Laundry Hygiene

BACTERIA can remain alive on fabrics a long time. *Staphylococcus* ("staph") can live on wool blankets for 18 weeks and on muslin sheets for 12 weeks.

Contaminated clothing and household textiles thus can become carriers of disease-producing micro-organisms.

Micro-organisms—microbes—include bacteria (examples: *Staphylococcus, Pseudomonas);* viruses (examples: influenza, poliomyelitis); fungi (examples: those causing mildew and ringworm); protozoa (examples: those causing amebic dysentery and malaria).

Used clothing and textiles often contain large numbers of microbes. We have isolated as many as 5 million bacteria per square inch from the underarm parts of a T-shirt, and 53 million bacteria and 900 thousand fungi per square inch from a washcloth.

Even at the end of the spin-dry cycle of home laundering, the fabric may contain 25 thousand bacteria per square inch.

Many of these microbes are harmless, but some are harmful: *Staphylococcus aureus,* for example, can cause skin lesions (boils), pneumonia, or kidney infections. *Pseudomonas* also can cause skin infections (green pus producer), infections of the middle ear, and kidney infections. Paracolon bacteria can cause intestinal infections.

Whenever beds are made, towels are used, clothing is put on or taken off, and dirty clothes are sorted in the laundry, the fabrics are shaken enough to release microbes from them into the air. The microbes may then settle on other surfaces or may enter the body through the nose or through breaks in the skin.

Bacteria from one article may be transferred to another article during laundering. Harmful types that are present on the clothing or bedding of one person may be deposited on the clothing or bedding of another person.

Many bacteria can remain alive on the inner surface of the washing machine for at least 24 hours.

These are not, of course, the only ways in which microbes are spread. They do form one link in a chain of ways. If this one link can be broken, the whole chain is weaker.

IF WE HAVE ever thought about the problem of microbes in fabrics, most of us have probably assumed that laundering would solve the problem.

In former days it probably did, because many people used very hot wash water, and heat is one of the best ways to destroy micro-organisms. They sometimes even boiled the clothes, especially if there was sickness in the family.

But most people now use wash water at much lower temperatures. The average in home-type laundering in the United States is now 125° to 130° F. That is lower than the 160° to 180° used by commercial and institutional laundries and very much lower than boiling (212°).

A factor often overlooked in home laundering is the drop in temperature between the hot water tank and the washing machines and after several wash loads.

Most machines also have a warm-water setting, which delivers water at approximately body temperature and is used oftenest when the wash includes manmade fibers or certain dyed fabrics.

Furthermore, cold-water laundering has been introduced, in which special detergents are used. Water is used as it comes from the cold-water tap; the temperature could be 35° to 85°.

Why do people use these lower tem-

DISINFECTANTS FOR USE DURING LAUNDERING

Type	*Examples* of available products*	*To be used in—*	*Amount to be used*	*Active ingredients*
Chlorine (hypochlorite)	Clorox. Fyne-Tex Liquid Bleach. King Liquid Bleach. Purex Liquid Bleach.	Wash cycle.	As directed on label for bleaching. Usually: Front loading machines—4 oz. Top loading machines—8 oz.	Should contain 5.25% sodium hypochlorite. (Cannot be used on silk, wool, spandex, and certain dyed fabrics.)
Phenolic	Al-Pine. Pine-Sol.	Either wash or rinse cycle.	Front loading machines—5 oz. Top loading machines—8 oz.	3% orthobenzyl para chlorophenol or 3% chloro-o-phenylphenol.
Pine oil	Fyne-Tex. King Pine. Pine-O-Pine. White Cap.	Either wash or rinse cycle.	Front loading machines—4 oz. Top loading machines—6 oz.	Product must contain at least 80 percent pine oil.
Quaternary	Co-op Sanitizer. Roccal.	Rinse cycle.	Front loading machines—3 oz. Top loading machines—4 oz.	10% solution of alkyldimethylbenzyl ammonium chloride.

*Trade names are used in this publication solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the United States Department of Agriculture or an endorsement over products not mentioned.

peratures for wash water? Probably there are many reasons. Some are lower fuel costs, possible danger to children of very hot water, the use of new fibers and finishes, and lack of facilities for boiling clothes.

