A study of the selection, care and wearing qualities of silk hosiery
by Vivian Baker

A thesis Submitted to the Graduate Committee in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE IN HOME ECONOMICS
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Abstract:
Information gathered from the fifteen stores that sold women'S silk hosiery, showed that in all thirty-four different brands were carried and from one to five kinds within a brand might be purchased.

The prices ranged from thirty cents to five dollars per pair. The sales-people thought their customers were influenced most by price and color, but the majority of women also considered weight, smoothness, evenness of weave, shape and the placing of reinforcements. They reported that interest was shown in the materials used, the women preferring silk to rayon in the leg of hosiery, but divided in their preference for silk or cotton hems. Half of the stores believed that a silk foot was most popular, while the other half thought little attention was paid to materials used in the feet. They thought most women asked about wearing qualities of hose and that this influenced their selection. It was interesting to note that the sales-people stated that women were buying hose in the longest lengths of leg.

Personal interviews with a large number of women in the community furnished some valuable information about their methods of Selecting hosiery, their ways of caring for hosiery and their opinions about its wearing quality. Two hundred and fifty women were interviewed, the group consisting of 54 students, 25 clerks and stenographers, 28 teachers, 100 town homemakers and 42 rural homemakers. In Table I, it will be seen that these women were forty-seven brands of silk and rayon hosiery. The trade-marked, names of these brands are not included in this Study but they will be disignated by Roman numerals. The number of women wearing the Various weights in these brands, and the price paid per pair are also shown in Table I.

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A STUDY OF THE SELECTION, CARE AND WEARING QUALITIES OF SILK HOSIERY

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A STUDY OF THE SELECTION, CARE AND WEARING QUALITIES OF SILK HOSIERY.

INTRODUCTION

Silk hosiery is a very important item in the clothing purchases of today. Women have come to wear it more generally than cotton hosiery, for it has a more pleasing appearance, is more suitable to accompany the modern wardrobe, is more comfortable, and comes in a greater variety of colors. While its use brings great satisfaction, silk hosiery is, however, considered a rather expensive article of clothing, for the reason that the money spent for it does not seem to be compensated by the amount of wear received.

Very little is definitely known about the causes of the short life of silk hosiery. Whether it is due to various types of construction, composition, or to a lack of available information about the selection of hosiery, or to improper care in handling and laundering them, remains to be determined.

HISTORY

Women recognize the fact that there are many brands of silk hosiery from which to choose. To the average consumer, price is ordinarily thought to be the distinguishing mark of quality, and yet, a knowledge of construction is even more important. Very few seem to realize that a number of types may usually be found within a brand, and that each type has a different kind of construction.

The two extreme types of construction os silk hose are known as service weight and chiffon, with varying graduations between them. Service weight usually consists of a cotton welt or hem; a cotton foot; a high splice (the reinforcement above the heel) of silk plated with cotton; and a boot (or leg) made of heavy silk yarn. Chiffon weight has a silk hem; a silk foot and high splice; and the boot is made of a silk yarn of smaller diameter.

In addition to these, there are other points of construction that may vary, one of which is shape. Hose are made either full-fashioned or tubular. The former is knit in a flat piece with the leg and heel knit on one machine and the foot on another. The shaping is done by the dropping out of needles. Wherever these occur, marks appear in the knitting known as "fashion-marks". These are found in the back of the boot near the seam, sometimes near the welt, and in the heel and sole. The number and placing of these fashion-marks determine how well the hose will fit. Tubular hose are knit in one operation on a circular machine. They are shaped by cutting out sections from the tubular material.

One of the most important items in construction is the reinforcing of silk hosiery. Reinforcements differ in kind, amount, and placing. They may be of either silk or cotton and of a yarn of varying weights. Usually the high splice reinforcement is of silk or a very fine cotton yarn. The heel reinforcement is heavier; the sole, light weight; and the toe, light weight, except for a rectangular piece that is sometimes found over the center of the toe. This piece varies in weight in different types of hose. The space between the toe and sole reinforcements is taken care of in several ways. In the cradle

foot, the toe reinforcement slopes gradually to the sole, while in others, one or more rectangular reinforcements are placed there. These are supposed to protect the hose at points receiving hard wear but are not always correctly placed. A knowledge of types and placing of reinforcements is very essential in choosing hosiery which will give a desired amount of wear.

The twist of the yarn used in making hose is another significant point in construction. There is a question as to what amount of twist in the yarn will give the greatest satisfaction and wear. There are also different kinds of twists used for hosiery yarns. One recently adopted is called "dull twist", "grenadine" or "grenine" and is made by the twisting together of two yarns each of which has been previously twisted in opposite directions. This makes a more sheer appearance and is said to give more wear.

