of its color.

Starch Substitutes such as borax, gum arabic, glue and dextrine may be used with the starch, but are often used as substitutes. They are especially good for silks and for colors where one fears the whiteness of starch may be seen.

Glue may be used for dark-colored fabrics, but has been superseded now by a "mourning starch" which is so darkened in manufacture that it does not show white on blues, browns or blacks.

Gum arabic is an easy, good substitute for starch. Use 1 tablespoon to 1 quart of warm water. Strain.

Tinting Starches by tea liquor, bluing, or colorings, makes it possible to starch any color and not have it show and also makes it possible to replace some color that may have faded in washing.

Tea makes good ivory, old lace, and ecru colors. It is better than coffee, as the liquor is more likely to be clear and there is less odor. Cook a cheap black tea (about one tablespoon to one pint of water) until a strong colored liquor is made. Use enough of this to get the tint desired. This tea water must take the place of some of the clear water allowed in the starch recipe or the starch will be too thin.

Tinted starches should be treated first on a small piece to see if the color is good. Remember it will be lighter when dry.

Recipes:

	Water.	Borax.	Fat.	Starch.		
				Corn.	Wheat.	Rice.
Heavy starch.....	1 qt.	½ tsp.	½ tsp.	3 tb.	5 tb.	5 tb.
Thin starch.....	1 qt.	½ tsp.	½ tsp.	1½ tb.	2½ tb.	2½ tb.
Clear starch.....	1 qt.	½ tsp.	½ tsp.	½ tb.	1 tb.	1 tb.
Raw starch.....	1 qt.	½ tsp.	½ tsp.	1 tb.	1½ tb.	1½ tb.
Gum arabic, 1 tb..	1 qt.	.....	.....	.....	.....	.....

tb. = tablespoon. tsp. = teaspoon. pt. = pint. qt. = quart.

BLUES AND BLUING

Blues come from a vegetable, mineral, or chemical source. They are bought either in a liquid or solid form—

balls, blocks, crystals, powders. Color tones of the different blues vary considerably; the chemical variety being a violet or blue blue, or greenish blue; the mineral, a blue blue; and the vegetable, a dull, dark blue. A comparison of the cost of different blues proves one cheaper than the other, for some may be used entirely while in others there is considerable waste material of a clay nature.

Bluing is used to counteract the tendency of white clothes to yellow. The amount used in any case varies according to the material and weave, the thinner, soft mesh fabrics absorbing the most color.

Kinds Used:

Indigo.
Ultramarine.
Prussian.
Aniline.

Indigo, the oldest known blue, comes in powder or lump form. It is obtained through fermentation of the indigo plant. The liquid product secured by means of this process is agitated in order to oxidize the indigo plant. The blue pigment is the result of this aerating process. Several other treatments are necessary before the crude product is in marketable form.

The process of making indigo blue is tedious, and the quantity obtained per plant is very small. This bluing is therefore expensive. The color is a dull dark blue, looking almost black when in lumps. Its lack of brightness of color and the cost of manufacturing it has caused this blue to be almost abandoned as a laundry blue. It is insoluble in water, bluing by the fine particles being suspended in the water.

Ultramarine Blue comes in ball or block form and occasionally is a powder. The ultramarine of the laundry is not the natural product, lapis lazuli, but an artificial by-product obtained from the soda industry. Its composition is very similar to the blue mineral formerly used, having china clay or kaolin as a basis. It is believed that the ultramarine blue is a double silicate of sodium and aluminum with sodium sulphide in addition. Different samples of this blue may show slight differences of composition on analysis.

The color is a bright blue. This blue is used commonly in the home but not in commercial laundries. When the large amount of clay material in the blue and, consequently, its small capacity for bluing is considered, it is not difficult to realize that this bluing is not cheap when compared with others. See analysis of blues, pages 58-59.

Prussian Blue has copperas and potassium ferrocyanide as a basis. The blue usually appears in liquid form, only occasionally as a powder.

The color is greenish blue. This blue is a favorite with many laundresses. If used when clothes have been carelessly rinsed, the iron in its composition will probably prove troublesome by the soap, which is carried into the bluing water, making an iron compound which later appears as rust spots on the clothes. When compared with other bluings, this is by no means as cheap a bluing as many consider it.

Aniline Blue comes in a powder or crystal form. It is always converted into a liquid state before using. It, too, is an artificial blue, being a by-product from coal tar.

Aniline gives a great variety in color, the extremes being a blue blue and purple blue. This variety of color is valued, for its different tones lend themselves to the launderer's skill in obtaining the color of different fabrics that is desired. This bluing is sold by the ounce or pound and may be bought from any laundry supply house. One ounce makes a gallon of liquid blue. Comparing this blue with others, it proves cheaper and more effective, as it gives a clear color to clothes, is so strong that only a small quantity is required, and is soluble.

Properties.—Indigo, besides not having a good color itself, and therefore not being able to give good color to clothes, does not stand heat from the iron well.

Ultramarine decomposes in presence of acids—its large proportion of clay material is a large factor against its use.

Prussian disintegrates when it stands for a long time in sunlight. Alkali in connection with heat will break it up, giving an iron precipitate.

Aniline will be but slightly affected by strong alkalis and will stand heat from the iron.

Solubility.—The different blues vary greatly in solubility:

Indigo is insoluble.

Ultramarine is not soluble, for there is the clay carrier which is insoluble.

Prussian in commercial form and aniline are entirely soluble.

To Make.—1. Bluing from liquid blues.

To the tub of water, pour in a small quantity of the liquid blue and stir with the hand to blend. If not

the required color, add small quantities at a time, stirring each time. Use about one teaspoonful to a tub. It is difficult to give a definite amount as tubs vary in size and bluing varies much in degree of color. To test the degree of color tone lower the hand under the water or put some in a clear glass. It may be tested with a small piece of fabric. Experience soon teaches the amount to use.

2. All powdered blues must be made into liquid form before using.

To prepare aniline blue:

1 oz. aniline blue (powder).
1 gal. water.

Stir until dissolved and then filter through filter paper or several thicknesses of fine cheese-cloth. Bottle. A much smaller quantity of this liquid aniline blue will be needed to make bluing than of any of the other liquid bluings on the market, about ½ teaspoon for a tub of water. Test as under No. 1.

3. Bluing from solid blues—ball, block, or lump.

Tie a quantity in a flannel or in three or four thicknesses of cheese-cloth. This blue bag is dipped into the tub of water and squeezed, then the water is stirred to blend the blue. Use about ⅓ of a ball to a tub of water. Test as under No. 1.

To Use.—Before using, the bluing should be stirred each time to blend. In case of the indigo and ultramarine blues, settling of particles of blue is very noticeable if bluing has stood for only a short time. Each article washed should be shaken out before putting into the blue tub. Only a few pieces should be put in at a time.

Stirring the blue each time it is used, shaking out each piece, and leaving in the blue for a few minutes only, will prevent streaking. It is better to dip a garment several times rather than allow it to stay in the blue tub for a length of time.

Effect of Bluing on Different Weaves.—Materials that are open in weaves, as table linen, laces, etc., will take the blue very readily; therefore, bluing for them should be light in tone. For closely woven material, as sheets, etc., the blue should be considerably deeper.

To Remove Blue.—Clothes that are too blue, as a result of bluing being too deep in color or from an accumulation of repeated bluings, should be put into boiling water and allowed to remain for a half hour. When the excess blue will not yield to this treatment, clothes should be boiled. Boil until white.

Tinting.—For very dark blue or black material, the bluing should be made very deep in color in order to be of any use to these colors.

Do not use bluing for browns, greens, or pinks.

Experiments for Testing Blues.

Equipment needed for experiments:

Test tube rack.
Test tubes—two for each bluing.
Funnels—one for each bluing.
Filter paper—two for each test.
Strong alkali—as caustic soda.
Dilute hydrochloric acid.
Some means of heating test tube.
Knife to scrape balls of block into powder.

1. Test for Solubility.

Small quantity of blue to be tested.

Mix well with water and filter.

Material left on the filter paper shows the insoluble portion of the blue. The liquid portion that has passed through the filter will show by its tone how much or how little blue has gone through.

Blues that are quite insoluble, blue clothes by depositing fine particles evenly on the fabric. In order to get fine particles, the blue is squeezed through fine meshes of flannel or several thicknesses of cheesecloth, and the tub of blue is stirred in order to keep particles in suspension.

2. Test for Iron in Blue.

Small quantity of blue and water mixed well in test tube. Add small quantity of alkali—as caustic soda—and heat the contents of the tube. This can be easily done by holding the test tube in a pan of boiling water.

If the blue is an iron or Prussian blue, a heavy red precipitate will form. It is this change that takes place when the hot iron is run over fabric that has been carelessly washed and rinsed and a Prussian blue has been used. The alkali of the soap combines with the blue, resulting in deposits of iron oxide or iron rust.

3. Test for Foreign Materials in Blue.

Filter papers with results of Experiment 2 should be carefully washed with dilute hydrochloric acid, five per cent.

Aniline blues are not affected. Ultramarine blue will yield their blue color and a gray-colored clay material will remain on the filter paper. The propor-

tion of the clay material to the amount tested is very large. With the change of color from blue to gray, a distinct odor of hydrogen sulphide will be noted.

Prussian blue will react to its original color on washing the filter paper containing the iron residue with the acid, and the iron deposit will disappear, having been changed into soluble form.

NOTE.—For young children who would not appreciate the change taking place in test tubes, the first two experiments might be done in a way to appeal to them. (1) If bluing has been made from ultramarine blue, and allowed to stand, the deposit of blue particles will show plainly, even in the blue tub, showing insolubility of blue.

(2) If a piece of cloth is washed with ordinary yellow laundry soap, which usually has excess alkali, and rinsed sparingly, then blued with a Prussian blue—when the hot iron is applied, rust spots will usually appear or the cloth will be quite yellow in tint compared with the new piece from which the child has torn the test piece.

CLEANSING AGENTS

Alum

Na_2SO_4, $Al_2(SO_4)_3$, $24H_2O$. Very soluble in water, having astringent acid and sweetish taste; litmus test acid; loses water of crystallization on heating. Commercial alum—potash alum.

Uses in laundry: Salts of alum used in dyeing, mordanting; clarifying turbid liquid; alone or with borax in starch to improve color, increase penetrability and pliability, and to thin starch mixture.

Borax

$Na_2B_4O_7$, $10H_2O$. A colorless, well crystallized salt; reaction, alkaline. Milder than washing soda, but effective as a cleaner, a disinfectant and a bleach. Being weaker in its action, more of it must be used to produce a given result. It is much less irritating to the skin and less injurious to fabrics and colors.

Magnesium

Malleable, ductile metal of the color and brilliancy of silver; reaction slightly alkaline.

Uses: Magnesia, MgO, used in cleaning white felts, velvets, etc.

"Benzinized magnesia," for grease spots on silk: Mix calcined magnesia with just enough pure benzine to make moist, crumbly mass. Spread thickly over spot and rub thoroughly with finger-tips. Brush off lumps, and when benzine has evaporated, brush off all particles.

"Etherized magnesia" also used for spots.

Caustic Potash

KOH. Used to make soaps. Strong alkali unless combined with fat as a soap. Neutral olive-oil potash soap, less deleterious effect on wool and silk fibers than soap, but not so cheap. See chapter on Soap.

Potassium Permanganate

$K_2Mn_2O_8$ or $KMnO_4$. Manufacture: To ten parts saturated solution caustic soda add seven parts potassium chlorate and eight parts manganese dioxide; evaporate and heat until potassium chlorate decomposes; treat with boiling water, filter, and crystallize filtrate. Crystallizes in

rhombic needles of a very dark purple color. A very soluble salt, forming a purplish-red solution.

Uses in laundry: Oxidizing agent; removing stains; it bleaches by its free oxygen in the presence of an acid. Removes stubborn stains of almost any source, but, of course, like any bleach, will remove color. Use 4 grams in 1 liter of water (about 1 teaspoonful to a quart of water).

Washing or Sal Soda

Na_2CO_3, $10H_2O$. An alkali, soluble in water. Strong reaction, therefore:

Unsuitable for colored clothes; hardens and yellows woolens.

Good for soaking of coarse dirty clothes; it should be dissolved in water before adding to water for soaking.

Softens water and dissolves grease and acts on dirt, rendering both removable by water.

Alkaline base for soaps.

Care: Keep in covered jar, as it effloresces in dry air.

Kerosene

Colorless liquid. Manufacture: Crude Petroleum obtained by boring tube wells through shale into sand rock; refined. Products: Naphthas, including benzine and gasoline, kerosene or coal oil, vaseline and paraffin and lubricating oils.

Has solvent and bleaching property.

Uses: As fuel; in so-called naphtha soaps; to clean rust from irons, lampblack, stains from wringer, spots from porcelain; in starch to give gloss; in boiling process, two tablespoons, saves rubbing, but necessitates thorough rinsing.

Ether and Chloroform

$(C_2H_5)_2O$. Ether and chloroform used as anesthetics, but of importance in cleaning on account of solvent powers.

Ether manufacture: Strong sulphuric acid on alcohol. Very volatile, boils at 35° C., soluble in water.

Ether magnesia for stains: Mix calcined magnesia with enough ether to make paste. Spread over spot. After ether has evaporated, brush magnesia from garment and rub with piece of soft white bread.

$CHCl_3$. Chloroform: Heavy, clear, colorless liquid, sweet burning taste; boils at 61° C. Solvent for iodine, wax, etc. Should be kept well covered and in a dark place.

Uses in cleaning:

Chloroform solvent for fats, alkaloids and iodine; ether for these and also resins, etc.

Chloroform is non-inflammable, so safer to use than ether, which is both inflammable and explosive.

Dry cleaners use these chemicals for spotting agents. They must be absolutely chemically pure or they may make stains.

Ether used in combination with other ingredients to make cleaning fluids. One for leather tissues: One part ether to four parts turpentine.

Price prohibits extensive use, especially since benzine is much cheaper and very efficient.

Chloroform, like ether, may extract color.

Turpentine

$C_{10}H_{16}$. A resinous exudation from trees like pines; found notably in section of Mediterranean. It is a solvent, having special power on varnish, paint and vaseline. It may be used in place of paraffin in making starch.

Paraffin, Gasoline, Benzine

Hydrocarbons are obtained in the distillation of crude petroleum. Volatile, but have a disagreeable odor which clings to clothes unless hung for a time in the open air. Very inflammable.

Used as a grease solvent and for cleaning metal work of machinery.

Crude petroleum yields gasoline of all gravities.

Formerly gasoline disposed of as waste in effort to make kerosene.

Lowest gravity is highly volatile because it is so nearly gas that when exposed to air it evaporates very rapidly. Cannot be confined in barrels by any care—paint, wax, etc.—so is not put out commercially in this form.

Cleaning.

"Dry cleaning"—cleaning without water. Removes grease, because it is a solvent for fatty materials.

Gasoline should be colorless, mobile, leave no residue on evaporation. Its great danger is inflammability. Dry cleaners mix it with carbon tetrachloride, a grease solvent, leaving no ring. Very expensive and has anesthetic effect on workers.

Benzine, if not free from water, will form damp spots on garment, which retain their dirt and also attract dirt from immediate surroundings. Pure benzine should have violet color when treated with potassium iodide.

Benzine soaps—rubbed on soiled spots before garment is put into machine for cleaning helps much. In the absence of a special soap, any white soap may be used with gasoline. Use no water.

All work with benzine should be done in airy rooms, in

daylight, and in rooms free from all flames. Best to have a separate building. Do not clean gloves on the hands.

Pour used gasoline on porous soil to be quickly absorbed. It kills grass.

Purification of benzine after using: Filter through sand and sawdust; this removes mechanically all gritty material.

Storage of naphtha—in separate building or outside. Two things to guard against: (1) loss from evaporation, and (2) danger from fire.

Alcohol

CH_3OH. Wood spirit; destructive distillate from wood. Used to dissolve resins, fats, oils, etc., and in making aniline.

C_2H_5OH. Commercial alcohol; made by fermentation of glucose and distillation of products. Colorless, mobile liquid. Denatured alcohol—methylated spirit. Wood and denatured alcohol are poisonous. Alcohol burns readily with blue flame, producing great heat and liberating CO_2 and H_2O.

Alcohol used as a grease solvent by warming it over water.

Acetic Acid

CH_3COOH. Important organic acid. Found in vinegar. Commercial: Fifty per cent solution, colorless, having pleasant odor and sharp taste. Excellent solvent for many drugs.

It is useful in laundry to set colors, and for the removal of glue stains. It is used to develop some aniline blues.

Citric Acid

$(CH_2)_2COH(COOH)_3$. Colorless crystals, not soluble in ether. First obtained by Karl W. Scheele in 1784 from

juice of lemon. Also found in many other fruits and in some bulbs and tubers.

Used as a bleach and will remove iron rust. It is not as strong as oxalic acid.

Hydrochloric Acid

HCl. Muriatic acid. Colorless gas, having pungent odor and taste. Fumes strongly when exposed to air. Commercial product is gas dissolved in water; this commercial product usually yellow and contains impurities, as arsenic, sulphuric acid, chlorine, ferric chloride and sulphurous acid. Never used by launderers.

Hypochlorous acid, by-product of HCl industry, used in laundry for bleaching.

HCl used for iron-rust stains by diluting with equal quantity of water.

Oxalic Acid

$(COOH)_2$, H_2O. Oldest known organic acid. Found in many plants, as wood, some rhubarb roots. Poisonous, and care should be taken to label it plainly.

Used in laundry to extract iron rust, and as bleach, either alone or with potassium permanganate. Used to clean straw hats, but should be most thoroughly rinsed out. Used to clean metal washing machines. For stains dilute by equal quantity of water; for washing machine use four to six ounces for 100-shirt washer.

Waxes

Allied to fatty acids and oils, but distinguished from them by absence of glycerin. Vegetable origin—wax tree, whose fruit has waxy covering; bayberries. Animal origin—bees.

Beeswax is solid fatty substance secreted by bees in constructing hives, and composed of three chemical principles—myricin, cerin and cerilein. It undergoes bleaching in the sun. Sold either yellow or white. Costs about sixty cents per pound.

Used in laundry for cleaning irons and as a coating on irons to prevent rust.

CHAPTER V

PREPARATION OF THE WASH

From the laundry point of view, Tuesday is a much better home laundry day, because it allows Monday for preparation. The preparation does much to economize effort and time on the busy day.

Mending is considered the first stage of preparation. Often a stitch before the wash saves nine after.

All mending of table linen, bureau scarfs, trimming on underwear and children's dresses can easily be done before the washing. Again, it saves wrinkling the well-ironed garment. Stockings and underwear are easily mended after, and it is usually preferred to do so. If the clothes are to be sent out, counting and marking will be necessary.

Counting, if goods are sent to a commercial laundry, may be made easy by good laundry list pads. Two lists should be made, one for the laundry and one for reference. Be careful that the count is accurate, as this is the only way to avoid loss.

Marking may be done before the new piece is put into use, and if well marked the mark will last as long as the garment. There are many ways to mark, but the best way is the one that is least conspicuous and most lasting.

Pen and ink on linen tape or Cash tapes are the best and the neatest. Embroidered initials and monograms

are of course the most ornamental, but they involve much work and are not the most lasting.

A fine-pointed steel pen (No. 00) or a glass pen will make marking easy. To make the marking more lasting, the dressing should be washed out or rubbed soft to allow the ink to penetrate the fabric, and a warm iron should follow the marking to set some inks. Read directions on the bottles.

Marking inks may be purchased in small bottles or in pound or quart quantities for institutional work.

Payson, Carter, Stafford and all ink manufacturers put out good indelible inks and several have little marking outfits which sell for a small sum and contain ink, marking frame and suitable pens.

For institutions the marking is done by a marking machine which is like a typewriter. The ink for such a machine is specially prepared and is lasting in its color.

Sorting is an important stage in the process of preparing. A good sorter sorts for color, putting pinks and blues, etc., in their color pile; sorts for separation of woolens and silks from cotton and linen and always puts in a pile those garments which need special care in laundering—perhaps being washed by themselves to save from tearing or pulling or for special temperature of water.

This is sorting for colors and fabrics, but another important division must be made which is not dependent upon fabric or color—that is, sorting for a preliminary treatment all stained garments which may have their stains permanently established if allowed to reach soap and water.

For stains see chapter on Stains.

CHAPTER VI

PROCESS OF WASHING ALL WHITE CLOTHES

Method of Washing:

Soaking.	Bluing.	Stretching.
Washing.	Starching.	Folding.
Rinsing.	Hanging.	Ironing.
Boiling.	Drying.	Folding.
Rinsing.	Sprinkling.	

Soaking Clothes.—With the cleaner clothes, soaking is less necessary, but clothing that is soaked requires less rubbing and saves not only the fabric but the worker's time and energy. Unless one is sure that no stains exist, soak the clothing in cold water without soap. Soap may set stains.

Washing.—This is a mechanical means of removing dirt in which a clothes board or washing machine is used and the clothes are rubbed or agitated in soapy water to remove the dirt. If some of the clothes are very heavy and dirty, they may be cleaned with a short, small scrubbing brush. This is good for jumpers, overalls and corsets. The clothes are washed first on the right side and then are turned and washed on the wrong side.

If clothes have been soaked over night, on washday morning wring them out of this water. Then fill the tub half full of hot water and put in the clothes, rub with soap, and wash. Turn wrong side during washing so both sides may be clean. When washed, wring

from this water, rinse and soap the articles, and place in the boiler if they are to be boiled.

Rinsing.—After the washing, the clothes may be rinsed in clear water so as to remove any loose dirt before putting them into the boiler. Rinsing floats off dirt loosened by rubbing.

Boiling.—The clothes, after being rinsed, are wrung and soaped all over, and placed in the boiler with clean cold water. Do not pack so solidly as to prevent floating. Small pieces of soap may be thrown into the boiler for suds, as good suds are necessary. After coming to a boil the clothes should boil briskly for five minutes. A scum will not form if sufficient soap has been used to soften the water.

