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DEPARTMENT OF COMMERCE
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Letter
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TREATMENTS FOR SILK STOCKINGS

This letter circular has been prepared as an answer to inquiries about treatments for silk stockings to make them last longer. The results of experiments in which stockings were treated with aluminum sulphate and soap, reported in the January 1935 issue of the Journal of Research of the National Bureau of Standards, have received wide publicity in newspapers and radio news broadcasts. The method of applying the treatment and the results obtained with it are described below. A full account of the experiments is given in Research Paper RP753 which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., for five cents a copy. (Stamps not accepted).

Hosiery manufacturers apply a variety of materials to stockings to improve their appearance and performance. Preparations for use in the home which are alleged to make stockings last longer, run-proof, resistant to the formation of runs, water-proof, water repellent, spot-proof, or resistant to spotting, have been offered for sale to the public for a good many years. The compositions of these materials are for the most part trade secrets.

The meagerness of the available information is indicated by the following statement quoted from the Textile World Vol. 80, p. 3006-7, Nov. 28, 1931,....."There are several of these products on the market. One in particular is a mixture of albumen and powdered glucose. It is dissolved in water and is added to the last rinse bath or the finishing bath. The theory is that the adhesive nature of the albumen will prevent the threads from pulling out and running, and that the powdered glucose will offset the harshness and stiffness caused by the albumen.

"Some department stores sell compounds which, as near as we can find out, are mixtures of soap and metasilicate of soda. Just how these will prevent runs we are not aware, unless they soften the silk to such an extent that it becomes one sticky mass and cannot run.

"Other products are mixtures of glue, gelatin, etc. These bind the filaments of the stocking together so that they are not easily broken or pulled apart. Their chief virtue is not in preventing runs, but in keeping the stocking from becoming scratched and the threads pulled when the goods are being handled in the finishing room."

Some of the materials for treating hosiery have been patented.

References to patents can be obtained by consulting the "Official Gazette of the United States Patent Office" or the indices to "Chemical Abstracts", which are available in many libraries.

Alum and other salts of aluminum have been used for giving water repellent finishes to textiles, and for treating hosiery both in the course of manufacture and in the home. The procedure given below is taken from page 271 of "Practical Everyday Chemistry" by H. Bennett, (Chemical Publishing Co., New York City.) Alum and perhaps aluminum sulphate can be obtained from drug stores.

"Silk stockings may be protected against runs by washing them as usual in soap, squeezing them as dry as possible, and afterwards rinsing them in 1/2 to 1% alum solution. It is immaterial whether the aluminum salt used is potash or ammonia alum or aluminum sulphate".

An aluminum-soap treatment of this kind was given to stockings in some experiments at the National Bureau of Standards. The procedure used was as follows: the stockings were laundered with a good grade of white chip soap and tepid water, well rinsed to remove the soap, immersed for 30 minutes in a solution containing 2 teaspoonfuls of aluminum sulphate in 1/2 pint of water (enough for 2 stockings), dried at room temperature, and then washed as before in the soap solution, rinsed, and dried. The aluminum sulphate solution and the soap solution were warm (100°F), not hot.

Stockings treated in this way and similar untreated stockings were tested on the Bureau's hosiery testing machine along with other stockings with and without commercial finishes. The object of the experiments was to find out whether the physical characteristics of stockings which are evaluated with the machine are affected by hosiery finishing treatments. The characteristics in question are the

ability of the upper part of the stocking to be distended, to recover its shape and not become baggy when distended repeatedly, and to withstand repeated distension without developing holes or runs.

Some of the finishes decreased the distensibility, elasticity, and resistance to failure of the stockings when repeatedly distended. Others, including the aluminum-soap treatment described above, had the opposite effect and so far as these characteristics are concerned may be considered beneficial.

No study was made of the effect of the aluminum-soap treatment on abrasive wear like that which occurs at the toe and heel of stockings in use, effect on colors, or on tendency to snag. It may tend to cement the filaments in the silk yarn together, and increase resistance to snagging of stockings made with low twist yarns. The treatment will not prevent runs. It will make the fabric water repellent and therefor resistant to spotting. The tests made at the bureau indicate that it will improve the distensibility and elasticity of some silk stockings.