The gauge number may also vary in construction. "Gauge" refers to the number of needles per inch in the knitting bar, for instance, a 45-gauge machine has 30 needles per inch. The more needles, or the higher the gauge number, the finer will be the weave and more fabric will be included in the width of the leg. The gauge number may be determined by counting the length-wise ridges or wales on the right side of the knit material in an inch and one-half space crosswise. The number of courses per inch also seems to be an important factor in the knitting of hosiery. By "course" is meant the number of cross-wise loops counted lengthwise.

Hosiery differs in composition of yarn as well as in construction. It may be made from reeled silk (that which comes from and unbroken cocoon) or from spun silk (short broken fibers of vary-

ing diameters, taken from imperfect cocoons and spun together). A combination of fibers, such as rayon and silk, may also be used in hosiery yarns.

There are a number of methods employed in the preparation of hosiery for market, which make it difficult for the purchaser to distinguish a desirable article. One of these is boarding, which is a process of stretching the finished hose over a shaped board and steaming them. This is done to give the hose a neat appearance. However, if the board is narrow, the hose will measure longer than those stretched on a wide board. This necessitates that the purchaser shall compare the length and width in order to secure the size she desires. Also, she cannot be sure that the length of foot designated by the size number is the same in all brands without experimenting with them, as manufacturers have not yet established standard practices.

Sometimes it is even difficult to distinguish circular knit hosiery from the full-fashioned type because of mock seams and fashion marks.

Not only are construction and composition important factors to be considered in estimating the length of life of a pair of hose, but the method used in handling and laundering them is said to have an influence on the amount of wear received. Selling agencies, laundries, and clothing experts advocate special care in laundering silk hosiery. It is believed to last longer if it is laundered after each wearing with a mild soap and tepid water. Perspiration is probably harmful to silk hosiery if allowed to remain in it as it permits bacterial action that deteriorates the fibers. Also, in laundering, rubbing

and wringing weaken the silk yarn by placing too great a strain upon it. A suction motion of forcing water through the fibers is thought to be a better method of laundering silk hose. Since alkalies are harmful to animal fibers, a mild soap is suggested as a cleansing agent. Thorough rinsing is also necessary, followed by squeezing the fabric as dry as possible.

In all these considerations of silk hosiery, the manufacturer and consumer have shown especial interest in the appearance of the hosiery. Their construction and composition have been changed from time to time to meet the demands of fashion, but parallel with these, very little definite information has been given to the consumer regarding their durability. Rosamond Cook (1), of the University of Cincinnati, has made a study of hosiery advertising in which it is seen that out of the twenty-five hosiery advertisements selected, eighteen mentioned that the hose were made of silk; nine told that hosiery was full-fashioned; five described reinforcements (placing, not kind); three mentioned picot edge; two mentioned gauge but did not explain its meaning; one gave width of hem; and only three mentioned wearing qualities without naming the factor which made for service.

A few limited studies have been carried on with actual wearing tests in an attempt to find out the relative durability of different brands of hose. In an unpublished report of research conducted at Iowa State College, Grace Trumbo(2) compared the wearing qualities of silk and rayon hosiery. Nine brands were worn by members of the student body and faculty for a period of nine months, but the number of pairs of each brand was not stated. The wear and laundering were kept as uniform as possible, with the hose being rinsed after each

wearing and washed after three wearings, but the actual laundering process was performed by each individual. The condition of the hose was reported only once a month instead of after each wearing. The amount of experimentation done on wear did not seem to justify the conclusions drawn. However, the laboratory tests were very complete including: measurements, weights, thread count, yarn count, twist of yarn, crimp, bursting strength, and tests for the identification of silk and different types of rayon.

Another such study(3) was made on the wearing qualities of silk hosiery at the University of Chicago by Ruth Holmes for her Master's thesis, but is as yet unpublished.

The Dexdale Hosiery Company (4) thought it desirable to compare the wearing qualities of their "sealed" hosiery with "unsealed" hosiery by conducting an "on-the-foot" wearing test. One hundred girls at Wellesley College and one hundred at Radcliffe College were given three stockings apiece - one Dexdale "sealed" stocking and two "unsealed" ones. The "sealed" stocking was worn on one foot and an "unsealed" stocking on the other foot. The student wore these day after day, laundering them each night, and recording the number of hours each stocking was worn per day. The test continued until either the "sealed" stocking or both the "unsealed" stockings were worn out. However, with as little wear as even a hole in the toe, the stocking was discarded. This does not seem a practical estimate of the length of life of hose for the majority of women. Also this test was of a commercial nature rather than of an analytical type. The only laboratory

test made was of the tensile strength of the yarn.

