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Factors Relating to the Selection of Sewing Thread

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FACTORS RELATING TO THE SELECTION OF SEWING THREAD

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INTRODUCTION

The present study was undertaken in answer to frequent complaints by consumers concerning the quality of sewing thread. Although money expenditures for thread by individuals are usually small, satisfactory thread is important for durable products of good appearance. Thread of high quality is especially important at the present time for home construction, repairing, and remodeling of garments. If durable thread is used in the first place, less time is required for subsequent repairs.

In this investigation, a number of brands of 3-cord and 6-cord ordinary cotton thread, mercerized thread, heavy duty mercerized thread, and nylon thread were tested. These varieties of thread and the different brands of each variety were compared. A study was made of factors related to quality and of the reliability of labels.

THREADS TESTED

BUYING INFORMATION

Types and brands of thread.—Four types of thread were tested. These included eight brands of ordinary cotton sewing thread, four brands of mercerized cotton thread, two brands of heavy duty mercerized cotton thread, and one brand of nylon thread. Of the ordinary cotton sewing thread, threads 1 and 6 were manufactured by one company and threads 4 and 8 by another company. With these exceptions, each brand of the same type of thread was manufactured by a different company. An attempt was made to select both well-known brands and relatively little-known brands representing as wide a range of quality as possible. Both large and small manufacturers of domestic thread were represented.

Where purchased.—Thread was purchased at an independent department store, two chain department stores, and six variety stores in Columbus, Ohio, in December 1942 and January 1943. Some brands were available only in variety stores and chain department stores; others were available only in the independent department store. By buying at different types of stores, it was hoped to include the brands of thread that varied types of consumers might purchase.

Size.—In order to secure different types of thread in as nearly equivalent sizes as possible, size 50 was selected in so far as it was available.

Price.—An attempt was made to purchase thread representative of the prevailing price range. Prices per spool were $0.025, $0.04, and $0.05. Since the yardage per spool varied more than the price per spool, the range in price per unit of thread length was greater than the price per spool indicated.

Yardage.—If possible, 100-yard spools were purchased. Otherwise, it was necessary to buy spools holding a larger or smaller yardage.

Number of spools purchased.—The minimum number of spools and total yardage were determined by the sampling requirements for various tests. A minimum of 10 spools of white thread of each type was purchased, regardless of yardage per spool. If this yardage fell below 100, sufficient additional spools were purchased to supply a total of at least 1000 yards; thus 20 spools of mercerized cotton thread 9 and of dull nylon were purchased. Only seven spools of bright white nylon were available. At least one spool, and a minimum of 100 yards, was purchased in black and in each color.

Colors.—White thread was purchased for all tests except those of colorfastness. For testing the colorfastness of ordinary cotton sewing thread, black thread was obtained. For testing the colorfastness of the other types of thread, black, brown, navy, medium blue, yellow, red, and green were purchased. These colors were chosen to represent the more common hues at as high an intensity and as near middle value as possible. An attempt was made to secure approximately the same colors in the various types of thread, but it was not possible to match them exactly, except in one color of threads 10 and 13 and three colors of threads 11 and 14.

Appearance and texture.—Depending on the type of finish, cotton thread is classed as soft or dull; silk finish (polished, hard, or glacé); or mercerized. The 6-cord threads numbers 6, 7, and 8 and black 3-cord thread number 4 were soft or dull finished. These threads were probably " treated with a sufficient amount of softening to give good slippage qualities and to overcome the harshness caused by the removal of the natural oils from cotton in the bleaching and dyeing processes." (2) Of these soft finished threads, number 8 was the roughest, number 7 was second in roughness, and numbers 4 (black) and 6 were moderately rough. For the most part, the 3-cord threads appeared to have a silk finish, because they were lustrous and had a smooth, hard texture. "To obtain a 'silk-finish' thread, a special solution is applied to lay the projecting fuzz into the body of the thread and then polished. The polishing process works the solution into the thread and gives it a good luster and general smoothness." (2)

The mercerized cotton, heavy duty mercerized cotton, and nylon threads were relatively smooth and lustrous. Nylon thread number 15 was delustered, but nylon thread number 16 was bright.

INFORMATION ON LABELS

The type of thread was mentioned on the labels of three of the eight brands of ordinary cotton sewing thread and on all of the brands of mercerized cotton, heavy duty mercerized cotton, and nylon thread. Either the brand name or the manufacturer's name was given on every label. Ordinary cotton sewing thread and mercerized cotton thread were sold under either the brand or manufacturer's name, but the heavy duty mercerized cotton and the nylon thread were sold entirely by the manufacturer's name. The name of the manufacturer failed to appear on the spool of only three brands of ordinary cotton sewing thread.