Stir and press clothes down in boiler with a clothes stick. When clothes are scalded (five minutes boil is sufficient for most clothes) take out of boiler with a stick, place in a tub of clean hot water, then cool water. No special point in very cold rinse water.

When the first set of clothes is scalding, rub out the second, in the same manner, and then continue with the third, until all the clothes are washed. The boiler should have clean water each time.

Rinsing is again necessary after boiling because plenty of water and thorough rinsing are essential to good work. It is better to rinse in two clear waters before putting into the blue water. The first rinse should be hot to remove soap and greasy scum, the second should be cool to prepare the clothes for the blue. Clothes should always be rinsed well before bluing, as the soap and blue may combine and cause iron-rust spotting. It is not

possible to over-rinse; in fact, three rinses before bluing are better than two. Gray, grimy clothes are usually poorly rinsed clothes.

Bluing.—Blue water is made by adding blue to clear cool water. If lumps, balls or blocks of blue are used, they should be tied in a cloth and then rubbed in the water until the water is the required color. Test by holding in the palm of the hand or by bluing a small garment. Blue water should not be too deep in color. The bag of bluing should be tightly squeezed before putting it away, to prevent the wasting of the blue, or else kept in a cup and this liquid used the next time. Blues vary, so it is impossible to give a definite amount, but use will soon teach. In making the bluing, the water should be well stirred each time before more blue is added. The clothes should be opened well before going into the bluing, so that they will not be streaked with blue. The clothes, if quite yellow, may remain in the blue water longer—otherwise one or two dippings in water is enough. The water should be well stirred every time the clothes are added, as the blue may settle to the bottom, and streak the clothes. After bluing, the clothes are wrung and are then starched, or not, as is necessary, and then hung.

(See chapter on Blues and Bluing.)

Starching.—Thickness of starch depends upon the articles to be starched. Starch is used: (1) for stiffening clothes; (2) to make them look well by giving the gloss of new material; (3) to keep them clean longer, because starch causes them to resist moisture. Borax is added to starch to give a gloss and to whiten and stiffen the clothes. The wax, paraffin or lard added to starch serves to keep the iron from sticking.

Garments that are raw starched are harder to iron. In using raw starch, the articles should be first dried so that they take up enough starch to make them stiff. Use raw starch by keeping it well stirred, wring out all surplus and roll collars and cuffs in a cloth to stand about one hour before ironing. Raw starching increases the work of ironing so much that heavy starching takes its place in most laundries.

(See chapter on Starch and Starching.)

Hanging is best in the open air. The line should be secure, perfectly clean and the pins clean. Keep both line and pins in a bag when not in use. Wipe carefully wire lines. Always shake the garments well, hang straight, and with the wind, *i. e.*, so the wind will blow through the garment rather than against it, and for efficiency's sake, hang like garments together.

Drying.—After clothes have been blued and starched, if they are to be, they should be hung out to dry. Table linen and bedding should be washed first, as they take no starch and can be gotten quickly to the line.

Every piece of clothing turned wrong side out for starching is hung to dry that way.

Hang articles of the same kind together. White clothes should be hung in the sun, colored clothes and flannels in the shade. Fasten by bands if possible, never by corners, as the strain is apt to tear the garment. Care should be taken to have clothes well pinned to the line to avoid loss and to avoid tearing. If enough of the garment is laid over the line before pinning there will be less danger from tearing than if just corners and edges are pinned. Starched articles are better not hung in a strong wind, as it takes the starch out of the fabric.

Sprinkling.—Clothes are sprinkled, stretched into shape, rolled and allowed to stand an hour or so, sometimes over night, before ironing. Handkerchiefs, napkins and towels should be folded, sprinkled and rolled together to have the moisture more evenly distributed and to prevent rapid drying. Warm water penetrates the fabric more quickly than cold, and if sprayed on from a spray nozzle, whisk broom or clothes sprinkler the work is much easier than the hand or finger method. Roll tightly, being careful to fold in all lace, embroidery and tucks, press or pound the rolls to distribute the moisture, and place the rolls close together in a basket lined with heavy, clean white cloth. Any stretching necessary should be done after the clothes are damp from sprinkling.

In warm, muggy weather it will be found safer to sprinkle the clothes early on ironing morning, as this warm, moist condition may cause mildew to grow. If mildew does form it may, in its early stage, be washed off, but it must be very freshly formed. Otherwise see Mildew—chapter on Stains, page 33.

Ironing.—Certain rules will help the ironer, but it is an art, and the best results will only come from the practice of frequent doing. All embroideries and laces should be ironed on the wrong side with a soft pad underneath so the pattern may sink into the pad and not be flattened by the iron. Tucks should be pulled taut and ironed lengthwise, and at the same time downward from top tuck to bottom tuck. Iron dry each part before beginning a new part. Goods left half dry or half ironed will pucker and look rough dry when finished. Ruffles should be ironed by ironing straight on the hem edge

and then by ironing up into the gathers. "Nose" the iron well between the gathers. A small pointed iron will assist in this work. Sleeves, ruffles, in fact all parts of the garment that may be ironed and allowed to hang over the board, should be done first.

All hems, tucks and bands require extra pressing, as they are thick. Use heavy broad irons for heavy bedding and table linen, and lighter, more pointed irons for body clothes. The irons should be smooth and very clean and sufficiently hot to "hiss" when touched with the moistened finger. An iron is too cool when the moisture does not turn instantly into steam, and may be seen to bubble on the iron. An iron that is too hot will cause the moisture to evaporate so instantly there will be scarcely a sound. Beware of this kind, as it means scorch, which of course is more or less injurious to the fabric.

Folding.—Care should be taken to fold clothes according to directions given under special chapters. Much depends on the folding. Let hang to air. Draw clothes-horse near the table, and fold garment by laying it first on the table and then into its particular fold. Clothing to be mended should be set to one side, and in this way there is no need of unnecessary unfolding and folding to look for mending, and again none escapes.

CHAPTER VII

TABLE LINEN AND BED LINEN

TABLE LINEN

Stains.—Fruit.
Tea and coffee.
Chocolate.
Grease: cream, oil, gravy.
Iron rust.
Meat juice, gravy, soup.
Vegetable.
To remove, see chapter on Stains.

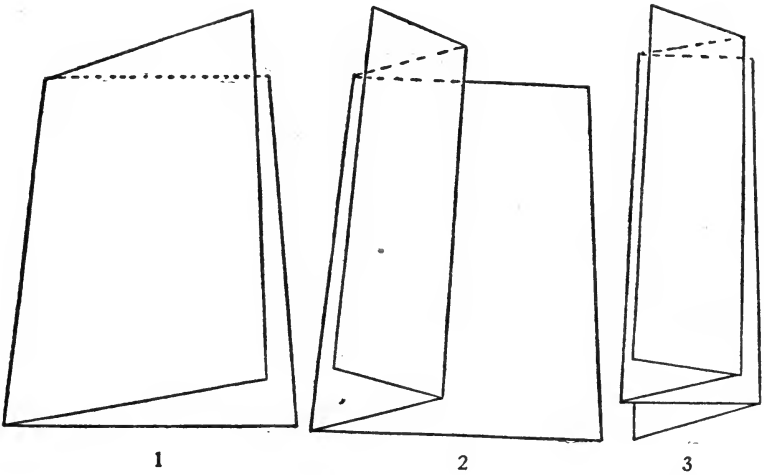
Soaking.—Soak table linen one-half hour in lukewarm or cold water without soap. Do not use hot water, as it will set some stains.

Washing.—Table linen does not need much rubbing, because it is rarely very soiled, and again the looseness of the fabric makes it easily cleaned if the stains have been removed. It should be washed on both sides with care not to omit sections. The clothes-wringer should be loosened for all table linen, as the material is soft and creases easily.

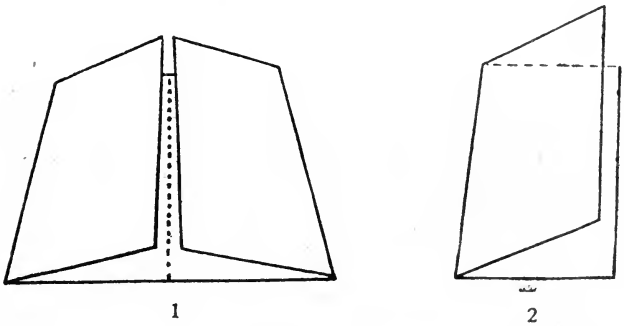
Boiling
Rinsing } See pages 70–71.
Bluing

For table linen, the blue water should not be as deep in color as for other fabrics, because of the softness of the material.

Table linen is not starched except perhaps to make poor linen look like a better quality.



Fold No. I.



Fold No. II.

THE FOLDING OF TABLE LINEN.

Hanging.—All table linen should be well stretched and hung very straight. It is found better to hang a third or a half of the tablecloth or napkin over the line, as pinning from the corners causes tearing. Good hanging does much to hasten the ironing.

Sprinkling.—Table linen may be taken from the line when half dry. The even dampness secured by this method especially facilitates good ironing. Dried table linen should be thoroughly and evenly sprinkled. In either case fold evenly, roll tightly and wrap in a heavy cloth. A heavy, hot iron on such damp linen will develop a gloss, and the pattern will shine prettily if ironed until dry.

Ironing.—Use heavy irons and iron dry. Fold table linen by folding selvages together. They may be folded with either three or four lengthwise folds. See chart, page 76, I and II. Napkins should be ironed partly dry on the wrong side, and then, when ironed on the right side, ironed dry. Fold all edges very evenly, except when folding the lengthwise folds in half. Here the upper half should be drawn back about one-half inch; otherwise, in making the last fold this part will be pushed out about that distance, making the edges uneven. This applies equally to table cloths, sheets and handkerchiefs. Embroidery should be ironed on the wrong side, on an embroidery pad, or folded clean soft cloth. Doylies may have the fringe brushed with a strong whisk broom, rather than combed, which tears the fringe, then trimmed evenly with scissors. Tray cloths should be folded in three folds if it is necessary to fold them. It is better to lay them flat, or roll around a paper roll.

Embroidered Centerpieces may be washed as colored goods, because of the colored embroidery silk often used, or as white goods. After considering this point, if it is like colored clothing, see Chapter IX. The ironing often gives the most trouble; no matter what the shape of the centerpiece, iron in straight lines, straight with the fiber of the goods, being sure to iron dry before beginning a new portion. Centerpieces with little or no embroidery, but with wide lace borders, like Cluny centerpieces, should have the linen center stretched taut and held in shape with pins placed close together. Having pinned the center, stretch the lace border into shape, and pin carefully. Let the whole remain this way until perfectly dry, then no ironing will be necessary, except, perhaps, if one wishes to have the linen glazed. For pinning, see chapter on Laces.

BED LINEN

Stains.—Vaseline.
Medicine.
Iron rust.
Blood.
Ink.
See chapter on Stains.

Soaking.—Soak half an hour with soap in lukewarm water, after stains have been removed.

Washing.—Bed linen should be washed on both sides, with care to wash regularly from one side to the other. Pillow cases should be turned wrong side out in the washing, and then left in that condition until folded for sprinkling. In washing bed linen the hems require the most care. They should be well soaped and rubbed.

Boiling
Rinsing } See pages 70–71.
Bluing

Hanging.—Sheets may be hung as a table cloth. Pillow cases are hung by the seam opposite the hems. If opened to the wind, they are liable to be torn, as there is no opening opposite.

Sprinkling and Folding.—In sprinkling, give especial attention to hems, not sprinkling the middle of sheets so heavily. Sheets are folded in fourths lengthwise, having selvages together, and then in fourths crosswise. Some prefer to fold the hems together. Pillow cases are turned right side out.

Ironing.—Care should be exercised in ironing hems. The sheets may be folded with the ordinary fold, or may be folded the same as table cloths. (See chart under Table Linen, page 76.) Pillow cases should be ironed very smooth, and if there is embroidery on them it should be ironed first, and on the wrong side. Always iron the case itself by beginning in the corner where the side and end seams meet; iron from the side seam across the case. The cases should be folded in thirds—that is, with only two creases—and the middle third fold is folded out unless the mark requires a different finish.

CHAPTER VIII

BODY LINEN

BODY LINEN—WHITE

Drawers.	Handkerchiefs.	Aprons.
Night dresses.	Corset covers.	Skirts.
Waists, dresses.	Shirts.	Knitted underwear.

Stains.—Grease.
Blood.
Iron rust.
Medicine.
Ink.
Perspiration.
See chapter on Stains.

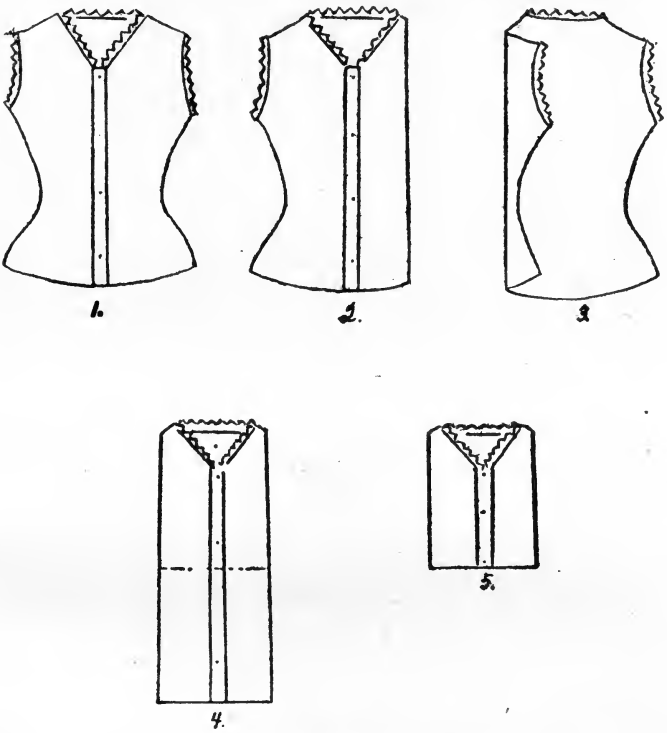
Soaking.—After removing stains, soak one-half hour in lukewarm water with soap.

Washing.—Wash in clean warm water and soap. Wash on the right side and turn and wash all garments on the wrong side. To do this, drawers, night dresses, chemises and sleeves of waists are turned inside out and washed. Soap the bottom hems, seams, bands, and neck well, as they are thicker and get most wear. It is the inside of body clothes that is most soiled. In putting through the wringer, turn the buttons inside, and keep them flat so as not to force them off, or tear holes where sewed.

Boiling.—Soap bands, seams and hems well before boiling.

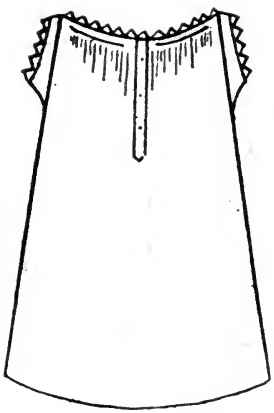
Rinsing.—Use hot water and then cold.

Bluing.—See page 71. Garments that are lace-trimmed will require less bluing, because the softness of the lace makes it most susceptible to blue.



THE FOLDING OF CORSET COVERS.

Starching.—A little starch in the trimming and tucks will make the ironing easier and more finished and will help to keep the garment clean longer. It need in no way be stiff or scratchy.



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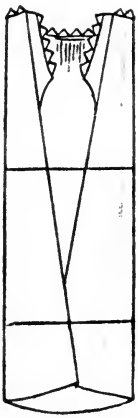


3.

THE FOLDING OF CHEMISES.

For the trimming, the starch should be thinner than for the body of the garments.

½ tbs. of wheat starch. 1 qt. water.

For body of garments use:

1½ tbs. wheat starch. 1 qt. water.

For aprons:

2½ tbs. of wheat starch. 1 qt. water.

Less of corn starch for each recipe. See table, page 52.

Have starch strained and use very hot.

Have garment wrong side out.

Starch: Cuffs and yoke of nightdress.
Hems and tucks of drawers.
All of corset cover with thin starch.
Ruffle of skirt, or sometimes the lower half.
All of apron.
All of dress or waist with thin starch.

Wring as dry as possible and rub in with the fingers. A well-starched garment should show no surplus starch, as whatever is not wrung out should be rubbed in.

Hanging.—Hang wrong side out and with the wind:

Nightdress, by one side of lower hem.
Skirt, by one side of lower hem.
Drawers, by the band.
Corset covers, by one of fronts, or thrown over the line and pinned by middle seam of back.
Apron, by the band.
Dress, by hem or wherever least strain.
Waist, and shirt, by bottom hem.

Sprinkling.—Sprinkle the body of the underclothes well, but not too heavily. Rub the lace and trimming between

the fingers, which have been dipped in water. Both hems and trimming should be well sprinkled; the hems, because they are thick, and the trimming because it is thin and likely to dry quickly.

Folding.—Lay trimming all inside and fold in the hems before folding the garment. Roll smoothly and tightly.

Ironing.—Iron embroidery on a pad and on wrong side. Iron all garments quickly, ironing dry as large a space at one time as is possible. Iron buttons on the wrong side. If clothes are too dry, use a piece of cheese-cloth wet in clear water for dampening.

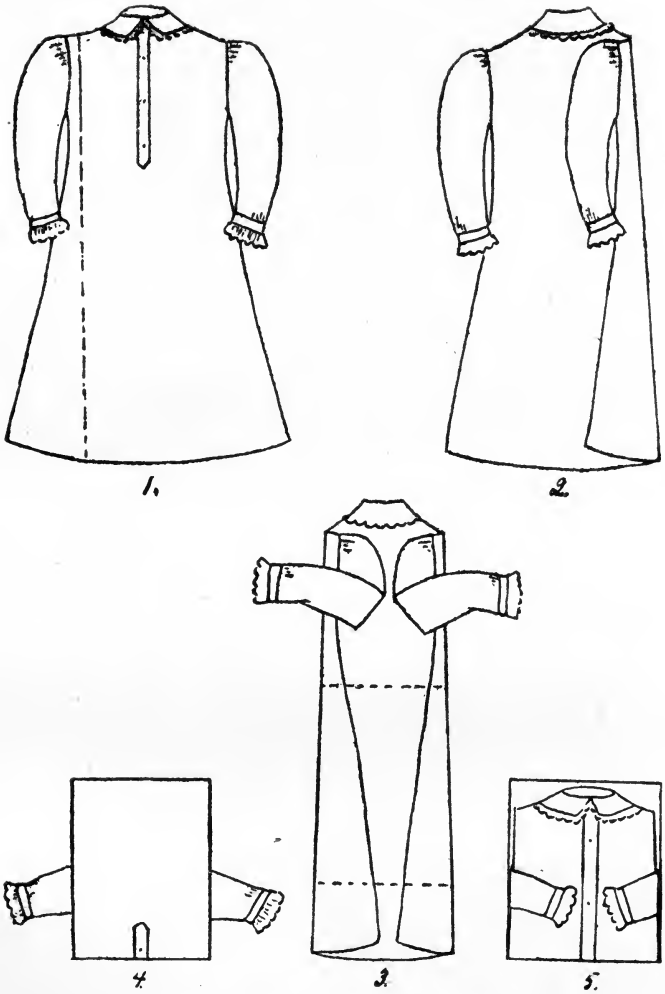
In ironing nightdress, iron the embroidery and tucks on the sleeve, then the sleeves. Then iron the yoke, the body of the nightdress, running the iron well into the gathers, and then fold.

In ironing drawers, iron the trimming, tucks, the band and then the body. Ironing the body of nightdress and drawers may be done more quickly by ironing double as a pillow case is ironed.

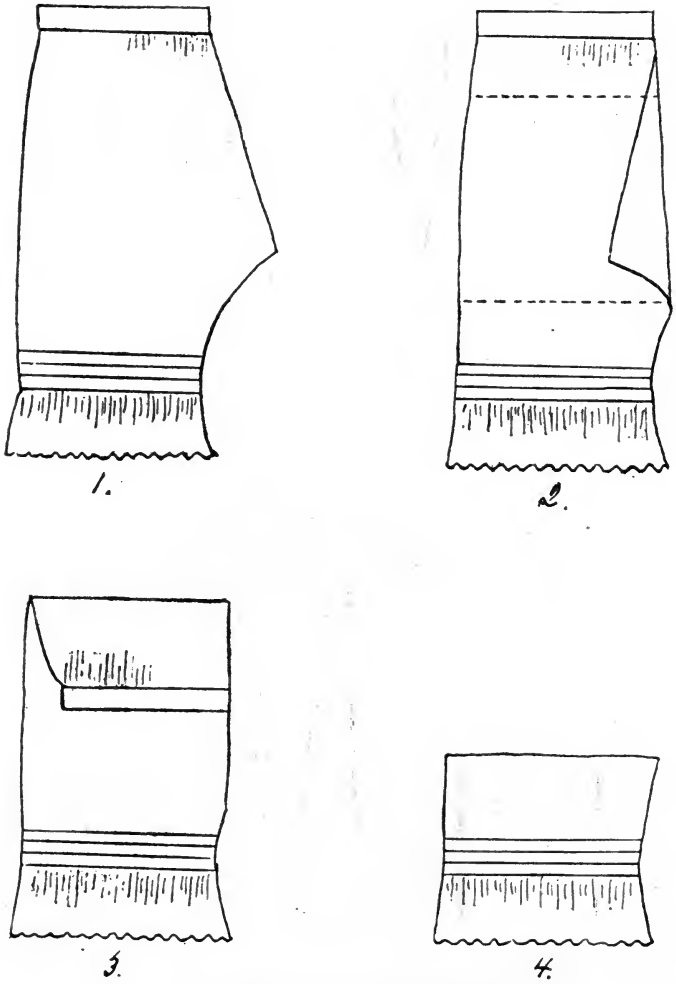
Corset covers should be ironed with smaller iron, and between the seams.