At any rate, whatever the reasons and however valid they may be, the use of lower laundering temperatures is an established practice in home management. In a program of household hygiene we cannot depend therefore on heat to control the problem of microbes in home-type laundering.

Another change is the greater use of coin-operated washing machines. Or, to put it another way, many of us use each other's laundry facilities. Since some microbes remain alive on the inside of the machines and since we do not use water that is hot enough to kill them, they can be transferred from the laundry of one family to the laundry of another family.

You cannot depend on the dryer to kill all bacteria that are still alive in the clothing. Some things are removed before they are really dry—to avoid wrinkling, perhaps, or because the timer on the dryer has stopped the machine, and all articles are removed, even though some are not dry. Dryers do, however, reduce the numbers of bacteria.

During drying, many bacteria are released from the fabrics, and the air movements force them out of the machine. Dryers therefore should be vented to the outside to prevent this atomizing of the bacteria back into the room.

We are asked about the effectiveness of outdoor line drying. Ultraviolet light has germicidal activity, but the amounts of it in the atmosphere vary in different parts of the country and may be reduced by clouds, smog, and smoke.

I have noted a considerable interest in making fabrics "self-sanitizing" or "resistant to microbes." This is also called "residual" disinfection, because if fabrics are soaked in solutions containing certain disinfectants,

some of the disinfectant clings to the fibers even after drying and is therefore a residue.

When the fabrics are wet again, some of the disinfectant washes off and kills some of the microbes with which it comes in contact.

Such products often are used in the final rinse of diaper laundering to aid in the control of diaper rash. They have been used also on bedding and clothing of bedridden patients to aid in the prevention of bedsores.

Cloth that is to be made into tents, awnings, sails, and such often is treated with disinfectants to prevent rotting by fungi.

Considerable moisture is present under the special in-use conditions I mentioned (urine, perspiration, rain). Blankets and certain articles of clothing that have been treated with disinfectants can be bought.

Final judgment as to the usefulness of such treated articles under the relatively dry conditions of normal use must await further research and improved test procedures.

I should emphasize, however, that treated fabrics are not the solution to the problem of laundry hygiene. When disinfectants were added in the rinse cycle during in-use experiments on home laundering, a residue was left on the fabrics. When the clothes were used and laundered again, there was no discernible reduction in the number of bacteria found on them.

Research, carried out under in-use conditions, has demonstrated that the most effective solution to the problem is to add a sufficient amount of a suitable disinfectant directly to the wash water or the rinse water.

To be suitable for use in home laundering, a disinfectant must not discolor or injure the fabrics; it must not leave a residue on the fabrics that is toxic to the user or wearer; it must not leave a disagreeable odor on the fabrics; it must kill many kinds of microbes; it must be available on the consumer market; and the cost must not be prohibitive.

These four types of disinfectants have been found to be effective: Chlorine (hypochlorite), phenolic, pine oil, and quaternary.

I summarize examples of products available on the consumer market, their active ingredients, and suggestions for use in a table on page 372.

It is important to read the label on the bottles in order to be sure of the name and amount of disinfectant in any product. To insure effectiveness, it is also important to measure the amount to be used.

Future research may, of course, demonstrate the effectiveness of still other types of disinfectants.

When used as directed during home laundering, the four types of disinfectants I list reduce the numbers of bacteria to a safe level. (ETHEL MCNEIL)

Removing Stains

USUALLY it is easier to remove fresh stains than old ones. Identify the stain, if possible, or determine whether it is a greasy stain, a nongreasy stain, or a combination of the two.

The kind of stain remover you select should not harm the fabric on which you use it. Test the stain remover on a sample of the material or on a seam allowance, hem, the inside of a pocket, or the tail of a blouse or shirt.

Absorbent powders, such as cornstarch, cornmeal, talc, and powdered chalk, are used to remove some fresh stains, such as spattered grease. Spread the powder over the stain before it dries. Then remove it, as it absorbs the stain, by shaking or brushing.

Other absorbent materials, such as