The yardage per spool ranged from 50, in the case of nylon and one brand of mercerized cotton, to 175 in the case of ordinary cotton sewing thread. The yardage was stated on the label in every case. The thread size was marked on all thread except mercerized thread number 9 and the two heavy duty mercerized cotton threads. Size A was given instead of numerical size in the

case of mercerized cotton thread number 11. The size of the nylon thread was given as 56-3, meaning that the thread was composed of three cords, each of which was 56 denier.

The number of cords was given on the labels of all but two of the ordinary cotton sewing threads but not on any of the other types of thread. Both of the ordinary cotton sewing threads that were not labeled in this respect were found, upon test, to be of 3-cord construction.

Labels indicating fast color were found on all but black, green, and brown spools of thread number 9, and a statement claiming fastness to boiling was on all other mercerized cotton thread (except navy of thread number 11) and on heavy duty mercerized cotton thread. No ordinary black cotton sewing thread and no colors of nylon thread were labeled colorfast.

Other statements on labels indicated general quality and recommended use. Statements of quality included "extra quality" (number 2), "99 ¾ % knotless" (number 5), and "extra strong" (number 13). Recommended uses included "for hand and machine sewing" (number 7) and "for all sewing needs" (number 15). The name of the manufacturer of the fiber was given in the case of nylon thread.

METHODS OF TEST

GENERAL

In preparing samples, the cut ends of the thread were held to prevent untwisting. White thread was used for all tests except that of colorfastness. Tests requiring constant temperature and humidity were conducted at 70°±2° F. and 65%±2% relative humidity.

PRICE PER 1000 YARDS

Two factors complicated the comparison of the price of different kinds of thread—the wide variation in the yardage per spool and the low price per spool. To overcome these difficulties, the price per 1000 yards was calculated. On the basis of this length of thread, differences in price became large enough to be meaningful. The yardage given on the spool was used as the basis of calculations.

THREAD CONSTRUCTION

A length of thread was removed from a spool and untwisted. The number of single yarns or cords used and the way in which the cords were combined were noted. The direction of twist of singles, plies, and cables was designated as either "S" or "Z" twist.

EQUIVALENT SINGLE NUMBER

Size of thread was determined and expressed as equivalent single number on the typp basis. Under the typp system, fineness of yarns is indicated by the number of thousands of yards per pound. Each sample consisted of 10 yards of thread, one yard having been taken from each of 10 spools. Three such samples of each kind of thread were weighed on an analytical balance under conditions of constant temperature and humidity. From the average weight of these samples, the equivalent single number on the typp system was calculated.

TWIST

Twist was determined at constant temperature and humidity by the method of manually applied tension and dead-weight control of the American Society for Testing Materials (1). A Suter Precision Twist Tester was used. After determining turns in the cable and plied thread, all plies but one were cut away, and the twist in singles was determined. Three tests were made on each of 10 spools. The average of these 30 counts was taken as the average twist of the thread.

BALANCE OF TWIST

Balance was tested by the American Society for Testing Materials method (1). As the tendency to twist varied noticeably, it was decided that a count of the twists might indicate degree of balance. This was not, however, a part of the standard method of test. The number of complete twists was counted and recorded. One such count was made on each of 10 spools of each kind of thread. The average of these 10 counts was then calculated. This test was carried out at room temperature.

BREAKING STRENGTH AND ELONGATION OF THREAD

The breaking strength was determined by the single strand method of the American Society for Testing Materials (1). Tests were conducted at constant temperature and humidity on a Scott tester, model x-5, with a 5-pound capacity. Tests were made on four samples from each of 10 spools. The average of the 40 determinations was taken as the breaking strength of the thread. Data on thread strength were evaluated by the analysis of variance and the t test (3). Elongation at break was determined in connection with breaking strength tests. Average elongation was expressed in terms of per cent.

SEAM STRENGTH

For tests of seam strength, the same fabric was used throughout. A boat sail drill was chosen to insure having a fabric which would be stronger than the seam. To provide samples with a seam at the center, the fabric was cut into strips 3.5 inches by 12 inches, with the 12-inch distance running fillingwise. These strips were paired so that the adjacent 12-inch edges could be seamed. Ten pairs of strips were seamed with each kind of white thread. Each pair of strips was seamed with thread from a different spool, except in the case of thread number 16, of which there were only seven spools.