In ironing skirts, the ruffle is ironed first, and then may be laid back without wrinkling while the hem of the skirt is ironed. Iron the band, then the body. Do not fold the skirt at once, but hang to dry, as the folds are usually damp.

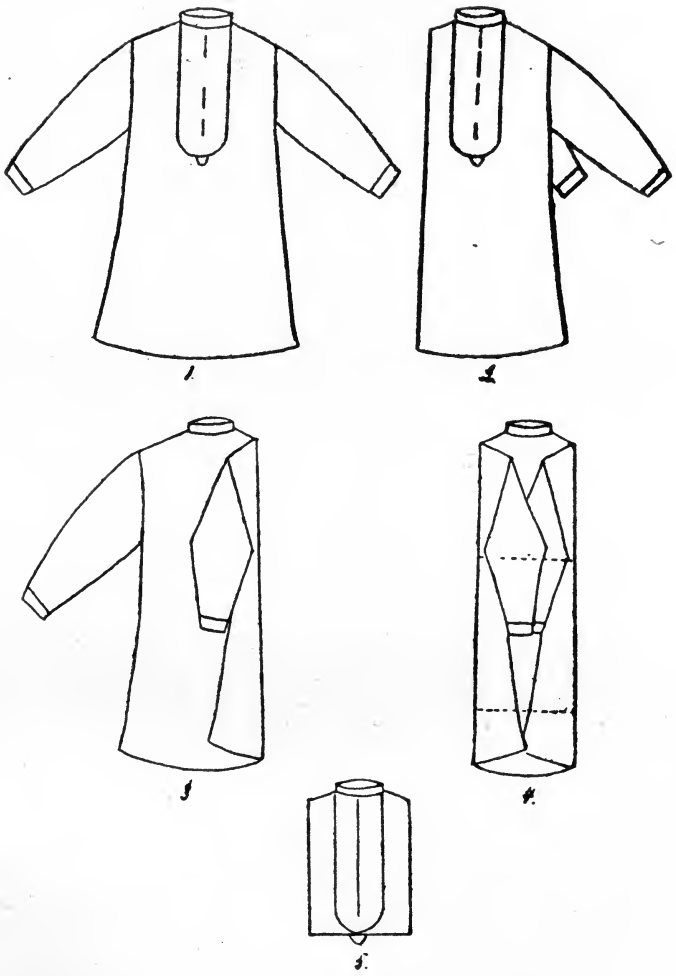
Aprons will hang better if ironed from hem up to gathers rather than finishing whole hem across first and then doing next section and then gathers. Bibs and strings should be ironed before the skirt of the apron and will look better if ironed on both sides, by ironing half dry on wrong side and finished by ironing on right side.



THE FOLDING OF NIGHT DRESSES.



THE FOLDING OF DRAWERS.



THE FOLDING OF SHIRTS.

Waists should have sleeves ironed first, as they will hang out of the way while the rest is being done. Next iron under-arm piece on each side, then either front or back, whichever is in two pieces. The fronts will set better if ironed from shoulder down. Ironing around or across the yoke will make yokes bulge. Ironing up will cause pleats at the shoulder.

Handkerchiefs are ironed the same as napkins.

Towels, with the exception of those with non-fast colored borders, are washed and boiled as body linen. They are ironed on both sides and folded in three lengthwise folds. Finish with middle third out unless marking requires otherwise. The marking should be out.

Shirts are well prepared for ironing by good starching as told on page 50. The iron should be hot and smooth; the shirt bosom thoroughly damp, not wet. Iron the neck band first, then down from the neck to the lower end of the bosom. This rule holds for plain and plaited bosoms alike. Iron until dry and perfectly smooth. The glaze from the hot iron and starch may be wiped off with a damp cheese cloth; a bone paper-cutter or any dull flat surface will open the plaits.

Collars and cuffs are ironed like shirt bosoms and are best done by ironing half dry on the wrong side, and then entirely dry on the right. The glaze or polish can be removed from these in the same way as from a shirt front. To shape collars and cuffs, press firmly with the heel of the iron and roll the collar or cuff over close to the iron. Hold a minute and the collars and cuffs will be rolled. To turn turn-over cuffs and collars —when finished run a moist cloth which is held over the end of the thumb along the bending line. While still damp, turn the collar or cuffs or points over, and press on the wrong side with the iron.

Knitted Underwear may be washed as white goods, as woolen goods, or as silk. All underwear depending on the fiber should be pressed with a warm iron to soften and shape it.

Stockings should be washed in clean water and not in water which is full of lint from other clothing. Wash on the right side, giving special attention to the foot; turn and wash on the wrong side. Stockings require thorough rinsing and should be hung by the feet to dry. Brown stockings should be washed by themselves, as they usually "bleed" considerably. Silk or woolen stockings should be washed as any silk or woolen garment. Stockings may be pressed with a warm iron on the wrong side.

Diapers.—Cloths of this nature should be put to soak in cold water as soon as used. To wash, use a good soap and warm water, boil, rinse thoroughly, dry in sun and air. Ammonia is better than washing powders or washing soda, as these alkaline substances may remain in the fabric after drying and irritate. There is no reason for not boiling with good soap if well rinsed.

CHAPTER IX

COLORED CLOTHES

The dyer has succeeded in finding fast dyes. The fastness depends not so much on his dye recipe as upon the fact that some dyes combine with the materials like wool and silk, and are known as direct dyes, while others adhere to the fabric, as in the case of cotton and linen, and are naturally freer to leave the fabric. Softness and absorbing power of fabric plays an important part then in the dye. Again, cloth dyed in the thread is likely to be more lasting in color than when dyed in the piece or the color stamped on. These two facts show us we have an uncertain problem and that we must still realize that colors are to be washed with care.

The wisest plan is to establish the rule that will best suit all conditions, and then run no risk by attempting what may seem a quicker method.

Set the color if the color begins to bleed.
Use warm water, not hot.
Use soap free from alkali and in solution.
Wash quickly.
Hang away from sunlight.
Dry quickly.

These rules, if followed, will bring the best results.

To Set the Color.—Salt is a good mordant (as a substance used to set colors is called) and should be at hand to use if the color begins to bleed. To use on every color is not necessary, in fact is a hindrance, as salt hinders

the suds. No definite proportions can be given, except that in most cases two cups of salt to one gallon of cold water will be enough. More may be used until the bleeding of the color stops. Salt may be used for all colors but is most effective for browns, blacks and pinks. *Vinegar* is a good mordant for blues—use one-half cup to one gallon of water. *Sugar of lead* (*poison*) is best for lavenders—use one tablespoon to one gallon of water. Be careful of this poison. Its success hardly warrants its danger.

Stains.—The stains on colored clothes are hard to remove because the chemical will probably remove the color too. Often a white spot is less noticeable than the stain—this must be decided by the owner. Stains on white goods with stripes or figures can be more easily removed by applying the chemical with a dropper between the stripes or pattern and quickly washing. To prevent the chemical from spreading into the stripes, it will be found possible to protect them by applying a little soap to the stripe. This acts as a bar over which the chemical can not step. Quick rinsing is the best precaution.

Washing.—After the color has been set, wash the garment as quickly as possible in warm water to which has been added enough dissolved white soap to make good suds. This soap should be free from alkali, and because of the soda in most washing powders, they had better not be used for colors. If the color seems especially sensitive, avoid all soaking and as much rubbing as possible. Rinse quickly in two or three clear waters. Putting salt in the last water may brighten the color. Pinks,

lavenders, greens and yellows should not be blued. Do not boil colored clothes, or at any time use water hotter than the hand can bear comfortably. Better work will be accomplished by washing one color at a time and not combining different colors. For example, if reds and blues are washed together, the blue may take on a purple tint.

Starching.—The starch for colored clothes cannot be as hot as for white clothes. The garment should be wrong side out, the starching should be done as for white clothes, keeping like colors together. For the best starching of colored clothes it is wise to divide the starch, so that blue garments will not need to be starched in pink starch, or *vice versa.*

Hanging.—Colored clothes should be hung in the shade to dry. A quick drying will prevent colors in striped and figured goods from running and spoiling the background. If one has time, or is doing a very special piece of work, it will be found an advantage to take the garment from the line when half dry and iron at once. When the dye seems especially uncertain lay the garment between cloths to take up all the extra moisture and hang so the folds do not touch each other. For example, hang sleeves away from the rest of the waist.

Ironing.—Colored clothes should be ironed on the wrong side or on the right side with the use of a piece of cheese-cloth. This cheese-cloth will prevent the shine which is often seen on seams and tucks where the goods is thicker. Do not use too hot an iron, because it will help to fade the color.

SOAP SUBSTITUTES FOR COLORED CLOTHES

Where the color seems uncertain, soap may be eliminated from the cleaning and with it will be eliminated all risk of alkali affecting the color.

Bran water (4 cups of bran to 1 gallon of water).
Soap bark (4 cups to 1 gallon of water).
Starch water (3 tablespoons of starch to 1 quart of water).

Cook each mixture twenty minutes, strain and use strained water. These may be used in the wash water in place of the soap solution. Two waters should be used, the one as a wash water and the second as a rinse water; there will be enough starch in the second water to give the clothes a slight stiffness. In this case there should be no rinsing with clear water and the starch will be sufficient if ironed without drying.

Gum arabic may be used as a starch substitute for stiffening. It will give the dressing to the fiber without the gloss that starch gives.

CHAPTER X

WOOLENS

Wool must be considered a delicate fiber because it is an animal fiber, and like all animal tissue is sensitive to heat, friction and alkalis. The fiber is microscopic in size and covered with scales which overlap. Any change of temperature causes the scales to fold over on themselves and so shorten. Friction knots them by twisting and turning them. Strong alkali dissolves the wool, making it at first tender, then finally causing it to disappear.

These three facts give us our general rules or principles to be followed in washing all woolens, whether white or colored:

I. All waters should be of same temperature—about 110° F.
II. All rubbing or twisting should be eliminated.
III. Only mild soaps (containing no excess alkali) should be used.
IV. Soaps should be in solution—to prevent rubbing.
V. Borax and ammonia may be used to soften water, as they are too mild to injure wools.

To Remove Stains from wool, one is a bit hindered if a bleach seems necessary. Dilute acids do not injure the fiber, so lemon juice, dilute oxalic or dilute hydrochloric acids may be used for ink and iron rust; but mildew, grass, or some stubborn stains which might be otherwise easily bleached out with Javelle must be treated

with care. Applying dilute acid to the spot first, then Javelle, allows the bleach to work without having opportunity to discolor wool if done rapidly and enough acid is used. Potassium permanganate and sulphur fumes are the best bleaches for stains on wool.

Any chemical will destroy color in wool as it will in cotton and linen or silks.

Washing.—Woolens should be brushed or shaken to free the loose dirt; pockets or cuffs turned inside out and brushed. Have water of tepid temperature, and the soap dissolved by itself. Add enough soap solution to make good suds. Wash the garment by a squeezing motion (sometimes called sousing) and as fast as the water becomes soiled change to another which is soapy and of the same temperature as the first. To remove persistent spots of soil, rub some soap solution directly on the spot with the palm of the hand. Do this work thoroughly, as quickly as possible, and without any lifting or pulling which will stretch the garment—a precaution necessary with the knitted type especially. A little borax—one-half cup to the tub of water—in the last rinse will clear up the white wools. The wringer is best for wools, as it presses out the water. In its absence they should be squeezed dry. Do not wring by twisting.

Drying.—To consider drying divide the wools into two sections—knitted and woven. Knitted garments should be laid on a pad to dry. The shape and size can be best checked up by measuring the shawl or sweater or petticoat before wetting. These measures should be written down and the garment shaped to these measures. The pad should be made of several thick-

nesses of bath towels, a folded sheet, or any soft, absorbing material.

Woven garments should be stretched and shaped. A blanket may be put in curtain stretchers or one-half over the line so that the edges may be pulled straight. This is better than hanging single, as the weight of water in larger portion is so great it sags the corners.

Brushing the blanket while drying will fluff it and to a degree card the wool. Use a stiff whisk broom to brush, and brush both sides and one way. Dry in moderate temperature—not in the sun—and do not allow it to freeze. Sun burns the white wool. Freezing causes shrinkage.

Skirts and trousers should be hung by the band and pulled equally so that the entire bottom line is even.

Cleaning Without Washing.—Magnesium, fuller's earth, and starch are the reagents usually considered where one fears shrinkage from the use of water, or where the "newness" is to be retained. They may be used for the whole garment or for "spotting." They are of little use in removing egg or blood stains as protein is not absorbed by these dry materials. To clean a whole garment, cover well with the powdered cleanser and roll in a clean cloth in layers of gown and layers of cloth. Grease is absorbed and the soil set free. Gasoline, alcohol, ether and chloroform may be added to the list for "spotting." The former absorb and the latter dissolve.

To remove grease spots by absorbents, cover spot on both sides with white blotting paper or soft cloth, or absorbing powders; press with a *warm* iron. This iron should be only warm enough to liquefy the grease

and not hot enough to darken the stain. As fast as the covering material soils, change to a new.

Solvents, such as alcohol, gasoline, ether and chloroform, will remove the grease by dissolving it. In this method, too, the pad of absorbing material should be used. This pad will do much to prevent grease rings. Rub the spot to hasten the dissolving and absorbing of grease and to prevent the grease from settling. *Do not use near a fire or flame.* Carbon tetrachloride may be used as chloroform. It is non-inflammable.

Bleaching of woolens must be done with great care, and with the home facilities results are more or less uncertain. A sulphur candle, clean barrel and a pan of water, will make a bleaching outfit if one has good outdoor facilities. The garment should be clean, and damp. Stand the sulphur candle on an old plate in a pan of water in a barrel, light and let burn. Spread the garment out on several strands of heavy white twine and suspend hammock fashion a few inches below the top of the barrel. Tack these strands securely to the barrel. Cover with heavy, clean paper, then with a heavy covering of old carpet or blanket. The fumes of sulphur will pass up through the wet wool. At the end of an hour note change. The time depends on degree of discoloration to be removed. Working in the open, one need not inhale any sulphur fumes. See page 21.

Soap Solutions for Woolen Cleaning:

BLANKET WASH.

1 large bar Ivory soap.
3 qts. cold water.
2 tbs. borax.
½ cup wood or grain alcohol.

Shave the soap into the cold water and heat at low temperature until dissolved. When cold, add borax and alcohol.

DETERGENT.

1½ oz. white castile soap.	1 oz. ether.
1 oz. grain alcohol.	4 oz. ammonia.

Cut soap fine and heat in 1 pint of soft water until dissolved. Do not boil. Then add three quarts of cold water and the other ingredients. Keep tightly corked in bottles.

SOAP SOLUTION.

1 cake soap.	2 qts. water.

Shave soap and dissolve in water.

Borax may be added to the wash water or to the plain soap solution if woolens are very soiled. (See page 21.)

To Iron.—Ironing of woolens is more like pressing. As the fiber scorches so easily and the heavy seams glaze under the pressure of the iron, it is advisable always to use cheese-cloth between the cloth and the iron. Pulling the cheese-cloth off makes the nap fluffy. A garment half dry when ironed will give better results. Otherwise, cheese-cloth should be dampened each time.

Colored Woolens.—Observe all points stated for white woolens, and note one additional problem—the fading or bleeding of colors. This may be overcome by setting the colors first with salt—one to two cups to amount of water needed to cover—and second by the

use of soap bark instead of soap. Recipe for soap bark (see page 93):

Soap Bark.

1 cup soap bark. 1 qt. water.

Cook together twenty minutes. Strain and use in wash water like a soap solution.

CHAPTER XI

SILK

Silk again represents an animal fiber. All rules for woolens are applicable to silks:

I. Heat yellows silk.
II. Strong soaps and alkalis destroy gloss and turn silk yellow.
III. Friction breaks fibers and so weakens the fabric.
IV. Squeezing should take the place of rubbing and wringing.
V. Too hot an iron yellows, stiffens and cracks silk. Cheese-cloth should be used for pressing, as it is the safest method.

Dark colored silks may be best washed with soap bark in the place of soap. Recipe, page 99.

A new appearance, and still not stiffness, may be given by the use of gum arabic in the last water before pressing. This often prevents a thin silk from looking washed.

Gum Arabic.

2 tsp. gum arabic (powdered).
1 qt. water (warm).

Mix water with gum arabic as with flour. Let stand until all is dissolved. Stir through cheese-cloth and use as starch water or for slight stiffening in the last rinse water.

Ribbons.—Wet ribbons and stretch on a clean table, then scrub with a small soft brush and neutral soap until

clean. Rinse in clear water, keeping ribbon smooth and straight. Remove some of the water by running the hand down the ribbon and pressing out the water. Stretch on the table again and allow the ribbon to dry. Ironing will not be needed in this method if the ribbon is allowed to lie flat until dry. Wash ribbons may be ironed with a cool iron when nearly dry. Narrow lingerie ribbons may be dried by winding around a bottle after washing.

Chiffon, Silk Crepe, Marquisette, silk and cotton, silk and linen should be treated as silk. Silk-embroidered linen should be washed as silk, quickly and without rubbing, dried quickly, and when half-dried laid on a thick pad wrong side up and ironed until dry. Pressing the linen on the right side will give a gloss to the linen. This can be done and still not touch the right side of embroidery.

Velvet may be cleaned by sprinkling thoroughly with magnesia or cornmeal, covering and letting stand twenty-four hours. Brush off with a soft brush. A second application will produce better results. All velvets may be freshened or folds taken out by steaming.

To Steam Velvets, stand a hot iron on end and cover the bottom of it with a wet cloth. Over this pass the velvet, holding the wrong side next to the damp cloth. The steam from a tea kettle may be used. This is especially easy with a spreading device put into the spout of the kettle. Have little water in the kettle so that it will not sputter out with the steam.

Velveteen, Corduroy may be washed by plunging up and down in warm soapy water—rinsing in the same way in

several clear waters and hanging dripping to dry. Do not put through a wringer or do not wring with the hands, as it will crease it. When dry, brush with a soft brush until the nap is all raised and fluffy. If well rinsed it will look like new. To prevent seams from puckering, sew such goods with a loose stitch.

Velvet Collars.—Make heavy white soap lather. To a pint of such suds add one-half teaspoon of kerosene. Spread thoroughly and evenly over the soiled velvet collar, and then rub lightly with a soft brush or cloth. Wipe the suds off. There need not be enough moisture to wet the collar. After wiping with several freshly rinsed cloths, being sure all soap is removed, steam on a hot iron. See Steaming Velvets above.

Chamois, Doeskin and **Washable Gloves** may be easily done on the hands by brushing in lukewarm suds with a soft brush. Putting them on the hands makes it possible to see all streaks and to give special attention to the ends of the fingers. Rinse in clear water, then pull fingers into shape and blow the glove up to prevent it drying too small. Do not dry in intense heat. Rub the glove when half dry and in that way overcome its stiffening. Gloves that have been badly washed and grown hard and stiff and perhaps too small for the hands, should be wet, put on the hand and rinsed in warm water to which half a teaspoon of olive oil has been added. This oil will soften the kid. Heavy colored stitching on the back of the glove had better be wiped to avoid the possibility of the color running.

CHAPTER XII

LACES AND SPECIAL CLEANSING

Laces, because of their very delicate structure, should be washed with the least possible rubbing and pulling. Those that are especially frail may be basted to a piece of cheese-cloth. Soaking, squeezing or shaking in the water are the safest methods to use.

Stains.—Stains on laces may be removed as from any other fabric. Thought must be given as to whether it is a silk lace, wool lace or a cotton one. To remove stains from silk and wool laces, see Chapters III and X. To remove stains from cotton and linen laces will be found as easy as to remove from linen and cotton cloth. See chapter on Stains.

Washing.—Dissolve a white soap in water, and add sufficient soap solution to the wash water to make good strong suds. Soaking the laces in this water may clean them without any handling. For very delicate laces a second soak in clean soapy water may clean them. Rinse thoroughly in several waters. White laces (cotton and linen) may be blued in very pale blue water. If cream or ecru, and they need retinting, a clear solution of tea may be added to the last rinse water, the quantity of tea used depending upon the degree of yellow or ecru desired. The tea liquor may be prepared by boiling one tablespoon of black tea in one quart of water, and using the required amount of the clear tea. Lace has great absorbing power, and care should be used not to make the tint too dark.

Bleaching.—Discoloration may be removed from lace by:

Sunlight.

Rinsing in borax and water.

Bleaching with Javelle water.

Using potassium permanganate and oxalic acid.

The lace should be washed as clean as possible before bleaching.

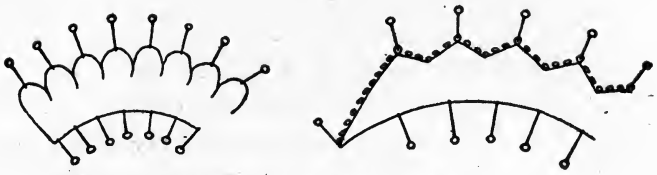
Sunlight.—Spread the lace thoroughly wet on a cloth or towel in the sun. Time is required for this process, and the lace should be kept wet.

Rinsing in Borax and Water may whiten the lace, because borax is a mild bleach. This and the sunlight method might be combined.

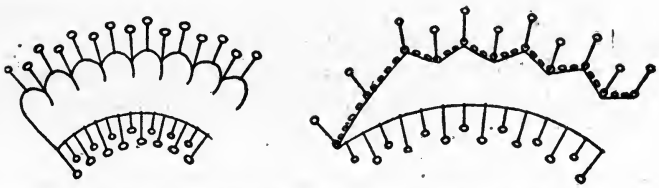
Javelle Water.—One-quarter of a cup of Javelle water in one quart of hot water. Drop the lace into this Javelle, then lift instantly from the bowl and rinse in a second bowl of hot water. This bleaching and rinsing should be done as fast as one motion can follow another. Two or three such applications bring good results without harm to cotton and linen laces. Then wash thoroughly in soap and water. It should not be used for wool and silk laces.