Due to the uncertainty in the amount of wear which can be expected from silk hosiery, it is considered a rather expensive article in a woman's wardrobe. A study made of the clothing expenditures of college girls at Iowa State College (5), showed the amount spent for hose by those who had an average allowance for clothing of $280.13, to be $19.80 or 7.07%. The average of the ten lowest allowances for clothing was $57.49 of which 20.06%, or $11.65, was spent for hose. On this allowance, relatively more was spent for hose than for coats and dresses combined. Not only is hosiery an expensive article in a college girl's wardrobe, but women in general feel that it occupies too large a place in the clothing budget.

Thus it will be seen, that with all the existing brands of silk hosiery and the weights found in each brand, accompanied by their various types of construction and compostion, it is extremely difficult for the consumer to be discriminating in her purchase. Unfortunately, cost does not seem to indicate quality in silk hosiery. For the same price, one may get hosiery of different gauge numbers, different amounts and kinds of reinforcement, different qualities of silk and dyes. When it is further recalled that practidally no definite information, based on laboratory studies, is available about the care and relative wearing qualities of silk hose, a need for study along these lines is apparent, particularly in view of the fact that hosiery demands a large place in a woman's clothing budget.

EXPERIMENTAL PROCEDURE

Before starting the laboratory experiments to determine the construction, composition and wearing qualities of silk hosiery, it seemed advisable to consult with merchants, sales-people and consumers to find what brands were available in the community studied, and the general opinions about them.

Accordingly, the stores selling women's silk hosiery were visited and the manager or sales person interviewed. They were asked for the names of all brands of silk and rayon hose carried in stock, the weights and types of hose included in each brand and their selling prices. Inquiry was made as to the most popular style of hose sold by them, and the best wearing hose. Questions were also asked about the qualities of hose in which women seemed most interested.

Next, an attempt was made to interview as many women as possible and learn what brands of silk hosiery they purchased and the prices usually paid. They were asked to state what factors influenced their selection. In addition, they were questioned in detail about their methods of caring for silk hosiery, including laundering and drying. This was followed by questions, asking for the estimated number of pairs purchased per year, the places in the hose where wear first appeared, and the size of hose and shoes worn.

From the information thus obtained, it was decided to make a laboratory study of seven brands of silk hosiery that seemed to be very popular among the women questioned. As more than one weight within a brand was worn, the studies included twelve kinds of hose, (a) designating chiffon weight and (b, service weight.

The study was made up of two parts, standard laboratory textile tests and wearing tests.

From the laboratory tests were derived the specifications used in manufacturing the hose. These consisted of the following:

Measurements

a. Length of hose (7)

b. Length of foot (6)

c. Depth of hem

d. Width of hem, flat (top) (7)

e Width of hem, stretched (top) (7)

f. Width of leg, flat (top of fashion marks)

g. Width of leg, stretched (top of fashion marks)

h. Width of ankle, flat (narrowest place) (7)

i. Width of ankle, stretched (narrowest place (7)

Weights

a/ Weight per hose (unconditioned)

b. Weight of total silk per hose

c. Weight of total cotton per hose

d. Weight of 3 two-inch samples from outside of hem (8)

e. Weight of 3 two-inch samples from leg (taken two, twelve and eighteen inches down from bottom of hem (8).

f. Weight of 3 one-inch samples cut from heel

Details in Construction

a. Number of wales per inch (7)

b. Number of courses per inch (8)

c. Diameter of yarn (90

d. Twist count (Percision twist counter) (9)

e. Seam count (7)

f. Number of fashion marks

Determinations of Strength

a. Bursting strength (Mullen Tester)

b. Breaking strength (Scott Tester) (8)

Chemical Tests

a. Compositon of fiber (Lowe's solution) (9)

The wearing tests were conducted to determine the relative durability of silk hose under actual wearing conditions. For this, thirty women were secured to act as experimental subjects. Each woman was assigned five pairs of hose of different kinds to be furnished her in daily rotation. A white linen tape bearing the wearer's name and the number given to the pair, was sewed into the top of each stocking. A loop of white thread was placed in the top of one stocking to indicate that it should be worn on the right foot.

One pair of hose was delivered to each wearer per day. It was placed in a small manila paper bag, with a slip attached to it by a paper clip. On the slip the wearer recorded the date; the time when the hose was put on and when taken off; the amount of walking, usual, more or less than usual; and the kind of a shoe worn - pump, light oxford, or low-heeled oxford.

Each pair of hose was collected, after one day's wear, to be laundered. For this process, an aluminum hand washer with a suction cup plunger was used. Fig. 1. Into this was poured six quarts of warm

Fig. 1. Two views of machine used in laundering silk hosiery

water at a temperature of 110°F. and 15 grams of Ivory soap flakes were thoroughly dissolved in it. Ten pairs of hose were washed at one time. Fifty strokes of the plunger were used for washing, then the hose were squeezed by hand and freed from soapy water. The hose were rinsed twice, each time in six quarts of water at 110°F. with fifty strokes of the plunger. In both cases they were squeezed to remove water. Each hose was then stretched slightly lengthwise and along the foot, hung over a soft cotton line by the top, with just the hem hanging over, and allowed to dry in a warm basement room.