Seams were made on an electric sewing machine. The tension was well adjusted, and the length of stitch was set to give 14 stitches per inch. A uniformly moderate speed was used. With the aid of a cloth guide, plain seams were made ½ inch in from the edge and parallel with the filling. After stitching, the seams were pressed open with an iron.

Each seamed strip was cut apart to give three samples 4 inches by 6 inches with the long dimension running warpwise. The strength of the seams in these samples was then tested by the grab strength method of the American Society for Testing Materials (1). Tests were conducted under conditions of constant temperature and humidity. A model J_1 Scott tester was used. The average of 30 tests was taken as the seam strength for each type of thread. Data on seam strength were evaluated by analysis of variance and the t test (3).

RUNNING QUALITY

To obtain an indication of how satisfactory the different threads were for machine sewing, seams were made on four types of fabrics. The fabrics were selected to represent fiber compositions likely to be used with each type of thread. They included cotton percale, wool gabardine, viscose rayon French crepe, and cellulose acetate rayon "Sharkskin." An attempt was made to select plain weave fabrics of moderate weight woven from simple single yarns, but no suitable plain weave, all-wool fabric was available.

Ordinary cotton sewing thread, mercerized cotton thread, and heavy duty mercerized cotton thread were used on percale. Mercerized cotton thread, heavy duty mercerized cotton thread, and nylon thread were used on gabardine, French crepe, and "Sharkskin." With each kind of thread, three seams one yard long were made on each specified type of fabric. Each of the three seams was stitched from a different spool of thread. Strips of fabric 6 inches by 36 inches were cut with the long dimension running warpwise. Using a cloth guide, two adjacent strips were sewed together in a plain seam with stitching ½ inch from the edge. An electric sewing machine was used. The tension on the thread was good, and the stitch was adjusted to give 14 stitches per inch (1). All seams were made by one person, and a uniformly moderate speed was used. The running quality of each thread was noted with respect to tendency to split or separate, rough up, break, and stretch. One kind of thread was used on the various fabrics before proceeding to the use of another kind of thread.

SUITABILITY FOR HAND SEWING

To gain an idea of the suitability of each kind of thread for hand sewing, hems were made by hand. For this purpose, the same fabrics were used with the same threads as in the test of running quality. Three samples of each fabric were hemmed with each of the specified types of thread. Samples 8 inches by 21 inches were cut with the long direction running fillingwise of the fabric. A 1-inch hem was pinned and basted on a long edge of each sample. A hem was then made using the slip stitch with stitches about ¼ inch long. For this purpose, a 24-inch length of thread and a size 9 needle were used. On each fabric, one hem was made with one length of thread from each of three spools of each kind of thread. The needle was threaded from the cut end of the thread as it lay on the spool. A single thread with a knot at one end was used. One kind of thread was used on the various fabrics before proceeding to the use of another kind of thread. Observations were made on the tendency of the thread to snarl or knot, and the tendency to separate at the needle or away from it.

COLORFASTNESS TO LAUNDERING

For tests of fastness of color to laundering, samples of fabric were stitched by hand with black and colored threads. For this purpose, cotton percale, wool gabardine, and cellulose acetate rayon "Sharkskin" were used. Percale was stitched with ordinary cotton sewing thread, mercerized cotton thread, and heavy duty mercerized cotton thread. Gabardine and "Sharkskin" were stitched with mercerized cotton thread, heavy duty mercerized cotton thread, and nylon thread. Samples 2 inches by 4 inches were cut with the long direction running warpwise. One yard of thread was applied to each sample by means of the running stitch in rows about 3/16 inch apart. The

samples were laundered by the American Society for Testing Materials methods of testing colorfastness of cottons, rayons, and wools to laundering (1), the choice of method depending on the fiber content of the fabric. Percale samples were laundered by the procedure for test number 2.

RESULTS

PRICE PER 1000 YARDS

The price per 1000 yards of ordinary cotton sewing thread varied from $0.25 to $0.50, but, in general, there was relatively little price variation for each of the other types of thread (see table 1). All of the mercerized cotton thread except one color of number 9 cost $0.50 per 1000 yards. All of the heavy duty mercerized cotton thread except three colors of number 13 cost $0.67 per 1000 yards. The nylon thread cost $1.00 per 1000 yards. Therefore, ordinary cotton sewing thread was usually the lowest in price, mercerized cotton thread was about equal in price to the highest priced ordinary cotton sewing thread, and heavy duty mercerized cotton thread and nylon thread followed in ascending order.