Potassium Permanganate.—Apply the permanganate solution (see page 26) to the discolored lace, rinse with warm water, then apply dilute oxalic acid, which will take away all the brown stain which the permanganate has produced. Lace which has been bleached by this method or the Javelle should be washed thoroughly in soap and water, so as to be sure no chemical remains.

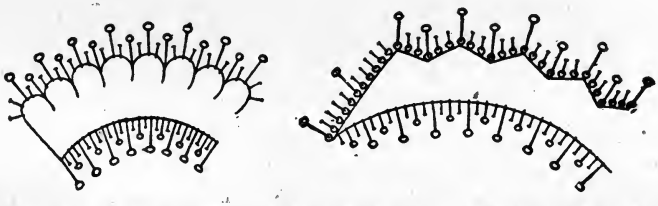
To Pin.—Lace is not starched, and is best unironed. It should be pulled and pinned into shape. This will open the mesh of the lace, and the drying under tension will give sufficient stiffness. If this stiffness is objectionable, the lace may be stroked with the flat side of the thumb and finger, and this will soften it.



The First Pinning is Very Important.



The Second Pinning Should Shape the Scallops and Points, and Sufficient Pins Should be Used to Hold Them Well in Shape and to Eliminate All Scalloping or Unevenness of the Plain Edges



The Third and Finest Pinning for Perfect Results Should be Done by Placing a Pin in All Small Loops or Picots. These Pins Should Not be Removed Until the Lace is Dry. Should There be Any Raised Flowers or Leaves, Like the Roses in Irish Lace, the Petals Should be Lifted With a Pin Until Each One is Opened and Stands Out.

LACE PINNING

Much care must be given to the pinning. The first pins should be put in with the idea of producing the straight lines as in lace by the yard, or the curves, squares or circles as in collars, lace scarfs, centerpieces and table-covers. One should remember that the pins are put in to resist the natural shrinkage which takes place in drying. These pins should also regulate the width, stretching each point or curve to the width required and making each one exactly the shape of its neighbor.

Or, if the worker prefers, the lace may be basted closely on shrunken cheese-cloth, giving special care to the shaping of points and scallops. The lace is then washed on the cheese-cloth, and the cheese-cloth pulled and pinned taut for the drying.

Lace Yokes and **Sleeves** may be cleaned without removing from the dress, if care is exercised to keep the water or gasoline, if used, from running down into the material of the waist. Powdered magnesia, chalk or fuller's earth may be spread on the yoke with less chance of harming the material. If it is to be cleaned by water or gasoline, cover the waist carefully by wrapping in a heavy towel; then with a soft brush, brush the lace with heavy suds, or with gasoline, brushing down from the waist, as this will prevent the moisture from running back into the material. It may be found advisable when using water or gasoline, to lay the lace on a heavily folded towel, as this will quickly absorb the moisture and prevent spreading. If cleaned with magnesia or any of the powdered cleansing agents, the lace may be laid on a towel and covered with the powder. In this way let it stand for twenty-four hours.

At the end of this time, brush off the powder, and, if not too soiled before cleansing, the lace will be a good color. This is, in fact, a good way to put away lace yokes between times of wearing.

Gold and **Silver Lace** may be cleansed by brushing with alcohol or gasoline. If this lace is in the dress, carry out the same precautions as given above. This metal lace may also be cleaned by boiling in salt and water, using two tablespoons of salt to each pint of water.

Drawn Work.—Care must be used in doing drawn work, because, while it seems sturdier than lace, the threads of the fabric which compose the pattern are often most delicate. Wash as any lace without much rubbing, blue, dry and sprinkle; or it may be ironed without previously sprinkling, as is suggested for napkins and table cloths. Tastes differ as to whether it should be starched. To iron, if possible use a large ironing surface like the table, and iron from the center out to the edge in straight lines and with the weave. This will prevent the usual puckering and ruffling of the hems. The ironing should be done on the wrong side with a dull-pointed iron, as a sharp point is often responsible for the tearing. A cover of cheese-cloth will help to keep the iron from catching in the threads.

Elastic Goods.—Elastic goods should be washed in cool water, as intense heat causes the rubber to deteriorate. A soft brush will be of great help, as it will sink down into the fiber of the goods, thus cleaning more rapidly. Rinse thoroughly, and hang to dry, as would be done with any white goods.

Dress Shields.—The life of a dress shield is increased by cleanliness. They may be easily washed with cool or

tepid water, a white soap, and if much discolored, a soft brush may help to clean them. Do not iron.

Corsets.—A corset that has been worn too long is hard to whiten and clean. Prepare a good, strong lather, add a little ammonia and borax, and with a small scrubbing brush scrub the corset thoroughly. Rinse in several waters, and hang in the sun to bleach. The laces of the corset will be like new if taken out of the corset to be washed. The corset should be starched and ironed; either iron the laces or wrap ribbon fashion round a bottle to dry.

Feathers from Hats.—Feathers are often washed and curled in the home. If so, make good suds of white soap and water and draw the feather through the hands in this water. Let the stroke be regular and always by pulling the feather from stem to tip. Dry the feather by shaking frequently and then it is ready for curling. Moisten with steam before curling—in fact, steaming a feather and then shaking it over the top of a stove is often enough to give curl to it. For a tighter curl draw three or four flumes at a time over a dull knife, like a bone paper cutter, after first steaming the feather. If the feather is too dry the knife will break it.

Pillows.—Pillows may be washed, without removing from the case, in a tub or washing machine. Wash by sousing up and down in the water, and then after rinsing, hang to dry in the sun and wind. Choose a windy day for this work if possible, as it dries and livens the feathers well. It will be easier to clean the tick if the feathers are removed, as the tick often needs rubbing which will break the feathers. For this transfer the feathers to

a cheese-cloth bag, and wash feathers in the bag and the ticking separately. The feathers can be easily returned to the tick after drying by sewing the two openings together and tossing the feathers from one bag to the other

Down Quilts.—Prepare a suds of warm water and white soap. Souse or knead the quilt in the suds. Use a second suds, two rinses, and then hang to dry by spreading out between two lines, and as often as possible while drying shake from all four sides to liven the down and to help to respread it. Wringing must be done by squeezing, and the pressing of the silk or sateen cover may be done with a warm iron. A little time after the down is dry will be required to spread it about with the fingers. The quilts may be most satisfactorily cleaned and will only lack a little of the puffiness which has come from the down being blown into the various sections of the pattern as the quilt was being made.

Rain coats may be cleaned with a brush and suds of white soap and warm water. Brush the whole coat evenly and thoroughly. Hang on a hanger and rinse by pouring water on the coat, and let hang to dry. Let drip dry.

Veils may be washed in warm water and soap, and if black should be rinsed finally in a strong solution of black tea to which gum arabic has been added. Use about two teaspoons of powdered gum arabic to one pint of water; while still wet, spread the veil in shape to dry, being careful to have the edges straight. White woolen or silk veils need no gum arabic. Chiffon veils may

be washed in soap and water and pressed while half dry. Strong tea water should be used for rinsing mourning crêpe.

Voile.—Colored voiles may need to have the colors set like any colored goods, and fortunately the salt and water used for the setting is harmless to the wool, silk and even cotton voile. Wash the voiles in lukewarm soapsuds, which has been made of a white soap. There should be several rinse waters of the same temperature as the wash water. The last rinse water for blacks and browns can be strongly colored with a solution made from black tea. Blue voiles may be rinsed in a strong blue water, and pure white voiles may have a very light blue rinse with just enough blue to whiten and in no way tint the cloth. If the garment has been ripped up to be washed, then care should be used to hang the various lengths perfectly straight, and if hung without wringing, there will be little need of pressing, although pressing with a warm iron will do no harm. Press on the side that is to be the wrong side with a cloth between the voile and the iron. A voile skirt, if washed without ripping, should be hung by the band, pinning the band several places on the line, so as to leave no chance for sagging.

Chiffon and **Chiffon Cloth** should be washed in lukewarm water with a light suds. Wash as any silk, rinse, blue slightly if it is to be a pure white. If colored chiffon or chiffon cloth, consider them as colored silks. (See chapter on Colored Clothes.) With either material iron with a warm iron on the wrong side and when the fabric is nearly dry.

Neckties.—Before wetting the necktie, loosen the inner lining. Lay the tie flat and treat as for ribbon. Press

when almost dry. If too damp when pressed, it will make the tie stiff and shiny. Keep the tie perfectly flat during the cleansing, and there will be little need for any ironing. Wash as for ribbons.

To Remove Rain Spots.—Steam the garment by holding over the spout of the tea kettle. Shake the garment in the steam until evenly moist and continue shaking until dry. Fine silks and even delicate colors respond well to this method.

Gloss Removed from Clothing.—Serges and broadcloths are likely to wear shiny. This gloss may be removed temporarily, the length of time it stays away depending in a great degree upon the amount of wear given the fabric. To remove, dampen a cheese-cloth in water to which a few drops of ammonia have been added (about one-half teaspoon of ammonia to a quart of water), and with this cloth sponge the garment by rubbing in even, straight lines, being careful that every part is sponged. Then with a dampened cloth spread over the fabric, press until dry. Use the same precaution in the pressing of these woolens as with any other wool; that is, do not have the iron too hot, and do not iron without a cloth.

Overalls.—Overalls usually present a grease problem. It is advisable, therefore, to apply to the grease spots clean kitchen grease, kerosene or some soft, clean fat. Then with warm, soapy water and a good scrubbing brush, it is possible to get them quite clean. It would be wise to add some grease-cutting agent to the soap solution, such as borax, ammonia or dissolved washing soda. If after the overalls are washed and rinsed, they are hung quite wet on the line, they will be found to dry so smooth that ironing is unnecessary.

CHAPTER XIII

FUMIGATION AND DISINFECTION OF CLOTHING

Clothes which are thoroughly washed and boiled, as is the usual method in all laundries, are sterile to the point of safety. Clothing that cannot be washed and must be sterilized may be fumigated or disinfected. In the home, simple methods must be resorted to. Fortunately the clothing used in the sick room is usually white and of a material that is washable.

All articles, whether bed or body clothing, that come in contact with the person suffering from contagious diseases, need special care. Most contagious diseases have no spores, so the extreme treatment required to kill spores is not needed. A simple way of caring for soiled linen from the sick room is to put the clothes immediately into a boiler which is half full of cold water, add soap, heat, and boil thirty minutes after the boiling point has been reached. This treatment will kill disease carriers with the exception of their spores (spores are like seeds or eggs which are not destroyed until they have matured). After boiling the clothes, they should hang to dry in the open, as sunshine and air are both good disinfectants.

Various methods are given, that one may choose what seems easier to them. In fumigating, a room or closet should be sealed, so that the fumes may be more concentrated and hence produce greater results. Keep a room sealed for at least eight hours after fumigation.

Formalin Candles may be burned, care being taken to avoid any danger from fire.

The Spraying Method may be used. A sheet, two by two and a half yards, sprinkled with eight ounces of formalin, is hung on a line in the center of the room. In drying, the formaldehyde gas which is given off does the work of disinfecting. One sheet of this size is used for every thousand cubic feet. The room should be kept sealed for at least eight hours.

A third method is the so-called **permanganate-formalin** method. For each thousand cubic feet of air space, use nine ounces of potassium permanganate and one pint of formalin.

The permanganate is placed in a receptacle and the formalin is quietly poured on it. As considerable action takes place when the two substances come in contact, the vessel in which they are put should be deep and a protector should be put under it in order to prevent carrying off the heat generated.

The gas given off when formalin breaks up—formaldehyde—is more effective in the presence of moisture. Into the air-tight box, closet or room which is being disinfected, moisture may be introduced by hanging up a wet towel or sheet, depending upon the size of the space treated. If steam can be introduced into the space it will be the best form in which to bring in moisture. This may be done by setting pails or a tub of boiling water in the room.

Disinfection is usually brought about by immersing the garment in a liquid. This is especially suitable for those garments that can not be washed and boiled. Carbolic acid, formalin, lysol, creolin and bichloride of mercury are the usual disinfectants. They must all be used with great care, the first two being especially hard on the

hands, if used much, and the last one producing discoloration in the clothes.

Clothes may be disinfected by putting into a carbolic acid solution and leaving them from twenty minutes to one hour. The right strength of solution is about five per cent. This can be made up by using

1 part carbolic acid to
19 parts boiling water.

One drawback in using this solution is that it is very hard on the hands; therefore, before removing the clothes, add a large quantity of water in order that the solution may be made very dilute.

Lysol and **Creolin** are manufactured coal tar products that may be used in place of carbolic acid. They are used in one per cent and two per cent solutions; being dissolved in tepid water, they will do equally good work. Solutions made from either will not harm the skin. These products are more expensive than carbolic acid.

Formalin is a very valuable disinfectant. It is claimed that this disinfectant will destroy spores. Clothes should be immersed in a four or five per cent solution and allowed to stay thirty minutes at least. (For spore destroying it is claimed that twenty-four hours are necessary.) It is also a deodorizer. Formalin is somewhat cheaper than carbolic acid. It is like carbolic in being irritating to the skin; therefore, care should be taken to dilute the solution very much before removing the clothes.

A solution of **Bichloride of Mercury,** 1 in 500, is sometimes recommended, but it gives no better results than those noted, and will discolor the clothes.

Spores.—The one sure way of destroying spores is to keep the garments that need sterilizing confined in superheated steam for one-half hour.

For any mattress or heavy article that cannot be thoroughly fumigated or disinfected, there seems to be little left to do but burn. The fumigation largely eliminates the loss by burning, because in the eight hours used for fumigation there is ample time for the fumes to thoroughly penetrate a thin fiber.

CHAPTER XIV

DRY CLEANING

Dry cleaning is so called because water is not used as a cleaning agent. It is really, therefore, a chemical process. The principle involved is to use some material which is a perfect solvent for grease, and as the grease is dissolved the dirt is naturally set free. Benzine, benzol, ether, chloroform, acetic ether, carbon tetrachloride, and alcohol are all grease solvents, and to a certain extent may be used for dry cleaning. The benzine and the carbon tetrachloride are the most used because of their extreme solvent power and because of their volatility.

Two points are absolutely essential in good dry cleaning. There should be total immersion, and the liquid used must be purely solvent and quickly volatile. To test a liquid as to its volatility, pour a little benzine in an open dish and after evaporation there should be no sediment. Benzine may be filtered through flannel or chamois to extract all moisture, as clothes that are moist, or benzine with water in it, produce poor results.

The object of dry cleaning is that we have a rapid cleaning which produces no shrinkage, no change of color, no wrinkling or disarrangements of parts; and again, the dry cleaning process is a process of disinfection.

Great danger is involved in the dry cleaning process. For this reason the utmost care must be exercised. It is essential that there be no heat, either of a heated room, or that there be no flame, as benzine and benzol are highly inflammable in a liquid state, and they have such a low boiling point that they give off large fumes of vapor

at ordinary temperatures. This vapor mixes with the air, and forms a dangerous and powerful explosive. Two conditions must exist before combustion or explosion can take place. One is that the liquid or vapor come in contact with oxygen, and the other is that there must be sufficiently high temperature. If neither of these conditions is present there is no possibility of the gasoline burning or exploding. For the housewife to use gasoline it should be done out of doors, in the shade, and for safety's sake, a cool day should be chosen. Benzine or gasoline is used with great risk in one's bedroom, bathroom, or kitchen, and only by the person ignorant of the danger. Carbon tetrachloride may be used with greater safety, because its burning point is higher, hence it is not inflammable. To remove spots by benzine they should be done according to the stain chapter, first removing the spot, and then it will be found better to immerse the whole garment. This will avoid the rings which often result from dry cleaning of spots. Pearl buttons should be taken off, as benzine destroys the finish of the pearl. Rubbing with oil may return the polish.

The main thought in cleansing with benzine is to use it like water in quantity and to rinse the garment in benzine as is done in water. A soft brush may be used on very badly soiled parts of the garment. Always do the lightest goods first and the rinse benzine may be used as wash liquid for the next lot.

Do not store quantities of gasoline in the house, and when the cleaning work is finished, hang garment in air; pour left-over benzine, if dirty, on some absorbing soil or gravel, or, if clean, bottle it. Every time gasoline is used and bottled it loses its good volatile quality. Do not pour these volatile liquids in the drain pipes to run to the sewer.

PART II

CHAPTER XV

EQUIPMENT

Equipment for Home Laundry.

Agate pan or basin, for starching.
Asbestos mats.
Boiler, copper bottom, 10 gallons.
Bosom board.
Bottles, ½ doz., 2 ounces.
Bowls, enamel, 2–6 quarts.
Case knife.
Cheese-cloth, 2 yards.
Cloth for tubs and boiler.
Clothes basket.
Clothes hamper.
Clothes horse.
Clothes line, 50 yards.
Clothes pins, 200.
Clothes pin bag.
Clothes props.
Clothes stick.
Curtain stretcher.
Dipper, block tin, short handle.
Droppers.
Duster for line.
Enamel cloth for table.
Felt or silence cloth.
Flannel.
Floor mop.
Fringe brush.
Funnel, enamel.
glass.
Iron holders.
Ironing table.
Ironing board.
Iron rests.
Irons, electric or gas.
fluting.
heavy.
polishing.
sad.
Labels, 1 box.
Mason jars, 1 doz., 1- and 2-quart.
Measures, graduate.
cup.
quart.
tablespoon.
teaspoon.
Pail, galvanized iron, 10-quart.
Paper.
Pins, ½ pound.

Saucepan, enamel, for starch.
Scales.
Scrubbing brush.
Sleeve board.
Soap dish.
Sprinkler, tin.
Strainer, tin.
Tape, 1 roll ($\frac{1}{2}$-in.).
Tape measure.
Tea kettle.
Wash board, glass or zinc.
Washing devices for tub and boiler.
Whisk broom.
Wooden spoon.
Wringer.
Yard stick.

SUPPLIES FOR HOME LAUNDRY.

Alcohol.
Alum.
Ammonia.
Beeswax.
Blue.
Borax.
Chloride of lime.
Hydrochloric acid.
Lime water.
Linseed oil
Paraffin.
Potassium permanganate.
Oxalic acid.
Sal soda.
Salt.
Soap.
Starch.
Tea.

Chloroform, ether and all other chemicals purchased as needed for special recipes.

The equipment of the laundry should be most carefully considered, for no work of the housewife is more dependent upon the workshop and good tools. The ideal situation of the laundry is one where plenty of light and air is possible, and if one can foresee that the laundress is to come in by the hour or day or is employed by the week as a household servant, where it is away by itself, either in the basement, near the drying yard or in the rear of the house. The last place it should be is in the kitchen. This is often done to economize, but a little planning will overcome this. Have the kitchen smaller, put the laundry adjoining so that the

kitchen chimney may take the laundry stove on the other side, and the kitchen plumbing may be backed up with the laundry plumbing—sink on one side of the wall, wash tubs on the other side of the wall. The kitchen stove can supply the hot water and if planned properly one set of plumbing will reduce the cost.

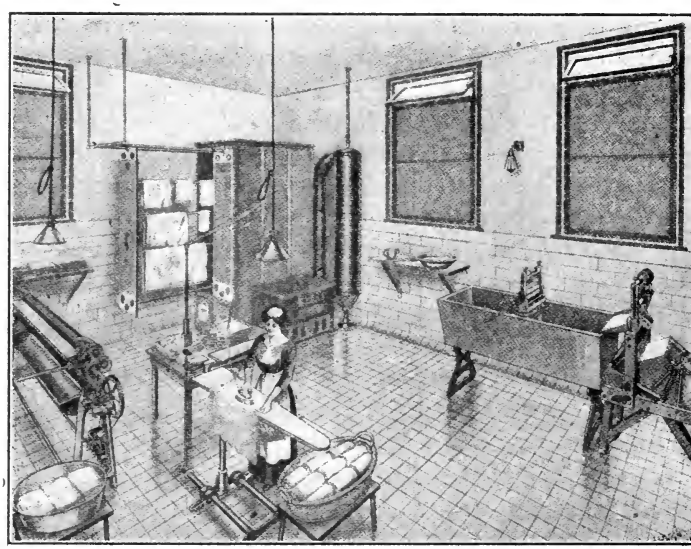
If one maid, or even the housekeeper herself, is to do the laundry work, the laundry and kitchen adjoining is a better plan than to bring two departments of housework into one room. Confusion and hindrance, to say nothing of mixing foods and their odors with clothing and its odors, and the bad interchange of equipment are the results.

The walls and ceiling should be of any finish that does not absorb moisture, and that can be easily cleaned. The most ideal finish is a glazed white brick which may be of the form of bricks or of tiles. This being too expensive, a hard plaster for wall and ceiling with white enamel paint will be economical and, from the sanitation standpoint, especially good. With this kind of a wall and ceiling, a five-foot tile or glazed brick wainscoting will preserve the plaster and hence give a substantial finish.

For the floor, we could consider several materials: small white tile (small because it wears better); cement; interlocking rubber; or a heavy grade of linoleum. The last two will be found much easier for the feet, and for that reason are favored by many. If there is no heavy rolling over these floors, they will be found to give good service. As far as cleanliness and dryness is concerned, they meet all requirements.

The windows in the laundry should be large, and for extra ventilation a transom over each. This transom allows fresh air to enter the laundry without the hindrance of this air blowing directly on the work, which not only dries the

garment about to be ironed, but cools the iron. The first objection that may be raised to this idea may be that the transoms do not harmonize with the rest of the building or are too expensive. As an alternative, one may put ventilators in the windows at the bottom, or a ventilator such as is over the kitchen range may be placed over the wash



Courtesy of "Good Housekeeping."

SUGGESTIVE PLAN SHOWING ARRANGEMENT.