After laundering, the hose were inspected with a darning ball for holes, and were mended if the holes were in the foot or in the upper part of the leg where they would not be visible. All wear was recorded. The loops of white thread were changed to the other hose in every pair to alternate the wear. They were then delivered to the wearers. When the hose showed visible wear, they were called worn out and were put aside to be examined at the end of the test and compared with new hose of the same kinds.

A drawing was obtained of each experimental subject's feet and questions were asked about foot troubles, such as corns, callouses and bunions, condition of the nails, kind and size of shoes worn with the tested hose, condition of shoe linings, kind and condition of hose supporters, degree of perspiration, body weight, and estimated usual amount of walking. Measurements were taken of the ankle, four inches above the heel; of the thigh, four inches above the knee cap; and of the leg, twelve inches above the heel.

From the opinions obtained from merchants and consumers, and

from laboratory studies of hose specifications and wearing tests, the following results were obtained.

RESULTS

Information gathered from the fifteen stores that sold women's silk hosiery, showed that in all thirty-four different brands were carried and from one to five kinds within a brand might be purchased. The prices ranged from thirty cents to five dollars per pair. The sales-people thought their customers were influenced most by price and color, but the majority of women also considered weight, smoothness, evenness of weave, shape and the placing of reinforcements. They reported that interest was shown in the materials used, the women preferring silk to rayon in the leg of hosiery, but divided in their preference for silk or cotton hems. Half of the stores believed that a silk foot was most popular, while the other half thought little attention was paid to materials used in the feet. They thought most women asked about wearing qualities of hose and that this influenced their selection. It was interesting to note that the sales-people stated that women were buying hose in the longest lengths of leg.

Personal interviews with a large number of women in the community furnished some valuable information about their methods of selecting hosiery, their ways of caring for hosiery and their opinions about its wearing quality. Two hundred and fifty women were interviewed, the group consisting of 54 students, 25 clerks and stenographers, 28 teachers, 100 town homemakers and 42 rural homemakers. In Table I, it will be seen that these women were forty-seven brands of silk and

rayon hosiery. The trade-marked names of these brands are not included in this study but they will be disignated by Roman numerals. The number of women wearing the various weights in these brands, and the price paid per pair are also shown in Table I.

TABLE I. NUMBER OF BRANDS OF SILK HOSIERY WORN BY WOMEN INTERVIEWED, GIVING NUMBER OF WEARERS FOR EACH WEIGHT IN BRAND AND THE PRICE PAID.

Brands of silk hosiery	No. of women wearing Service wgt.	Price per pair	No. of women wearing Semi-chiffon	Price per pair	No. of women wearing Chiffon	Price per pair
I	53	$1.50	44	$1.95	64	$1.95
II	37	1.95	25	1.95	37	1.95
III	25	1.95	14	1.95	11	1.95
IV	34	1.95	30	1.95	35	1.95
V	9	1.50	2	1.50	0	-
VI	17	.98	2	.98	2	.98
VII	23	1.50	5	1.50	7	1.50
VIII	13	1.50	8	1.95	14	1.95
IX	2	1.50	1	1.95	1	1.95
X*	6	1.00	-	-	-	-
XI	19	1.50	8	1.50	5	1.95
XII	2	1.95	-	-	-	-
XIII	3	1.95	-	-	-	-
XIV	1	1.25	-	-	-	-
XV	2	1.25	-	-	-	-
XVI	1	.85	-	-	-	-
XVII	2	.85	-	-	-	-
XVIII	1	1.00	-	-	-	-
XIX	1	1.95	3	1.95	4	1.95
XX	2	1.50	-	-	-	-
XXI	1	1.50	-	-	2	1.50
XXII	1	1.00	-	-	-	-
XXIII	1	1.50	-	-	-	-
XXIV	1	1.65	-	-	-	-
XXV	1	1.65	-	-	-	-
XXVI*	2.	.30	-	-	-	-
XXVII	1	.89	-	-	-	-
XXVIII	1	1.00	-	-	-	-
XXIX	12	1.95	9	1.95	9	1.95
XXX	1	?	-	-	-	-
XXXI	1	1.95	-	-	-	-
XXXII	1	1.50	-	-	1	1.95
XXXIII	1	1.50	-	-	1	1.95
XXXIV	1	1.00	1	1.49	-	-
XXXV	2	1.35	1	1.95	1	1.95
XXXVI	2	1.60	-	-	-	-
XXXVII	1	1.65	-	-	-	-
XXXVIII	1	1.45	-	-	-	-
XXXIX	2	1.00	-	-	-	-
XL	1	1.95	-	-	-	-
XLI	1	1.35	-	-	-	-

*- These hose are believed to be made of artificial silk