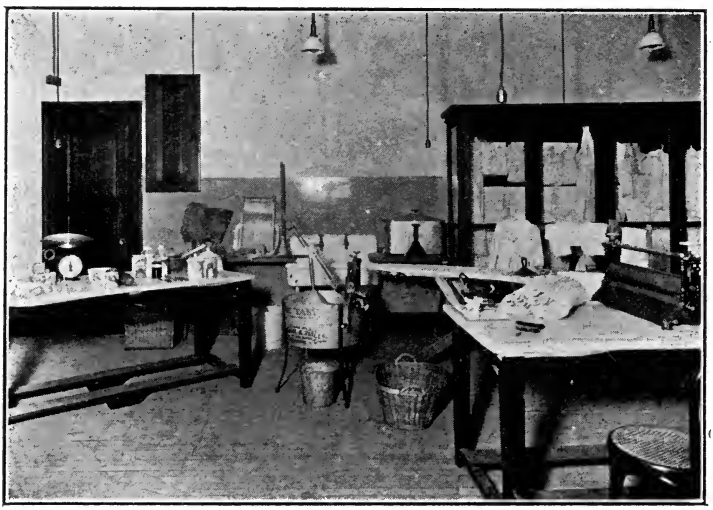
tubs and over the stove. These will not only carry out heat, but will also carry off any steam that may come from boiling clothes and from drying indoors on wet days. For the summer time, the windows and doors should be well screened, as flies seem to delight in resting upon clean clothing.

With the room finished, the type, cost and arrangement of equipment will require considerable thought if it is to be economical and at the same time efficient. In this planning, either for buying or arrangement, keep in mind the work that is to be done, and at all times group and arrange the equipment or utensils with the thought of the process to be carried out. It may seem advisable to put the tubs in one special part of the room, because it is the most economical for plumbing. This being the case, a center for the washing process is at once established. If a washing machine is to be used in conjunction with the tubs, naturally it is to be placed near them. It should be *so* near that the clothes may pass from tub to machine, or from machine to tub, without any carrying. Most machines are built with chutes so that this economy of labor is entirely possible. A side light is better than a direct front light upon the tub, as the latter is a continual strain on the eyes of the worker. Again, for general cleanliness and for convenience, the tub will be better set away from the wall, so that it may be approached from all sides. One tub will be found sufficient, if a washing machine is used; if not, the time and effort saved will soon, in the worker's mind, balance the cost of three wash tubs, as it means opportunity for good rinsing, even in two waters, without the handicap of constantly shifting water.

The stove ought to be comfortably near to establish a close relationship to the tubs and especially is this so if one always boils the clothes. At the present time indoor driers may be bought that have their own gas or coal stove. Such a stove heats water, irons, and by the arrangement of hot-air flues as in an oven, the hot air circulates around the clothes hung in a drying cabinet attached. A corner of the laundry is the best place for the drier as two walls are already established. No especial light is required but flue connections allow used heat and excess moisture to pass up and off.

Sprinkling requires either a table or drop shelf, which, if covered with zinc or oil cloth, can be easily kept clean and dry.

The ironing section of the room should have good light, because of the uncertainty of scorching clothes, as well as being able to see when the wrinkles are ironed out. Whether an ironing table, skirt board or ironer, place near



HOME LAUNDRY EQUIPMENT.

the windows, and, if possible, so the light will come from the side of the worker. An arrangement which adds to efficiency is one where the tools of each process are so placed that the worker walks directly from one set of working equipment to the next.

An efficient laundry need not be an expensive, luxurious one; it is only expensive and luxurious to the point that the

worker has a proper tool for the task she is about to perform. The choice comes after some study and investigation, perhaps some experiment, to get the best for the money it is possible to spend. For example, a ten-cent sprayer attached to a cork which will fit any four- or six-ounce bottle, will sprinkle the clothes as quickly and as well as a so-called clothes sprinkler which costs forty to fifty cents.

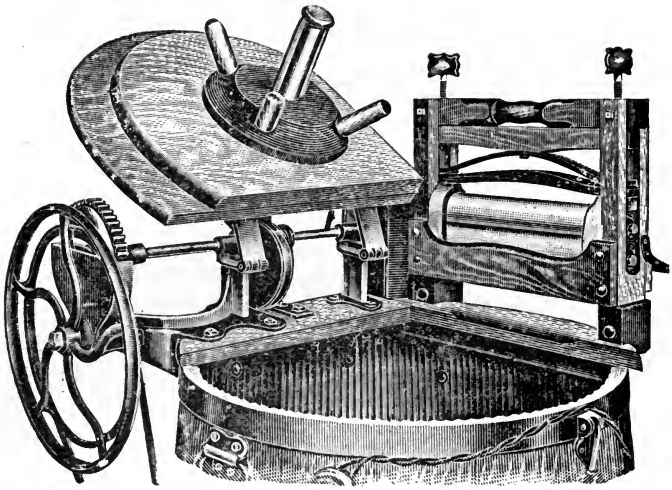
The small equipment—devices or tools—may be grouped near the working field in shelves, or, better still, in two small closets. Two closets, one for ironing equipment and one for washing, may be most convenient. Let the one or two closets be built with shelves sufficiently far apart to hold the various equipment and supplies. If there is one closet, have one-half for equipment and one-half for supplies. Narrow shelves for bottles and jars, so narrow that there can be but one row of bottles, make it easy to see quickly the various things needed. Spaces may be planned in this closet sufficiently large for the clothes boiler, and the wringer when it is not one permanently attached to the washing machine. A rather high, narrow compartment will take the skirt board and the bosom board; even the curtain stretcners could stand in the back of this space. A hook conveniently placed for the bag containing the clothes pins and the clothes-line, and good, substantial shelves for irons, saucepans, starch and bluing, and a goodly quantity of soap. With the room well lighted and well aired, equipment and supplies well bought, and a little study as to the best methods, one will find that the drudgery of laundry work is largely eliminated.

PIECES OF EQUIPMENT.

Machines and devices were never so helpful or at so varied prices. It behooves the housewife to consider the various

principles of machines and devices; to consider the greater economy, to spend time and energy doing the work herself which leaves little for the better, broader things of family life, or to purchase a machine, the first cost of which is large but which does all the heavy work for her.

Cost, then, is the first thought, and all electrically driven machines are, in dollars and cents, the most expensive. The more powerful and lasting the motor, the greater the

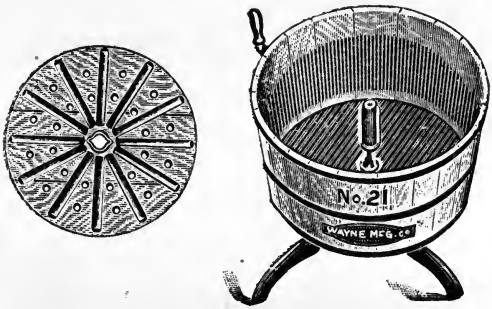


DOLLY WASHER.

cost. Electricity not being possible, gasoline, acetylene or water may furnish the power. Water motors are efficient if there is a sufficient flow of water, but are not to be considered if one must pump water to store it for power or if the water tax is very high. Most water motors require about forty pounds pressure per square inch. This can be tested at the faucet.

One must not feel that hand-driven machines are not labor savers, as they can do many more pieces in a given time and with less effort. No matter what the power, a washing machine is constructed on one of several principles, all cleaning the clothes by friction, pressure and suction, or agitation, and each displacing dirt by forcing soap and water through the fabric.

There are five types of washing machines. One is called the "Dolly" type; in this, the "Dolly," which is like a revolving milk stool, revolves in the center of an outer tub which contains soap and water through which the clothes are drawn. Care should be used in this machine that it



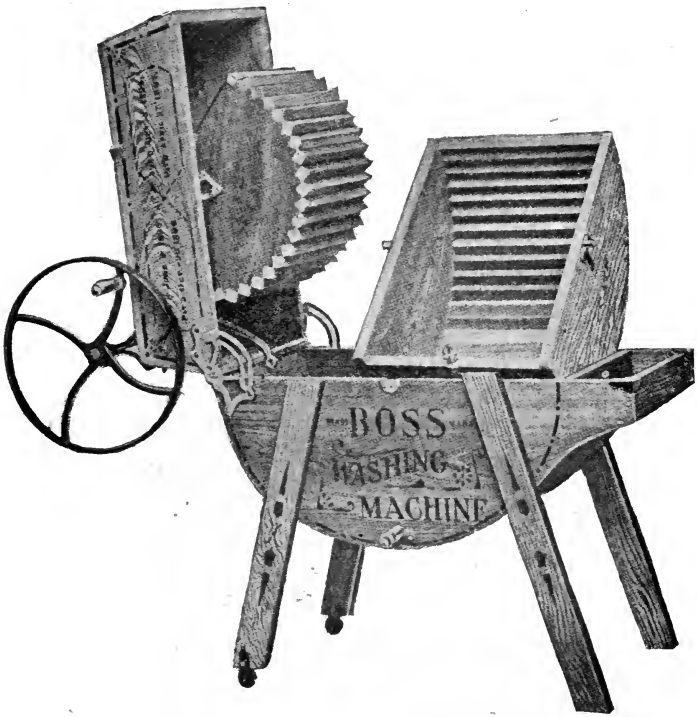
Corrugated Disk Type.

is not over-packed, because of the danger of tearing. The principle of this "Dolly" machine is agitation and friction.

Another group of machines cleans the clothes by friction. This friction is brought about by corrugated disks or semi-circular boards which revolve or rock with the clothes in between.

With either machine the clothes are rubbed between these two grooved pieces of wood. It is really a double wash-board device.

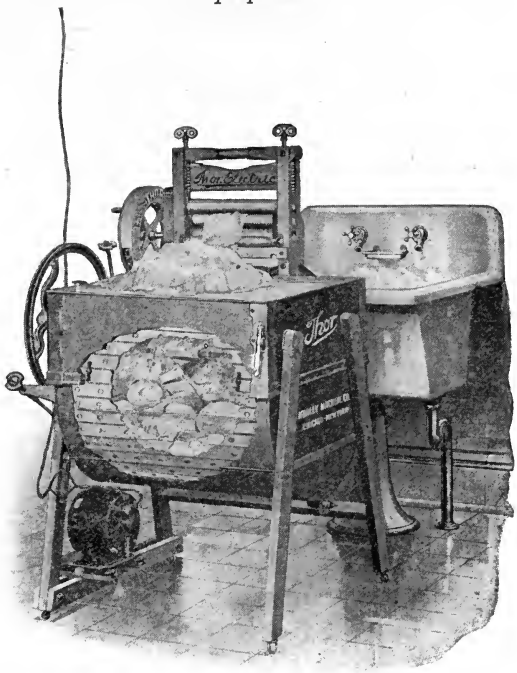
A third group revolves the clothes and hence agitates them in a cylinder-shaped cage. These machines are constructed with two cylinders; the inner cylinder, made



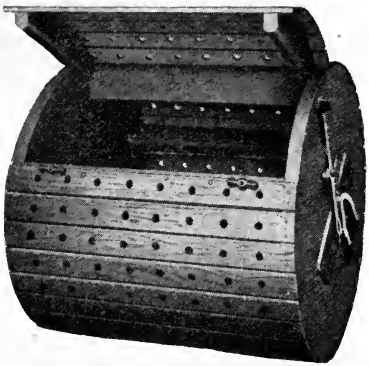
Reproduced from Boss' Circular.

CORRUGATED SEMI-CIRCULAR TYPE.

either of wood or metal, is like a cage which holds the clothes, and revolves in the outer cylinder which contains soap and water. It is this type machine that is used in all commercial and institutional laundries, and may be built with



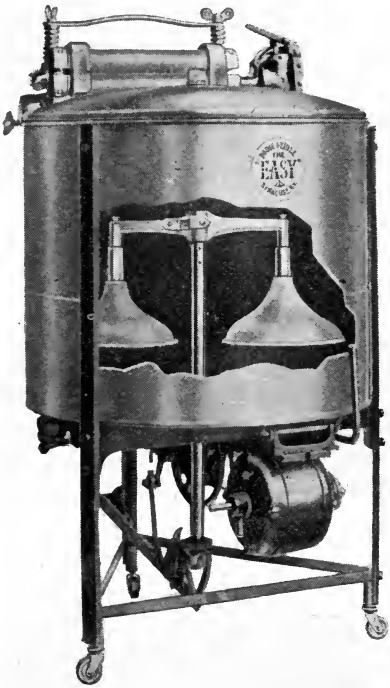
Courtesy of Hurley Machine Co.



Courtesy of Hurley Machine Co.

ROTARY TYPE.

one or as many as eight inner compartments. The compartment machine is used in the many wet-wash laundries. The cheaper of these machines, if power-driven, rotate only in one direction, whereas the better ones reverse their action.



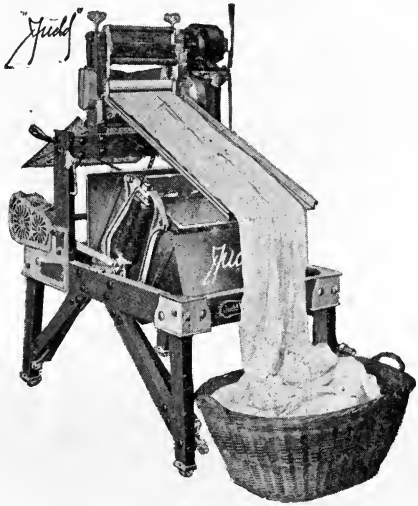
Courtesy of Dodge & Zuill.

PRESSURE AND SUCTION TYPE.

Hand-driven rotary washers may be turned or reversed at will according to the desire of the worker. It is the reversing of the action which increases the efficiency of the machine. This machine, like any other, should not be overcrowded,

so there will be sufficient room for the clothes to drop from the top of the cylinder to the side as the inner cage revolves. Some of this type revolve by means of the action of a paddle wheel agitating the water so forcefully as to cause the cage to revolve in the water. This method is agitation and rotation.

A fourth type of machine, the pressure and suction principle, are spoken of as suction washers. Metal cones are



Courtesy of Judd Laundry Machine Co.

OSCILLATING TYPE.

attached to a lever which pushes the cones down against the clothes, then suddenly lifts them away. A suction is caused which draws out the dirt previously loosened by the pressure.

Another type of machine oscillates or rocks the clothes in soapy water without friction. The clothes compartment

rocks cradle fashion and cleans the clothes by throwing them rapidly from one side to the other. This rapid throwing creates a forceful displacement, hence the cleaning is rapid.

Any of these machines will do good work, if not overloaded, if given sufficient time. There need be no tearing if one is careful in taking the clothes from the machine. Very fine lingerie, or a number of little pieces like handkerchiefs or collars, can be placed in bags made of cheese-cloth, or net bags especially made for the purpose which may be bought in any laundry supply house. These supply houses will be found in all large cities. The nearest one may be learned from any public laundry or hospital laundry.

Hand Washers.—A number of small washing appliances must be grouped with the so-called hand washing machines. Several devices are in the form of a vacuum boiler, on the principle of a coffee percolator. It is easily handled, light in weight, easily kept clean and costs little. It is used by placing it in the bottom of a clothes boiler, funnel side down. The clothes are distributed evenly around it, the boiler filled with cold water, to which shaved soap has been added. If the special stains have been removed, the soaking in cold water and the slow heating will remove the usual ones—such as egg, meat juice, oil, cream, etc. This washer cannot be used for colored clothes or woolens, because, for both, boiling is impossible. It is such a good labor saver, and is so inexpensive that it can easily be afforded by the saving accomplished on the other clothes. The cost is $1.50 to $3.50.

Again, there is the funnel type whose principle is that of a suction washer. It is a hollow cone, and may

be bought for any type of wash-tub; and where set tubs are not in use, it can be purchased with a galvanized iron tub, mounted on legs, with a water outlet in the bottom. This machine has its own stove and the clothes may be boiled in the tub. Again the ease of the

Courtesy of Dodge & Zuill.

FUNNEL TYPE.

leverage is increased by a heavy spring, which draws the handle quickly away from the worker. The kind of a device to be used in a stationary tub, costs $8; the one with its own tub, such as would be of service

in the country, or in camps where there are no stationary tubs, costs from $14 to $16.

Another funnel device has recently appeared. It is constructed with four smaller sections inside which increase the suction. This appliance can be found in three sizes, with a long and a short handle, so that it may be used in wash tubs, and wash basins as well.

Capacity.—The smaller power-driven machines have their capacity measured by the number of double sheets that they can wash at one time. If a machine is said to wash eight double sheets, perhaps better work will be found to result by attempting only seven. Full-sized tablecloths would be counted as sheets, four or five towels are equal to a double sheet, and three aprons to a sheet, etc.

Materials.—A wooden washer will wash the clothes as well as a metal one and costs less, but requires more care. It gives the greatest service when used in places where

not continuously heated as in city houses, because if left dry in such a place it shrinks and leaks water, and over-soaking will make it slimy. A wet sponge is better than letting water stand in the tub. Soap and water will clean the metal. Machines should be allowed to dry after use and the cover replaced to keep them clean.

To Set Up.—Place washer in working conjunction with the wash tub, pipe hot and cold water to the tub by means of a single faucet (bath-tub fashion) to which a hose can be attached and be led to the machine. This entirely eliminates pailing water.

Every machine has a water outlet, and only a little thought and money are required to have a drain from this outlet as from any set wash tub. The outlet may be a funnel which leads into a pipe or a trough. Better work will result from this saving of effort, as it means the worker will be more likely to rinse the clothes thoroughly.

To Operate.—See that the machine is well oiled and belts tight enough to save power. Have the soap in solution. (See recipe, page 45.)

Clothes may be soaked in two ways for the power home washer. One way: Put clothes in adjoining tub to soak; after ten minutes run through the wringer into the machine which contains hot soapy water ready to receive the clothes. Second way: Fill machine with a third or fourth of the capacity amount of cold water, put in clothes, soak five to ten minutes with the machine in action; then run in hot water (and it should be quite hot, as the clothes are cold), add soap solution until good lasting suds are formed—about one pint of soap to a six-sheet washer. Run the machine ten minutes.

Then pass the clothes through the wringer into the tub prepared with very hot rinse water. Use clothes stick, as water for all white cottons and linens is too hot for hands. The machine is emptied, filled with cold water for the rinse. Rinse five minutes and blue. The clothes are ready for the bluing, which may be done in the machine if care is given. Bluing cannot be well done without a great deal of water, and the blue should be mixed with a pail full of water and poured into the machine. With rotary or pressure and suction washers, the blue is added with the machine in action. Three minutes is enough for this. In the small washers the bluing had better be done in the tub. A family wash may be done in sorted lots, table linen, bed and body linen, colors, flannels and silks, and when so much is done at one load the worker can afford time to rinse well, using the machine and power wringer, and when the machine works she can be using that time to make starch or starch clothes or hang to dry.

Woolens are well done by machines, but the water temperature must be carefully considered. (See page 94.)

Cost.—The cost varies with the material used in construction, strength of motor, and accuracy and endurance of mechanical parts.

Rotary machines (electric motor), $75 to $175.
Hand-driven, $6 to $18.

Rotary machines (water motor), $35 to $50.

Oscillating machines (electric motor), $125 to $150.
Hand-driven, $12.00.

Pressure and suction (electric motor), $125 to $150.
Hand-driven, $1.50 to $18.

Operating cost for electric machines about $1\frac{3}{4}$ to 2 cents per hour.

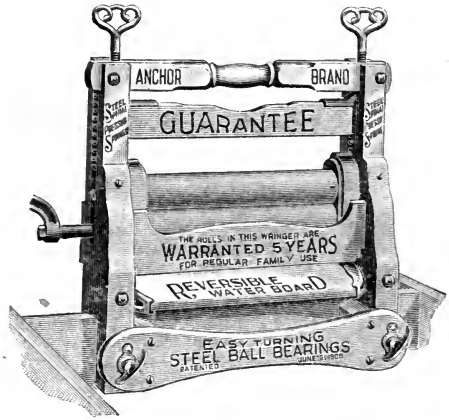
Wash Tubs.—One to three tubs should be in every laundry. A tub and a sink combination will be found most useful where a washing machine and one tub are considered. Stationary tubs are most convenient, as they eliminate lifting and can have a drain easily connected even if hot and cold water piped to them is not possible. These tubs are made of various kinds of material which makes it possible to come within every one's means. In all cases, legs, piping and faucets are extra.

A few suggestions will help in the choosing of a tub. Wooden set tubs are cheap, but not durable, and hard to keep sweet and clean. A single tub without plumbing connection costs about $8. Concrete and stone, easily cleaned, with round corners, about $12 per unit. Slate is not expensive, but not a pretty color, about $16 to $19 per double tubs. Soapstone comes in single sections. The color is gray, material fairly durable, but porous. Cost $13 to $18. Porcelain tubs are durable, easily cleaned with soap and water or a little kerosene with a cloth (no abrasive material), but are expensive, costing $36 to $40 for the white porcelain, and $27 to $29 for the yellow porcelain.

A stationary tub should be set sufficiently high so the worker's back is straight, and so the forward bending is from the waist. For a woman about five feet five inches tall, the top rim of a tub can be about thirty-six inches from the floor. Gas piping will make legs of the desired height if those belonging to the tub are too short. The faucets should either be bell type or they should be set above the tub, so that by no chance the clothes may catch and tear on them.

If the expense of a stationary tub seems impossible, wooden or papier-mâché tubs may be bought, and they may stand on a bench. These benches are usually low, but they can be blocked up to make them higher, and so lift the tubs. Even this simple, inexpensive equipment may be stationary, and hot or cold water piped to the tubs. Holes may be made in the bottom of either tub and a plug put in for drainage to a pipe or a trough.

It is not always the expensive equipment that is the most serviceable and complete.



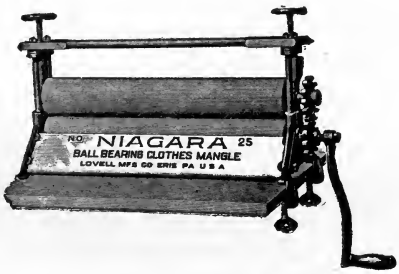
Courtesy of Lovell Mfg. Co.

WRINGER.

Wringers.—A wringer greatly assists in hand washing. One for a stationary tub would be more helpful if it were of reversible action, so that it could be put between two tubs and used without change. Wringers can be purchased at from $2 to $8, but it pays to consider the better quality, which should mean hard rubber rolls, heavy side springs and ball-bearing action. The care of the

wringer does much to counterbalance the cost price. It should never be left with the pressure on when not in use, as this will cause the rolls to flatten. Wipe the wringer dry and slip on a cover, which can be a loose bag easily put on; and if for any reason the rolls are badly stained, they may be wiped off with a cloth moistened with kerosene. Kerosene removes stains because oil dissolves rubber and this is the principle involved in cleaning the rubber rolls. Use little kerosene, wipe quickly to dissolve only a thin layer and wash thoroughly to remove all oil. The electric machines are usually equipped with their own wringers which are operated with the same motor that washes the clothes.

Flat Work Ironers.—Mangles, commonly called, are as much a time and labor saver to the ironer as the washing



Courtesy of Lovell Mfg. Co.

COLD MANGLE.

machine is to the washer. The cold mangle is an old device for pressing out the creases from dampened clothes without giving any gloss, and without any of the sterilization which comes with the usual hot ironing. The principle is like a wringer, with rolls of hard

wood, and springs at each side which control the pressure. It may be clamped to any table by the use of a thumb screw. More expensive ones will be found with their own table.

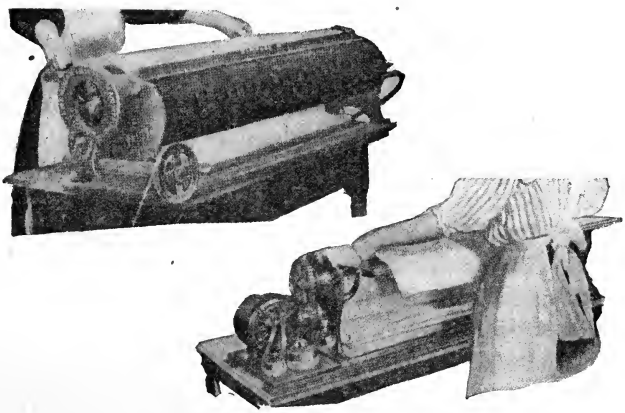
The clothes are slightly dampened, rolled and then, instead of being ironed, are folded and put through the mangle. By repeating the process, each time folding to increase the thickness, the work is made complete. As there is no heat, the pieces must be hung up to dry after pressing. The initial cost covers a large range, from $6.50 to $25, depending upon whether it consists solely of the rolls which are to be attached to the table, or whether a table is its base, and again upon the strength and size of the spring.

Heated ironers may be run by electricity or by hand. One of these is gas-heated and hand-turned; the more expensive ones are gas-heated and electrically-driven. A steel cylinder plays the part of the iron, ironing the clothes, which are flat pieces. There are two rolls, one a heated cylinder, the other a cloth-covered cylinder which takes the place of the ironing board. These mangles cost from $25 to several hundred dollars, the price varying with the size and quality of the mechanism, and the fuel and power cost depending on the size. They will be found to use from twenty to twenty-seven cubic feet of gas per hour at the cost of two to two and seven-tenths cents per hour; the power, two to five cents per hour, depending upon the size of the mangle.

Electrically-heated mangles are the most expensive, costing about fifty cents an hour to heat and twenty-five cents per hour to operate. This cost may be reduced by heating only one-half of the roll when ironing napkins, towels, and handkerchiefs; this is possible through a

cut-off switch. Electrically-heated mangles, electrically driven, are of great service where gas is not possible. Cost from $200 to $350.

Ironers must be covered with the same care as an ironing board and the covers should be kept clean and free from lint. When not in use keep the mangle covered to keep the machine free from dust. For good work the rolls should press evenly on each other. This



HEATED MANGLE.

means that the covering is of equal thickness on the roll and that the pressure is the same at each end.

Buttons are harmful to the steam heated roll and often are broken in going through. Starched garments should not be mangled. They require a so-called body-ironer, if done by machinery, as in the laundry.

Wax the steel roll in the same way as an iron, and, like an iron, be very sure it is thoroughly wiped off. Unbleached muslin is the best mangle cover and either

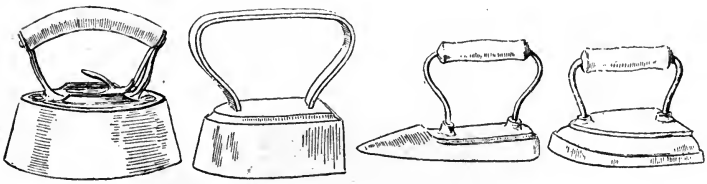
an old blanket or heavy silence cloth the usual padding. Wool felt may be bought especially for mangles through the laundry supply houses. Always remove pressure when not using mangles.

Ironing Boards, Table and **Sleeve Boards.**—The ironing surface should be very firm and large enough to allow a large space to be ironed at one time and also to support the garment while it is being ironed. Sleeve boards should be mounted on their own base and have a small, narrow end and a large end. Tables are especially useful for large flat pieces and for drying sweaters and laces, while the skirt board is a necessity for easy dress and skirt ironing. The tables may be used for sprinkling and starching by covering with a piece of enamel cloth. The skirt board may be stretched from table to chair, but it will be found more convenient to have it on its own standard or one end hinged to the wall to be ready for use and quickly folded up against the wall when not in use.

A stationary iron standard with board, gas stove and two water pans may be bought. These are most convenient and have been most efficiently arranged, for they are used by the commercial and institutional laundries where efficiency must be considered.

To fasten the ironing pads and covers, thumb tacks may be used, or the pads may be tacked on and the muslin covers tied or snapped on. To buy muslin for covers, choose that which is sixty inches wide, so the width of the muslin may be the length of the cover. This does away with waste lengths, so is no more expensive. Cut the muslin wide enough to have the cover turn about two inches under all sides of the boards.

Hem all sides with a half-inch hem, and sew tapes, five or six to a side. The tapes will make the covering and removing of covers a matter of a few seconds, no noise, no time needed to pull out tacks. Two covers to each board or table will mean time saving and a clean cover always ready.



TYPES OF IRONS.

Irons.—Irons, no matter what their heating appliance, should first be considered for their weight and for their shape. The worker with the old-fashioned flat-iron should have three irons ready for use. The weight of any of these three flat-irons must be, after all, more or less to the worker's liking. Three in all is rather a limited number for one who does varied work, and especially for one who is to do fine lingerie. She will find that besides her three—varying in weight from five to eight pounds—she needs a small iron with a decided point for little ruffles and for narrow edgings, such as might be found on baby's clothes. For perfect sleeve work she will like the long, narrow sleeve-iron, which noses its way well into the gathers and tucks of the sleeve. Irons with adjustable handles are desired by some ironers, as no cloth holder is required. Fluting or ruffle irons are efficient and make many garments most attractive. Plaiting can be done with knife ("knife plaiting") or with the fingers and the irons.

Electric irons, gas and alcohol irons are most helpful in reducing the heat in the summer and are economical besides. They require no hot stove, no walking to and fro to change iron, and some are of great convenience in travelling.

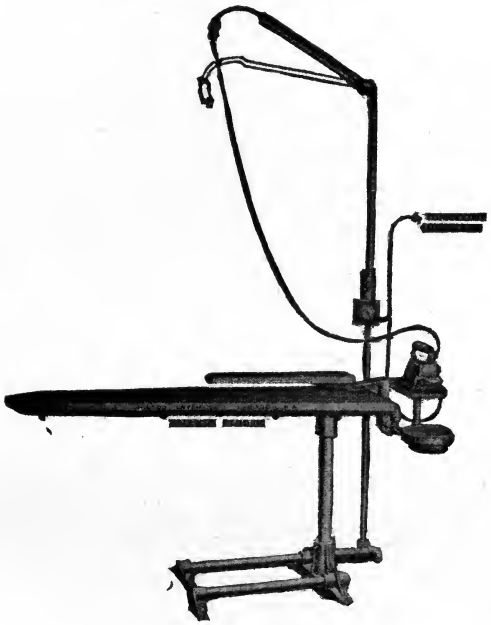
Electric Irons—The electric iron is perhaps the best of the recent new irons as an efficient economizer of time and labor. An iron of from six to eight pounds is the best for rapid ironing, because unless an iron be sufficiently large to have considerable heating surface, it

Courtesy of Vulcan Electric Heating Co.
IRON.

will cool with heavy ironing faster than it heats. As a safety device to these irons, it is wise to have a small one-candle-power electric light connected with the attachment plug to show by its light whenever the iron is in use. It is an advantage to have the wire lifted and held by a "bird-cage" spring, which also gives it play as it is used. Keep the wire from knotting or twisting, because the fine individual wires of which the cord is made are as fine as No. 60 spool cotton, and the bending back and forth which the knotting and twisting does causes these wires to break. The

conductor of the current is not only broken, but often these broken ends come in contact with metal and give a spark, and many sparks may produce a flame.

Gas Irons are like a small stove with the gas burning in them. Many of these irons turn so that as the bottom



is being used and cools, the top is heating ready to be turned to do the ironing. This is a good point, as often the iron cools faster than the heat can reheat and two irons would otherwise be needed.

Be sure the rubber hose conducting the gas is flexible and of good rubber—preferably wound with wire to prevent its knotting or twisting.

Alcohol Irons burning denatured alcohol are of great service, because they can be used in all homes where gas or electricity is not possible and are of great use in travelling. Their construction is not unlike the gas iron, except that they carry their fuel tank on their back, so to speak.

With either the gas or the alcohol iron, see that it is so constructed that its flame is always blue and not yellow which will soot the iron; and that its flame does not flare backwards, as burning backwards may be dangerous.

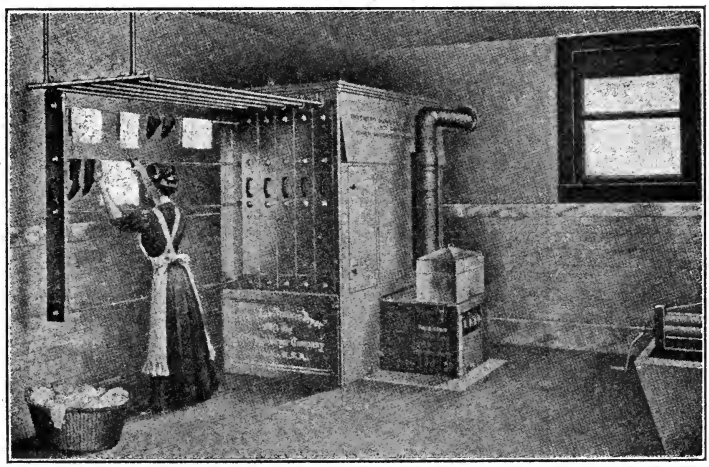
To Choose an Iron.—Consider weight, and for all self-heating irons examine the extent of their heating surface. An iron should heat so evenly that its scorch is even. This can be tested by a folded piece of new cloth or even paper. If there are spots that do not scorch, they show uneven heating. A good iron of even heating power and good metal should hold its heat for a reasonable time and not cool quickly on light-weight fabrics.

Care of Irons.—Clean irons are necessary for good results. To clean, wash the common flat-irons like a pan and rub with sand soap, Dutch Cleanser, ashes or salt. Then wash with hot, soapy water, rinse in hot water, wipe dry, and when dry, warm and cover with a thin coating of wax. To clean the self-heating irons, warm them by burning their own fuel, rub with wax and then rub in salt, Dutch Cleanser, or on emery paper. Wipe with a cloth, wax and rub clean.

Cost.—Flat-irons average about five cents a pound; gas irons from $1.50 to $6.50 per piece, and the operating cost is about half a cent per hour. Electric irons aver-

age $1 a pound and cost three or four cents per hour to operate.

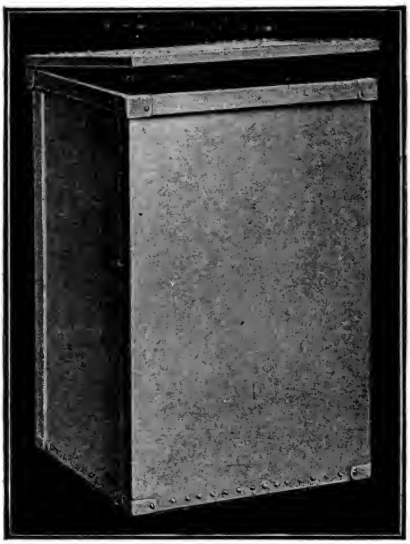
Clothes Driers vary from the hemp clothes-line, taken down after each drying, copper wires, stretched taut and left out permanently, to revolving driers mounted either on a post in the yard or on a projecting arm from a porch or window.



CLOTHES DRIERS.

Indoor driers vary from the clothes horse to a rack which is pulled by pulley to the ceiling (very convenient for limited spaces, costing about $5.00). Where one is entirely dependent on indoor drying, driers may be built in. They may have the stove attached and they are connected with a flue outlet so the moisture is quite free to escape. With this ventilation clothes are not likely to yellow.

Clothes Sprinklers.—Saving of time and effort has made us lay aside the use of the hand as a sprinkler for a method which is quicker and with most workers gives more even results. There are various kinds: a whisk broom set aside for the purpose, five cents; a sprayer that may be used in any pint bottle, ten cents; a tin can with a handle at one side, and a finely perforated top at thirty-



Courtesy of Jos. L. Cohen, New York.

PAPIER-MÂCHÉ CLOTHES HAMPER.

five to forty cents; a rubber bulb sprayer like that used for spraying plants; and a fine mist sprayer attached to a hose. These are all efficient, but the most suitable is the one easily dried, with fine holes, and not too expensive.

Clothes Hampers and **Baskets.**—The usual distinction is that the basket is used in the laundry and the hamper

as a soiled clothes container holding the linen that is waiting to be washed. The hampers may be woven baskets like those used most in homes, or they may be metal cans as used in hospitals, or may be papier-mâché, white enamel painted. The latter two have much in their favor, as they may be washed with soap and water, hot rinsed and wiped dry. Again, they are smooth and afford less chance for collecting dirt and hence germs. Bags for collecting and holding soiled linen are good, provided they can be washed. They should be sent each week to the laundry as the soiled clothes are sent. Wicker hampers may have muslin bag linings and these linings may be washed. Have two, so that while one is drying a second one may be slipped in. Baskets may be lined as suggested for hampers, and if put on wheels they will be of greater help, as there will be no need of lifting them or no occasion of dragging them and wearing them out.

Iron Holders.—Iron holders may be bought for a small sum, five and ten cents. They are made of ticking and asbestos, but many prefer to make their own, which can be done with no expense other than the woman's time. Folded stockings covered with denim or with ticking make excellent holders, as the stockings are good non-conductors of heat. Two holders will make ironing easier, as a change from a hot to a cold holder is restful to the hand.

Clothes Pins.—Clothes pins should be bought of the best quality and should be kept very clean by keeping them in a bag. A bag made like an apron is most convenient, as the pins may be right at hand. Make the pockets broad rather than deep.

Curtain Stretchers are of great use in finishing long lace curtains or shaping blankets. They are not expensive, therefore choose the best. The frame should be very substantial to prevent warping; an easel is a great convenience, as it means the stretcher may be placed out of the way. The pins may be movable with the idea of fitting all scallops, but the stationary pins are more substantial and very satisfactory. For straight edges to be pinned, one may baste to the edge of the curtain a piece of tape, and the pinning be done on this. Some prefer to tack tape, ticking or unbleached muslin to heavy strips of wood which can be clamped together and then pin to these instead of using the frame. This latter frame can easily be made in the home.

Stoves.—So far nothing has been said concerning stoves for the laundry. They are almost legion, from wood, coal or gas, shaped to hold just irons; better still, they should heat the water, heat the irons and have a place to boil the clothes or the starch. These stoves need not be large to do all this work. Cost varies from $4 to $18.

Starching Outfit.—The pans for starching and for cooking starch should be chosen with the thought of having material which is easily kept clean, and the cooking saucepan should be heavy enough to prevent scorching. A wooden spoon, quart measuring cup, tablespoon and teaspoon will complete the outfit.

Testing Outfit.—Much of the testing can be done with an ordinary teacup and saucepan with perhaps a glass or two; but it will be found that a few glass test-tubes, a measuring glass, two or three glass beakers, a package of filter paper (about four inches in diameter), a glass funnel (about three inches across), will make the testing

easier, as with glass, quantities can be more easily measured and results more easily determined.

INSTITUTIONAL MACHINERY

The general suggestions concerning the wall and floor finish of the home laundry may be considered for the institutional laundry. The whole room or rooms should be built with the idea of good ventilation and good light, and with every consideration that will promote the best sanitary conditions. Naturally the problem is a larger one with the work carried on in a building by itself. If the floor space is not extremely valuable, the building may be broad and of one story. In this case the room is divided by either a definite partition or by arranging the equipment one part as the wash room and the other the ironing section, with the thought that one section contains the washing outfit and the other section the ironing outfit. Even so, it is only a difference of size, because the idea of arranging the equipment with the thought of right relationship and economy of space and time is the same as in a small laundry.

With a greater quantity of soiled linen to be cleaned, there should be a special room planned for the delivery and sorting of clothes, and it should be adjoining the wash room. A second small room adjoining the ironing room is needed for the sorting and collecting of clean linen. There should be a room for the work people, properly equipped with lockers and dressing facilities.

If the plant is very extensive, it naturally must be increased in height, and in this case the division of departments is brought about by having each department on a floor by itself. Height of building overcomes expense of land, but of course involves expense of elevators and lifts, as well as more supervision by heads of departments.

Anything that has been said concerning the arrangement of washing machines or wash tubs may be transferred in thought to the arrangement of power washing machinery. The washing machines (two are greater economy than one) should be grouped close together, so that one drain may be the outlet for the several machines. One extractor, which is the wringer in a big laundry, will extract the clothes washed by two machines. This extractor then should be put between the machines, in direct line with them, or set off from them with a passageway between, in a right-angle triangle relationship. In this latter arrangement the extractor has its own drain. If a tumbler is used, for efficiency's sake place it near the extractor, as the clothes go directly from the extractor to the tumbler. Some of the more modern tumblers today are heated, so that simultaneously as the clothes are being shaken, ready for mangling or for starching, they are partially dried. This machine is especially good for flannels, as the tossing while drying keeps them soft and fluffy.

Driers are of special use for collars, cuffs and shirt bosoms, as the more modern way of making starch and starching no longer necessitates drying before ironing. The aprons, dresses, coats, and trousers go direct to the power ironer, leaving only the cuffs, collars and shirts for the drier. A "conveyer" drier is established for this work and it "trolleys" the clothes in and around the drier, geared to take a certain length of time; at the end of the time an automatic hand pushes the garment off and it drops into a basket. Driers are made for curtains and blankets where each section is like a curtain stretcher. These sections may be pushed in like drawers, and consequently economize space.

Because indoor drying is without fresh air, there should be special thought to having a circulation of what air there is, so that all good driers are set up with an outlet flue and are

built with electric fans. The flue and the fan promote a rapid drying, because there is the outlet for the warm moist air, and the fan causes circulation, so there is less chance of yellowing of clothes. Metal racks are preferable to wooden ones, as they do not warp and do not produce yellow streaks on the clothes. As a safeguard against the racks marking the clothes, and against soil, slips may be made of canvas or heavy muslin to cover the bars. Make the slips tubular like a bolster case, and large enough so that they slip on easily. Wrapping the bars bandage fashion will serve for cleanliness, but there is the great work of the wrapping and unwrapping.

The ironing section should be large, because the flat-work ironers or mangles occupy a great amount of room; and each flat-work ironer should have two tables near, one to hold garments to be ironed, and one to receive them after ironing. This table should be covered with zinc or galvanized iron to prevent danger from fire. The flat work taken from the mangle and folded quickly, then stacked in piles, naturally holds a great amount of heat. If this table is large, there will be room for the workers to sort and then stack like kinds of goods as fast as they fold. This does away with the second handling. Body ironers, presses and bosom and collar and cuff ironers should be placed near the windows, so that good light comes from the side of the worker. The same points concerning the cleanliness and the oiling of the small machines may be considered for the large work.

The laundry supply houses furnish various kinds of heavy felts and pads for the mangles, and this same material will be of service for ironing boards and all small machine ironers. This padding is expensive, but with care, which means preventing scorch, taking the pressure off of mangle and body ironers as soon as finished, these felts will last for several

months. To re-felt the pads, remove from the rolls, place in the washer, and with the washer revolving, turn on steam, let run for five or ten minutes, and the felt will be soft, fluffy and ready for further use.

This method of re-felting of course can only be used when the felts are clean, as it in no way washes. If the felt is to be washed, it should be washed as any wool by using waters of the same temperature and soap in solution. (See chapter on Woolens.) The muslin or canvas covers will need cleansing more often, because they, like the ironing-board cover, get the direct wear. Usually these covers are changed once a week, on whatever day that the plan of work sees the washing finished. Many institutions close Saturday noon as soon as the work is finished; then the muslin or canvas covers are taken from the mangles, washed, and may be put on by the ironers on Monday morning while the clothes are being washed. The covers of the smaller machines are cleaned in the same way and usually at the same time. The thought of a regular day for this work must be laid aside if the covers need changing before that time. Clean clothing will not come off of soiled ironing cloths.

To replace these clean felts, make a heavy paste of flour and water, and with a knife or with a paint brush about two inches wide, spread the paste along one edge of the felt, having placed the felt under the roll ready to be rolled. This brings the paste on the upper edge ready to adhere to the felt which is brought up to meet it. One person starts the machine, and one or two others hold the felt, resisting the machine while it winds the felt around the roll. The clean muslin is not fastened at the starting end, but about six or eight inches of it are laid under the last lap of the felt. Again the machine is started, and its action winds the muslin tightly around the roll. There should be even

and firm resistance on the part of the person holding the muslin. If the pressure is on the flat work and body ironers as the covers are replaced, the result will be smoother, freer from wrinkles and straighter. A roll should measure the same in circumference along its entire length and the pressure of all rolls on the heated steel roll should be equal. This may be determined by heavy folded paper or by a heavy towel with the machine in action. To test with a folded paper is like testing with a wedge—it should go in with the same resistance or ease between the heated roll and the cloth roll, and each roll should give the same pressure as its neighbor. Uneven pressure is instantly discovered if sheets or table cloths are fed into the machine perfectly straight and come out pulled with a long, pointed corner. At the same time, but not so quickly, it will be seen that the edge of the mangle roll is no longer straight, but is pushing out farther at one end than at the other. Continued use of the mangle with uneven pressure will result in torn mangle cloths, and is often the reason for flat work being torn. It is economy to have two sets ready for service, as the frequent re-felting helps to preserve the pads and requires time. The muslin or canvas covers from the large mangles can be cut down so that the best is used for the smaller machines and for the skirt and sleeve boards.

Each machine should be equipped with its own motor, because then there is no danger and no inconvenience from the belts, which one motor necessitates. It means that if one machine is out of order, the whole laundry is not crippled. Individual motors are safeguards because the worker may instantly cut off the power of that special machine. Again, overhead belting requires much cage protection to prevent catching of clothing. In all large institutions there is plenty of power, which is usually created by the institution and

used for many other purposes. In the smaller institutions, the power may be supplied from the city plant. Running machines without giving them work, or running them with insufficient heat, with steam valves leaking, and running the washers without an established formula, represents great waste. It seems like a drop in the bucket in the beginning; if added up at the end of the year, it means large coal bills, large water and electricity bills, and oftentimes it means a big salary expense, because workers have been standing, waiting for a machine to have power or heat to do its work. A good head laundryman will be sure that there is no leakage, and will see to it that the work and his workers are sufficiently organized to do all and perhaps more than is planned for them without the least waste. With this same thought of prohibiting waste, he must have knowledge of the quality of his supplies. Soap should be all soap, bluing entirely soluble; in fact, all supplies that are the purest will be the cheapest.

To Clean Washers.—Wooden washers require little cleaning, as the soda which is used in most soap solutions bleaches the wood and keeps it clean. Metallic washers are quickly covered with a scum. Continued collecting of this scum causes the openings in the inner cylinder to partially close and naturally, to a limited extent, reduces the action. This scum needs to be dissolved off, but should not be done too often, as it is best done with an acid, which, to a certain extent, is injurious to the copper and brass of which the inner cylinder is made. The injury is slight for one time, but it is enough to warrant the washer being cleaned only at regular intervals, perhaps once or twice in two months. Citric acid, oxalic acid and sulphuric and hydrochloric acids

are used for the cleaning. The least injurious, citric acid, is too expensive. Sulphuric acid will cost about half as much as the oxalic acid. Use one pound of acid to about two inches of hot water in the cylinder. Many prefer the hydrochloric acid because it is especially active on the scum. Dissolve the citric and oxalic acid crystals before using. Put acid in a pail of water, and with the water in the washer (just enough to cover the bottom on the inside of the cylinder) and the *cage open* add the acid. Let run for five or ten minutes until the washer clears. Deliver and then give several hot rinsings, to be sure that no acid remains in the washer to injure it or to injure the clothes.

Loading Extractors.—In loading extractors, the heavy pieces, such as spreads and bath towels, should, whenever possible, be placed at the bottom of the basket. Place the goods in the basket in bundles and pack tight. See that the ends of one bundle are entirely in the basket; that is, do not have loose ends hanging out to become entangled with the next bundle. Move the basket around and press the linen against the sides. By loading in this way one will not have the pieces "crossed" and will avoid having the linen torn or split, as the extractor gains speed. By crossed pieces is meant where the ends of a sheet or cloth are fastened by the weight of the load in opposite sides of the basket, and as the goods are forced back by the centrifugal force, the piece is stretched as tight as a drum head, and often splits. Sleeves, for example, should be folded into the garment and bunched with it. Load the extractor flush with the top of a basket, then cover with a round canvas three inches larger than the top

of the basket and start slowly. By using covers dirt is kept out and the clothes are kept in place. Never hold the hand on the extractor after it has started. See that it runs evenly and does not wabble. This shows even loading, which is most necessary to avoid danger of strain on extractor pivot.

To Make Soap Solution.—To use soap powders in an institution is considered by most workers to be very extravagant. To use all soap is expensive. Washing soda of a high quality, such as is specially prepared for laundries today, is considered harmless if it is combined in the soap solution. Nothing is so harmful, wasteful and reckless as to allow soda to be thrown by cupfuls or handfuls into the washer. A washing solution must be established to suit different kinds of water. Some of the hard waters will require more soda in the soap solution than others. The water should be measured, the soap weighed, and the two heated at a low temperature in the soap tank until all soap is dissolved and the liquor is amber color. The weighed quantity of soda is sprinkled in, and the solution simmered another ten minutes. For a general idea of proportion one may use, if water is hard:

5 lbs. of soap.
10 lbs. of soda.
25 gallons of water.

The capacity of the soap tank gauges the amount of soap and soda to be used. Generally speaking, the ratio is one part of soap, one part soda and five parts water, the soda being decreased or increased according to the nature of the water with care that soda is not in

great excess. By excess is meant that the soda should not be more than is needed to soften the water and produce good suds with the soap used.

To Make Bluing.—Dissolve one ounce of aniline blue in one gallon of warm water. When entirely dissolved, filter through filter paper and bottle. To a 200-shirt washer, use one ounce of this bottled solution. Introduce it into the revolving washer by first adding it to a pail of water. (The various bluings prepared by the various manufacturers and sold in the different laundry supply houses usually come with directions for their use. If the bluings are to be soured or acidulated, the proportions are usually given.)

Wash Formulas—(large machine).

I. For White Goods.

Cold soak, 1 inch in washer	10	minutes
Deliver.		
Hot water plus soap, 1 inch	20	"
Steam	20	"
Deliver.		
Hot water, 1 inch	10	"
Deliver.		
Hot water, 1 inch	10	"
Cold water, 1 inch	10	"
Deliver.		
Cold water, 3 inches plus bluing	5	"
Deliver.		
Extract.		

Clothes must be rinsed until water is clear.

II. Dirty Clothes.

Cold soak, 2 inches in washer.....	10	minutes
Deliver.		
Cold water and soda, 1 inch.....	10	"
Deliver.		
Cold water and soap and steam, 1 inch	20	"
Deliver.		
Hot water, 1 inch.....	10	"
Deliver.		
Hot water, 1 inch.....	10	"
Deliver.		
Cold water, 1 inch.....	10	"
Deliver.		
Cold water and blue, 2 to 3 inches.....	5	"

The above is for: Automobile coats.
Body Clothing.
Kitchen towels.
Overalls.

There is always enough water in any washer if it rises about half an inch above the clothes when they are pressed down hard with the hand.

PART III

CHAPTER XVI.

METHODS

REASONS FOR LAUNDERING

The laundering of clothing is most vital to the welfare and health of the individual. As unclean food may produce disease, so may soiled clothing. Clean clothing is emphatically important, and, with the other big divisions of food and shelter, ought to be treated with equal emphasis. Clothes must be changed, and clean ones put on, for they keep the body warm, because through the pores of clean clothes air may get to the body. Dirty clothes can no longer absorb.

Laundering by good methods gives us not only better looking clothes, but makes the clothing sterile. Soap is alkaline, and, together with the heat of boiling and ironing, we have present the two conditions which promote sterile clothing. It is definitely proven that well washed clothes are sterile for all purposes but an open wound.

Laundries are classed as factories, and are controlled by state and city laws and supervised by the board of health. Municipal laundries should be established in every city, as it is one of the greatest ways by which the health of the community may be guarded. For poor families a municipal laundry ought to be as much a social consideration as a public bath.

Inspectors of laundries are almost more important than inspectors of markets, because few housekeepers go to see where their clothes go. Trained sanitary experts should be appointed for this work. Social workers have much to do to teach the sanitary need of clean clothes, clean laundries and clean, healthy workers; shorter hours with consequent

less fatigue, and also that washer-women's homes should be inspected for their cleanliness.

Laundry experts are needed especially to organize the laundry department of institutions; they are as important in their department as a dietitian. Their supervision should help to reduce the great cost of a department which for the good of the institution must be operated.

HISTORY OF LAUNDERING

Mechanical History.—The earliest known method of washing depended entirely on the action of the running water of streams. If the water was not running, the primitive peoples quite naturally used twisting, shaking, flopping, slapping and pounding. They were dependent on the solvent power of water for many kinds of soil, but if any stain was not soluble in water, there was no way to take it out. We find it stated that

in B. C. 2000 Egyptians on the Nile stamped their clothes with the feet, beat them with white clay, and wrung them by twisting and turning, one end being held between the feet. Homer in the "Odyssey" tells of the early wash days in Greece.

These primitive laundresses next tried to hasten the

process by more mechanical methods. They used treading, pounding the clothes with sticks and stones, or rubbing them on rough stones—anything to create friction.

Platforms were built out from the shore and from these platforms slanting boards were used and the clothes were slapped on these—the first wash-boards.

Boards were gradually made with grooves or corrugations, as the rough surface increased friction and so hastened cleansing. This was the origin of the modern wash-board—which will soon be a thing of the past, as friction must cease. Smoothing with a stick finally was used as an ironing process. It became a machine

in which several wooden pieces rolled on each other, called a mange—Italian—from which we get our mangle. It was invented in the fourteenth or fifteenth century and was intended especially for weavers. In the sixteenth century small mangles were in use in all the cities.

Queen Elizabeth with her ruffs caused a certain Dutch woman to invent the art of starching, so the story goes. Teachers in this art were called professors of starching and were paid five pounds for every lesson.

Smoothing irons were made of steel or brass, with wooden handles. Red-hot iron or coals were placed in the body of the iron, such as are still used in Korea.

An ironing bell from which our puff iron comes was used for ironing ruffs. Delicate things were not ironed but were smoothed on a glass roller. We use this today for lace and ribbon in the form of a glass bottle.

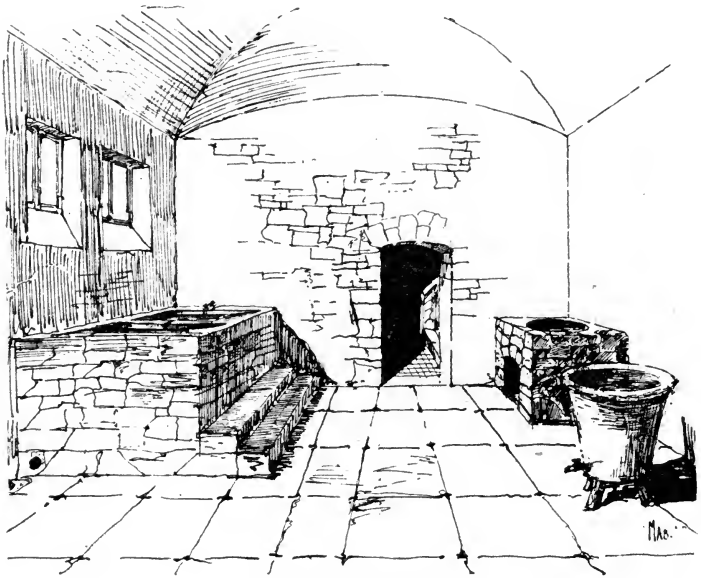
The story is told that a collar in London in 1832 drew attention to the question of sterilizing the clothes; as a result a poor woman set up a wash-boiler, soap kettle, and other appliances, and so we have the first public wash-house. Here washwomen paid a penny for the privilege of its use, and in 1842 a public laundry was established in Liverpool.

Finally in this present period, in the domestic laundry, wash-boards and other primitive equipment are giving way to the various mechanical devices which are great labor savers, and time savers, and often indeed fabric savers. Washing machines driven by motors, special washing devices for clothes, boilers and wash-tubs, wringers (even motor driven), and steam drying rooms, are making the work less of a drudgery.

Even the irons are no longer heated with smoking hot coals and dragged over the garment, but by gas or electricity giving off heat with evenness of temperature and continued action.

Chemical History.—Water has solvent power. The early laundress washed her clothes in the running brook and

the water dissolved out the dirt. To hasten its work the laundress often pounded the clothes with a paddle or stone or trod them. This process was slow, and as time became a consideration it seemed wise to find some cleansing agent that would add its power to that of the water.



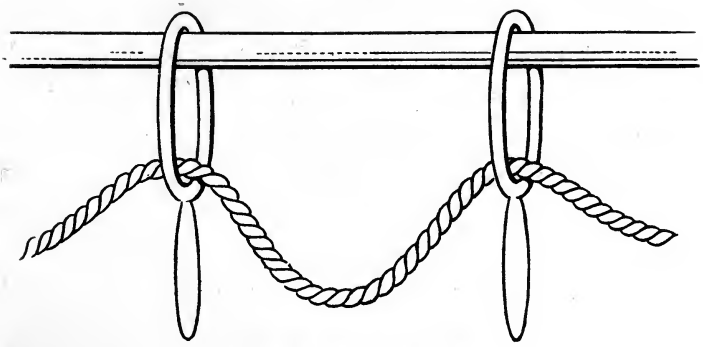
ITALIAN LAUNDRY.

The alkaline nature of urine was learned, and it was the custom to have urine collected in large urns in central places in the village. This became the public source of supply for the first chemical aid in washing. Even in our mother's early memory urine was used in dyeing the yarn.

Later wood ashes were taken from the housewife's

fire, covered with water and the pearlash or potash was dissolved—"leached." The clothes were soaked in this, and the pearl-ash or lye aided in the cleaning process, but it was destructive to the clothing. An illustration of this method is found in the Italian caldron, where the clothes are placed, the finest in the center, covered with canvas, ashes placed on top and water poured over.

To deaden the potash, later it was mixed with kitchen



ITALIAN CLOTHES LINE.

grease, thus making a kind of soap. This soap was of irregular composition, with the potash usually in excess. This potash "broke" the hardness of the water, and the suds acted as a carrier of dirt, thus making a double cleansing agent.

The modern use of soap demands that it be a perfectly balanced one in its proportion of grease and alkali—not just *any* soap. There are still inaccuracies in present methods—for instance, the extra handful of washing soda; but this, too, is going, as scientific accuracy demands it should.

When the soil of the clothes has been studied and means of removal other than soap and water have been found, it is learned that certain soil is not soluble in soap and water, but is soluble in an acid or an alkali. Also a knowledge of chemistry and textiles has shown how such agents may be used with little or no injury to fabrics.

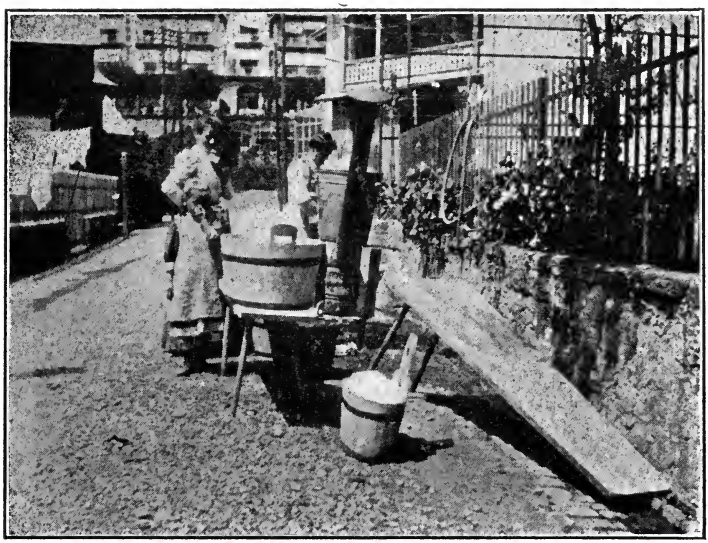
With knowledge of fabrics and the stains likely to occur, the trained worker may justly use the acid and alkali solvent because the chemistry of textiles and of stains teach the use, care, dilution and neutralization of chemicals and show those which are destructive to individual fibers.

FOREIGN METHODS

In France, at places along the banks of rivers and streams, women are seen pounding their clothes with flat paddles on the rocks.

The peasants in Normandy hollow out the loose beach stones in the path of a fresh-water spring on its way to the sea. When the pool is filled, they put in a large stone which they use as a wash-board. When clothes are washed and rinsed, they are spread on the beach to dry.

In Holland, the little Dutch woman may be seen at a



trough or boat landing on the edge of the canal washing her blue and pink cottons. Water is there and enough; but one is likely to question the merit of this kind of washing from a sanitary viewpoint.

The semi-annual wash-day in some remote places in Germany still prevails. Long lines of boats filled with the accumulated clothes may be seen coming down the streams until an available spot is found, when the work is begun.

This work is a task, as great quantities of clothes have accumulated. They have been kept from one wash-day to another in an aired loft at the top of the house where it is possible to stretch clothes-lines.

Among the Norwegians today we find this same plan of accumulating clothes for months, storing them in specially

made compartments in the lofts, and having wash-day two or three times a year. One rather unusual feature of their mangling or ironing is the use of a long box on rollers. This box is filled with stones, and with one woman at one end and one at the other they manage to do the tiring work of rolling this weighted press over the clothes.

The "open-air laundry" is a very common sight in Switzerland. In the middle of a street in the village all the washing

processes are carried on. On the wood-stove is the huge kettle in which they boil their clothes, often two or three hours. In place of a wash-board—for they do no rubbing whatever—there is a long, inclined board upon which they "throw" the clothes after being thoroughly soaped—literally throw out the dirt.

COMMUNITY OR MUNICIPAL LAUNDRIES.

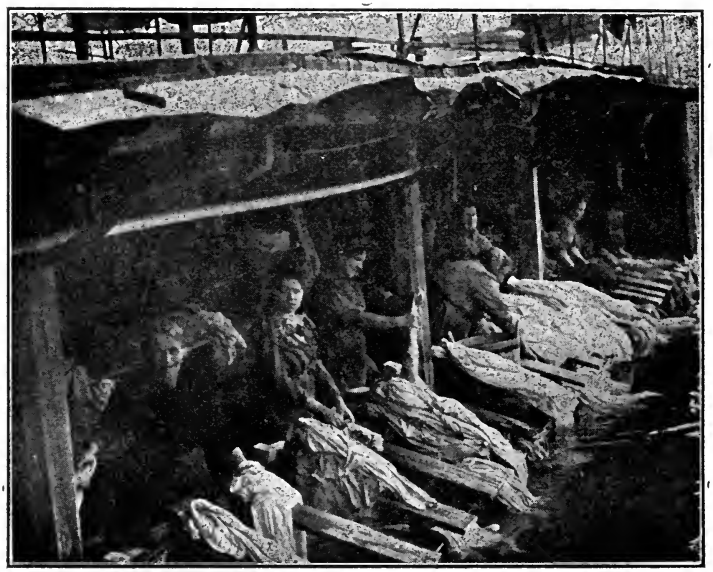
Common fountains for washing are used by groups of Swiss peasants. They gather at the bowl or trough of the fountain, working in twos at first, and later placing their clothes in the different compartments of the trough for rinsing.

This community work is carried out on a larger scale by furnishing public wash-houses to the poorer people in large cities in all countries abroad. The first one was built in Hamburg in 1852 at a cost of 100,000 marks, the city giving ground space and water free of charge. In London, the city's poor have a place to do their washing, usually in connection with their public baths.

In Paris two classes of "lavoirs" play a prominent part. The first kind—"bateau lavoirs," of which there are about a dozen—are large covered boats moored in the Seine, to which washerwomen go and wash their clothes in cold running water by rubbing with soap on a board, or beating with a wooden club or mallet. The second—the "lavoirs publiques"—are located in every part of the city, and supplied with hydrant water from the municipal water mains. These are private business establishments, open to the public on payment of a fixed rate or tax per hour. This entitles the women to the use of tubs, hot water, wringing machine, and a drying room in which the washing is dried by artificial heat. The sign of this kind of a laundry is generally a large

tin flag painted with the national colors. These laundries are subject to the visitation and inspection of the police, who in such matters, are under the control of the sanitary authorities or council of hygiene.

In Rome and in other Italian cities, we find the com-



PUBLIC WASH-HOUSE

mercial "lavatojos" similar to those found in Mexico. These are usually roofed over to protect the workers from the hot sun. Row after row of these Italian women are washing, each working in the divided trough. In some places in Italy they have their wash-day—"bucato"—every two weeks, and often a conca, or large earthen jar, is used as a tub.

The communistic idea is thus emphasized by many of these countries, giving opportunity to the poor people. Baltimore, Chicago and Philadelphia have most satisfactorily proven the good of such public wash-houses and laundries. Every city should make such facilities possible.

In a municipal wash-house the room is divided into stalls or compartments, and each is furnished with two set tubs and a wringer. Here the woman may take her clothes and wash them in privacy, and comfort of good equipment with an abundance of hot and cold water. Soap is supplied for a few cents or women may bring their own.

The public laundry is steam equipped, and the work is done by power machines. The individual family wash is placed in bags, and as the washers have four or five compartments, as many bundles may be done at a time. An expert washman does the work, and the owner calls for it at the close of the day. The cost per family bundle for washing the clothes is about ten cents in the wash-house and thirty cents in the laundry.

In the rural districts, co-operative or community laundries may be established in conjunction with creameries. This is possible through planning a building with two distinct ends. In each end the machinery for either operation may be established and one power house, rental, manager and oftentimes delivery does much to reduce the cost and to increase the prospect of getting some of the work away from the already too busy farmer's wife. Old barns or even old mills have great possibilities towards being remade into a laundry.

SUGGESTIONS FOR TEACHERS

Various suggestions are given with the thought that no one rule will help all who may be planning to teach laundry work.

The teacher, especially if she is a teacher of several subjects, as in a grade school or rural school, may like to bring into her work history of laundering, suggesting that the students read about foreign women and their methods. It is a most fascinating way to collect material which represents primitive methods and customs, correlating with history, geography and physics.

If the teacher of cookery wishes to give little or much laundry work to her students, and must give it in her kitchen class room, portable benches which fold, camp-chair fashion, and papier-mâché tubs can be used to good advantage. If there seems to be no room for this quantity of equipment, enamel pans or small wooden tubs of the toy size may be stood on the table tops. Napkins, handkerchiefs, students' hand towels, caps and sleeves, and the small uniform apron; ribbons, laces and knit goods or gloves can easily be done with this equipment. For individual boiling, the enamel pans which have been used for the tubs may be placed on the individual burners. Or, if time does not warrant this, the boiler may be placed on a large cook stove, and each student may soap her own garment and put it in the large class boiler to boil. At the table, with these same agate pans, or even the small wash tubs, each student may do her own bluing and may heat her irons on the individual burner used as a cook stove.

Many teachers will have to plan to leave the clothes hanging in the laboratory after the class has gone, appointing one student to return to take down all the washing for this one section. The sprinkling should be individual work and may be done at the individual cooking table which will afford sufficient ironing space for small articles. Small boards, like dough boards, can be covered, to illustrate a large skirt board, which may not be possible to use because of its size.

This gives an individual ironing space for each student. Skirt boards may be used by attaching, with a hinge, a wooden leg to one end of the board. When in use one end rests on the table and the leg supports the other end. In this way the student may use the individual stove for heating the irons, and still as many use the table as when cooking. The author has found that good work may be done by giving each student a square of padding and a square of muslin, and with a table which has an unvarnished top, these ironing-board covers may be fastened by thumb tacks to the table. It makes the lessons where only small articles are used for illustrations possible and at the same time practical.

GROUP WORK

A teacher may have older students, and feel that she would prefer to use the larger articles just as would be found in the family wash. This necessitates larger utensils, and as space is still a problem the alternative seems to be group work, three or four washing at one tub, using perhaps one wringer for the group and one boiler. This work must be carried on as in any group work, with each student having a special part of the whole process for which she is responsible. This can be done, but can be easily understood to be unsatisfactory because naturally no one person is responsible for the whole garment, and no one is likely to acknowledge careless washing or ironing. If the washing of one week waits over to be the ironing for the next week, as is usually found necessary, perhaps the room space, the time of the lesson and the thought of keeping the students busy can be best brought about by having half iron and half wash the first part of the lesson. As each group finishes the process they were doing first, they may go directly to the second.

Often in planning a building, or where room for a laundry is being sought, it may be possible to use a part of the basement; or, from experience, the upper part of the school (the attic of the home) will make a practical laundry, because this often is unused space, and in a school is usually well lighted and can be well ventilated. In this kind of a room it would be possible to put several stationary tubs, one or two benches with several portable tubs, a small laundry stove, some small machines, hand driven if necessary; and with all the other usual accessories such as baskets and hampers, various irons and sprinklers, there is really no part of the process that cannot be easily and well done. Be sure that in either case the floor is so finished as always to represent a dry, clean laundry.

Where a special room for the laundry is planned in the building, the first thought for the teacher is what sized class can be comfortably handled, and it will be found impractical to attempt as large a group in laundry as in cookery. Sixteen to twenty is a much better number than twenty-five or thirty. The work, unlike cooking, can rarely be carried on on exactly the same time for each student, because the stains of some garments take longer to remove than others, or the ironing of certain garments may be more complicated, and hence take longer. All this irregularity increases the work of supervision, because of the uneven stages of the class-room work, and because, with the laundry, the students usually furnish their own working material, which if lost would often mean a great sacrifice. Two students can do good work at one tub, even though they each have a garment. Often, for the sake of greater variety, the two students in the group may have different garments; but for the sake of the point of the lesson, both garments should represent the same principle.

INDIVIDUAL WORK

Individual work requires a much larger expenditure of money, because of the many pieces of equipment. It is the best work because each student may be held responsible for her own efforts and results. Individual work can be carried on by having each girl at a tub, both girls washing in one tub and rinsing in the other, and by this alternating of tubs, much time is saved. A steam valve may be attached to every other tub, which permits live steam to enter the tub, thus converting it quickly and easily, with less danger than lifting the boiler, into a clothes boiler. This steam valve should be like an arm that reaches down into the bottom of the tub, and may be lifted arm fashion up out of the way when not needed. It is possible with individual tubs to show a good variety of equipment, as the soap dishes, some expensive and some cheap; the washboards, wringers and clothes sticks may represent different makes; the individual work also makes possible different kinds of starch and blues used in the same lesson, students making comparison as they work side by side. For arrangement of tubs, the aisle between two double rows will be found very easy to supervise, because by standing at the head of the aisle, the teacher may direct two rows or even four rows of students. This placing of the tubs is done by standing the tubs back to back, and if the classes or the ages of the students vary to such an extent that two heights of tubs should be considered, one row of tubs may be set lower than the other row. This is quite necessary for grammar school children and for those students in first-year high school. For training schools and colleges it will hardly be necessary to have the row of low-set tubs; the occasional short student may have a small platform upon which to stand.

The hollow-square arrangement is not so satisfactory for

laundry classes as for cooking classes. The teacher may walk on the inside of the hollow square and demonstrate how to stir or measure, but to show a student how to wash or to wring a garment, the arrangement is not so satisfactory. The plumbing is in the way of the wash-boards, so the instructor must walk out and around in order to assist the student.

Ironing boards or tables should be as nearly individual as possible. For students who are training to teach, it would seem advisable to have variety in equipment, as its use will better prepare them for various localities and types of work. For example, choose a plain skirt-board, to rest on two chairs, one with folding standard and one with its own burner and sleeveboard costing about $15 to $20. Such a board is most suitable for laboratory, but is too expensive to use with classes representing poorer homes.

In this day when so many machines and devices are used, it would be wise to choose washing machines that represent different principles, as well as to have machines that may be of service in rural homes where perhaps electricity is not possible. Oftentimes the manufacturers are glad to loan the machines for the instruction of the class, or they may send demonstrators to show the working of the machine or device. This is a co-operation between manufacturer and teacher which can be of service to both.

If the plan is to wash the clothes in one lesson and iron the next, the rough dry clothes will have to be stored for over night or more often for one week. Washable bags, each marked with the student's name, or individual lockers, about a cubic foot in size, each with its own key, will be found the most convenient, as well as the safest way to keep the clothes, the student being held responsible for her own locker. The instructor has a master key, so that supervision

is possible. These lockers should be ventilated by wire netting in the door.

A two-shelved supply table on a wheeled truck will be found of the greatest value for the collecting and replacing of supplies and small equipment.

The storage of equipment should be given great consideration on the part of the teacher. The most satisfactory way will be literally to build the closet around the equipment. Folding skirt boards may be stood on end in a closet built especially for them. In this same closet above the ironing boards there may be two shelves for sleeve boards. A closet may be shelved so that wash-boards may stand on the shelves book fashion. The same sized closet that takes the skirt boards and sleeve boards will hold three tiers of wash-boards. It is best that all this equipment be kept in closed closets so that it will be clean and ready for use. In this storage room there may be tiers of drawers, one tier of deep drawers for the storage of new material, and a tier of shallower drawers for ironing-board covers, for ironing pads and iron holders.

From the outlines of lessons given in this book a teacher may combine her lessons in any way she wishes, but it should be her thought to combine various articles to be washed to illustrate the principle of the lesson. For instance, if there must be cutting down of work, because of limited number of lessons or shortness of hours, it would seem best to thoroughly impress the fact that alkalis yellow or dissolve wool, that boiling shrinks it, by performing these tests, or having the students do it individually if possible; and then for the practical work use two garments which represent the knitted and woven type like a shawl or a sweater, and a petticoat or a shirtwaist. To carry the principle further, one of these garments might be white and the other colored. In the

same way starching should be taught by laying stress upon the various kinds of starch, how to make and use the starch paste, and then choose two or three garments which would need different kinds of starching. For example, a man's collar or cuff, stiff starch; an apron for medium starching; and, for thin starching, some garment of sheer material, such as organdy, dimity, dotted swiss, and the like.

To introduce various kinds of soaps and blues, a different soap and blue could be used each lesson, having the students make individual observation as to the points which are to be brought out later when soaps and blues are used as the subject of a lesson. Suggest looking for variety of color, stickiness, and for odor of soap; for blues, have them notice their solubility and color tint. All of these observations make a splendid preparation for any chemical work which is to follow.

Too much time can hardly be spent on stains and their removal. To remove various stains on different fabrics is an excellent laboratory lesson for work early in the course. It develops confidence for stain work which is constantly arising. It brings about a very close correlation of chemistry of cleansing and chemistry of textiles, and it also brings before the student in a practical way the economies of stain or dirt removal. It is this lesson which should be the practical illustration of the theoretical work which has preceded, concerning solvents, absorbents, detergents and bleaches as soil removers.

From the viewpoint of economy, some discussion should be introduced about the comparative time required for the ironing of plain versus elaborate garments; of the cost of doing by one's self as compared to the washer woman's rates, and commercial versus home laundry.

A second problem where economics and laundry should be

correlated is the comparison of cost of machine and of hand work in the home.

The equipment may be taught by having the students go to house-furnishing stores, collect various advertisements from magazines, or perhaps write to manufacturers for their printed material. The cost of equipment is clearly shown, and much can be learned concerning variety of principles of machines and their general utility. For classes of teachers, illustrated card catalogues may be worked up, which will be of great service in the new field of work. Such work also assists in making out the departmental budget.

RURAL WORK

The rural worker has many possibilities to help relieve the drudgery which has so long been considered a part of laundry work in the rural home.

Instead of the old-time wash-board method, simple and effective hand-washing machines might be suggested. Hand-washing machines have the great advantage of doing a larger quantity of soiled clothing in a given time than could be done if done on a wash-board. Instead of using the hand machine, it might be connected by a belt to a gasoline engine. Many of these engines are doing farm work, so why not apply two or three hours a week and help the housewife?

In homes where fuel is plentiful, the washing may be done by a washing device in the boiler. Start the clothes in cold water with soap and boil five minutes, rinse, blue and hang to dry. One good-sized boiler would take all the towels, bedding, and some body clothes. Perhaps nearly the whole washing of a small family, after the table linen has been washed, could be done in this way. While the boiler is heating the housewife may be doing something else.

Any wash tub can be piped to deliver soiled water, if by no other means than a hose reaching to an outside drain. It need not be attached other days than wash days. Some tubs have been well drained by boring a small hole in the side of the house, through which a hose is inserted from the outside. This hose conducts the water to the garden. It is no more work than putting on a hose for sprinkling the garden. If carried far enough away the water will irrigate the garden.

After the clothes are washed, roll flat pieces down when half dry to save sprinkling. In taking from the line, fold so there will be fewer creases to need ironing out. For six to eight dollars, a hand mangle can be bought, and with it one can press all the bedding and towels, table linen, knitted underwear without buttons, and stockings.

In regard to teaching aids for the rural worker, methods and general suggestions as found in the previous chapters of the laundry book, would apply alike to rural and city workers. The equipment facilities are the only differences between the rural and city problem. With the possibilities of purchasing by mail, even the remote rural housekeeper can increase her working facilities.

Some suggestions upon which rural teachers might lay emphasis are the following:

A study of stains and their removal; how to make good neutral soap; to make starch and use it to better advantage.

Various helps, such as a funnel washer: substitution of a home-made one by the fastening of a tin funnel on a shaved-down broom handle.

How colors can be set; how flannels can be kept from shrinking.

How to choose the materials for the clothing to save

money: to show economy by the much greater use of crêpe in underwear, night dresses, house dresses and pajamas.

Greater saving in steps and energy by the use of a better equipment; to teach saving by having all house furnishings of such material that they may be more easily cleaned.

Such talks as these would help in institutes and grange meetings. As important a topic as any to the county agent, is that she study ways and means to get water in and out of the kitchen, and the tactful method by which she may show to the farmer that a mechanical help in the kitchen for the wife is as good a farm investment as a new churn.

SUGGESTIVE OUTLINES

The following topics may help the teacher in outlining her work.

The practical work of the course should be varied to suit the needs of the neighborhood and should be adapted to the type of school and to the need of students. The lesson on dry cleaning may be omitted unless the teacher demonstrates. If this lesson is given, the fire laws of the town should be noted and every precaution urged.

The cost problem will often come spontaneously from a student appreciating, for the first, the physical stress of work. Wages, hours and labor will almost always follow in discussion.

I. Reasons for the course: for housekeeper; for personal use—economy, practice, cleanliness. The laundress, her appearance, duty, knowledge of purifying aids, types of soil, removal of stains, caution necessary in use of chemicals, methods of washing all garments, knowledge of various

fabrics and the effect of chemicals on same. Spotting and cleansing reagents and solutions made.

II. The laundry: cost and time problems of commercial *vs.* home laundries. The home laundry, including the type wall, floor, lighting and equipment. The care of the clothing while waiting to be washed and after ironing. Preparation of irons and boards for work.

III. Methods of laundering: including sorting, removing stains, washing, rinsing, bluing, starching, tinting, sprinkling and ironing. Water: kinds, methods of testing hardness, purifying, cleaning and softening.

IV. Soaps: kinds, quality, adulterants, making and economical use of; making soaps, soap jellies, detergents; bleaching fat and making alkali for soap recipe.

V. Blue: solubility, value, color, composition, use and abuse, removal of over-amount, the decomposition of blues and iron deposits on clothes.

VI. Starch: kinds—rice, wheat, corn—their relative value for stiffness and color; testing starches by microscope; cooking; the use of starch for glazing and making garment less absorbent. Recipes for making stiff starch, starch jelly, clear starch, cold starch; effect of starch on blue.

VII. Woolens in form of flannel; knitted and crocheted articles. The wool fiber; its reasons for shrinkage; the effect of friction; effect of change of temperature on fiber; methods of washing to prevent shrinking and stretching; use of frames; recipes for flannel washes.

VIII. Embroideries: care in washing various colors and kinds; method of washing, drying, and ironing. The effect of salt and of heat in preventing or promoting fading. The use of extra padding on boards and how pads may be made.

IX. Laces: including their washing, bleaching, making an ecru tint, basting to keep shape; pinning as a substitute

for ironing. Lingerie material, as jabots, collars, ties, stocks, embroidered waists; illustrate both embroidery and lace.

X. Colored goods: including ginghams, prints, cretonnes and stockings; the use of salt or acid; effect of heat and long soaking for fading; brightening of colors by salt or acid rinse, by tinting starch for plain colors; hanging in sun; use of starch or bran water in place of soap; use of starch substitutes for blacks or browns.

XI. Dry cleaning: meaning of term; wet cleaning *vs.* dry; care in use, storing and buying of gasoline; fire laws; necessity of great care in working away from all fire; working in open air; gasoline used as water as regards quantity and rinsing; use of cloth and brush; use of gasoline as a moth or vermin exterminator; removal of odor by warmth.

XII. Disinfecting clothing by bichloride of mercury, Platt's Chloride, formaldehyde, burning sulphur, utensils to use; care in preparation and isolation from the household.

XIII. Bleaching: its use and abuse; methods, materials used; destroying chemical action after bleaching is complete.

LESSON OUTLINE No. I

Sixth Grade, Seventh Grade, or Eighth Grade

Time: 4 lessons, 1½ hours each.

Lesson 1.

Discussion on clean clothes.

Why necessary.
How obtained.
Effect of boiling.
sunning.
ironing.

Discussion on soap.
Why and how it cleans.
How to economize its use.
Practical work: Make soap from kitchen grease.
Make soap solution from scraps of left-over soap.
Remove stains: coffee, egg, cocoa, grease.

Lesson 2.
Discussion on fibers.
Practical work: Wash towels or napkins (alternate these for lesson in folding).

Lesson 3.
Discussion on starch and starching.
Practical work: Iron towel or napkin.
Wash and starch apron or petticoat (alternate).

Lesson 4.
Discussion on wool fiber.
Practical work: Iron petticoat or apron.
Wash woolen garment, mittens, or
gloves, or
stockings, or
sweater for class.

LESSON OUTLINE No. II

6 lessons, 3 hours each.

Lesson 1.
Methods of washing.
Making solutions.
Stains—their removal.
Wash tablecloth; fringed napkins; napkin.

Lesson 2.
Iron unstarched goods.
Wash starched goods.
Make starch.
Wash one of three pieces: Corset cover, apron, skirt.

Lesson 3.
Iron starched goods.
Wash tailored shirtwaist; collars.

Lesson 4.
Iron tailored waist; collars.
Wash knitted or crocheted piece.

Lesson 5.
Wash lingerie waist.
Clear starching.
Wash embroidery; lace.
Finish lesson of day.

Lesson 6.
Wash flannels; colored goods.
Finish flannels; colored goods.

LESSON OUTLINE No. III

16 lessons, 3 hours each.

One-third lectures and two-thirds practical work.

Lesson 1.
Lecture: General outline.
Study. Prepare equipment.

Lesson 2.
Lecture: History of development of laundry.
Foreign methods. Stereopticon lectures.
Reasons for laundry.

Lesson 3.
Lecture: Cleansing reagents.
Practical work: Making cleansing solutions.

Lesson 4.
Lecture: Effect of chemicals on fibers.
Stains. Removal.
Practical work: Removal of stains.

Lesson 5.
Lecture: Equipment, various machines.
Practical work: Stains and spotting.

Lesson 6.
Lecture: Methods of washing.
Practical work: Washing table linen, bed linen.

Lesson 7.
Lecture: Methods of washing reviewed.
Starch. Starching.
Practical work: Washing drawers, corset covers.
Ironing table linen, bed linen.

Lesson 8.
Lecture: Methods of ironing starched clothes.
Irons.
Practical work: Washing nightgowns, aprons.
Ironing drawers, corset covers.

Lesson 9.
Lecture: Soap. Analysis.
Practical work: Wash petticoat.
Iron nightgown, apron.

Lesson 10.
Visit commercial laundry.

Lesson 11.
Lecture: Stiff starching.
Practical work: Wash tailored waist, lingerie.
Iron petticoat.

Lesson 12.
Lecture: Blues. Analysis.
Practical work: Clear starch lingerie waist.

Lesson 13.
Lecture: Wool, silk fibers.
Practical work: Wash woolen,
knitted.
woven.
Press garments in lesson.

Lesson 14.
Lecture: Washing laces, colored clothes.
Practical work: Wash and finish garments of the lesson.

Lesson 15.
Special problems, representing review.

Lesson 16.
Cleaning laundry equipment.
Review.
Examination.

BIBLIOGRAPHY

I. METHODS—FOREIGN.

"Daily Life in Italy." *Journal of Home Economics*, February, 1911.

"Along French By-Ways." Clifton Johnson.

"Open Air Wash Days." *The Craftsman*, June, 1906.

"Modern Sanitation." Standard Mfg. Co., Pittsburgh, Pa. January, June, 1909; May, October, 1910; February, June, 1912.

II. CHEMISTRY.

"Dictionary of Applied Chemistry," Vol. IV. Thorpe.

"International Chemical Encyclopedia."

"The Science of Laundry Work." Margaret C. Rankin.

"Household Chemistry." Vulté and Goodell.

"Removal of Stains from Clothing and Other Textiles." Farmers' Bulletin 861, U. S. Department of Agriculture.

"Soap Manufacture." W. L. Gadd.

III. TEXTILES.

"Methods of Textile Chemistry." Frederick Dannerth.

"Textile Fibres." J. Merritt Matthews. Woolman and McGowan.

Hints on "Choosing Textiles." Cornell Reading Course.

"Cottons and Linens." E. B. Thompson.

IV. TEXT-BOOKS.

"The Art of Laundry Work." Margaret C. Rankin.

"The Science of Laundry Work." Margaret C. Rankin.

"Laundry Work." Juniata Sheppard.

"Approved Methods for Home Laundering." Mary Vail. Proctor and Gamble, Cincinnati, Ohio.

"Dry Cleaning, Scouring and Dyeing." William T. Brannt.

"Foods and Household Management." Kinne and Cooley.

"Laundry Work." E. L. Marsh.

"The Laundry." Flora Rose. Cornell Reading Course.

"Simple Directions for the Laundress." Caroline R. Wadhams.

"A Guide to Laundry Work." Mary D. Chambers.

"Handbook of Cleaning." Sara McLeod.

"The Home and The Family." Kinne and Cooley.

V. EQUIPMENT—DOMESTIC.

"Equipment for Teaching Domestic Science," Chap. IV. Helen Kinne.

"Machinery for Women." L. R. Balderston in *Good Housekeeping*, October, 1913.

"Cost of a Home Laundry." E. R. Peyser in *Good Housekeeping*, February, 1912.

VI. EQUIPMENT—INSTITUTIONAL.

"Equipment for the Small Institutional Laundry." Clara O. Noyes, *Journal of Home Economics*, November, 1910.

"The Launderer." D. H. Benjamin. Starchroom Pub. Co., Cincinnati, Ohio.

VII. MARKING.

"Methods of Marking Linen for Home and Institution." L. A. Parker in *Household Arts Review*, Teachers College, New York, November, 1910.

VIII. MANAGEMENT OF INSTITUTIONS.

"Laundry Accounts." L. J. Liversey.

"The Small Hospital Laundry." Clara Noyes in *American Journal of Nursing*, Volume VI.

"Municipal Laundry Problem." D. B. Armstrong, M.D., *Journal of Home Economics*, July, 1916.

IX. WAGES.

"Women Laundry Workers in New York." S. A. Clark and E. Wyatt, in *McClure's Magazine*, February, 1911.

"Report on Condition of Women and Children Wage-Earners in U. S." Charles P. Neill, Com. of Labor, in Employment of Women in Laundries, Vol. XII.

X. MAGAZINES.

Suds. Syracuse Chemical Company.

American Laundry Journal, Troy, N. Y.

Starch Room Laundry Journal, Cincinnati, Ohio.

American Outlook. American Laundry Machinery Co.

Good Housekeeping. September, November, and January, 1916.

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