Contrary to what one might expect, the best-known brands of ordinary cotton sewing thread were not the most expensive. In fact, the most expensive threads were relatively little-known brands sold in variety stores on 100-yard spools. Brand and type of store seemed to have little relation to the price of other types of thread. However, a chain department store priced heavy duty mercerized cotton thread number 13 lower than did the variety stores or another chain department store.

THREAD CONSTRUCTION

Thread numbers 6, 7, and 8 were of 6-cord construction; all of the other threads were 3-cord. When yardage per spool was taken into consideration, 6-cord construction was not the most expensive.

All of the 3-cord threads were plied threads. Six-cord thread numbers 7 and 8 were of cable construction, three 2-ply yarns being combined to form the cable. One 6-cord thread (number 6) was made up of one 2-ply yarn combined with four singles.

The direction of twist in the plies was the opposite of that in the singles in all plied threads. All of the 3-cord threads were made from "S" twist singles doubled together with a "Z" twist, this being a standard type of construction. The 6-cord threads were made with hawser twist, "a construction in which the single and first ply twist are in the same direction and the second ply twist is in the opposite direction." (1) The singles and plies of these cabled threads were made with "Z" twist and the cables with "S" twist, to give a Z/Z/S construction.

EQUIVALENT SINGLE NUMBER

The nylon thread was much lighter in weight than the cotton threads. Mercerized cotton thread was slightly lighter and heavy duty thread was somewhat heavier than ordinary cotton sewing thread. Differences in size of different brands of threads of the same type were relatively small as compared with differences between types, except in the case of 3- and 6-cord ordinary cotton thread. The difference in equivalent single number would have some bearing in determining the choice of the type of thread to be used in a given way on a given fabric.

TABLE 1.—Physical characteristics of sewing thread

Type of thread	Thread number	Price per 1000 yards	Number of cords	Size equivalent single number	Number of twists per inch			Balance of twist	Breaking strength of thread	Elongation of thread	Breaking strength of seams
					Single	Ply	Cable				
		Dol.	*No.*	*Typp*	*No.*	*No.*	*No.*	*No.*	*Lb.*	*Per cent*	*Lb.*
3-cord cotton thread	1	0.25	3	12.6	20.5	21.2	.....	2.0	1.97	3.5	50.1
	2	0.33	3	13.7	20.1	19.8	.....	2.6	2.16	3.7	52.6
	3	{0.50 / 0.40}	3	13.0	22.2	20.1	... .	2.2	1.68	3.2	46.8
	4	0.50	3	13.4	21.0	22.1	....	2.3	2.18	4.4	50.8
	5	0.50	3	14.9	21.5	23.7	.....	3.6	1.63	3.6	46.6
6-cord cotton thread	6	0.40	6	13.2	35.2*	10.5	23.3	1.2	2.12	5.6	51.6
	7	0.29	6	12.5	33.0	27.8	22.5	0.8	1.82	4.8	46.0
	8	0.40	6	12.6	25.7	24.2	20.8	0.2	2.15	6.3	49.6
Mercerized cotton thread	9	{0.50 / 1.00}	3	15.9	22.0	16.6	.. . .	10.8	2.00	3.9	48.8
	10	0.50	3	15.1	19.6	14.7	.....	6.5	2.28	4.3	49.6
	11	0.50	3	16.9	23.5	17 1	....	9.3	1.84	3.9	43.6
	12	0.50	3	16.5	19.7	15.9	....	13.5	2.13	3.6	46.8
Heavy duty mercerized cotton thread.	13	{0.53 / 0.67}	3	11.3	18.7	14.2	.....	4.1	3.07	4.4	65.6
	14	0.67	3	11.8	20.2	14.4	.....	0.0	3.03	4.4	58.6
Nylon thread	15	1.00	3	22.2	19.7	17.7	.....	6.4	1.99	22.0	54.6
	16	1.00	3	24.0	19.1	17.0	....	.....	1.95	25.0	55.4

*Average twist per inch of four of the six singles per yarn was 33.4.

TWIST

There was more twist in finished ordinary cotton sewing thread of both 3- and 6-cord construction than in the other types of thread. Heavy duty mercerized cotton had the least twist, probably because of its large size. There was more twist in singles of 6-cord thread than of 3-cord thread. In thread number 6, the 2-ply component was loosely twisted. There were no significant relations between price and twist.

BALANCE OF TWIST

As a group, mercerized cotton sewing thread was most poorly balanced, nylon thread showed some lack of balance, and ordinary cotton sewing thread was relatively well balanced. The two examples of heavy duty mercerized thread differed considerably, but heavy duty mercerized cotton thread was more balanced than ordinary mercerized cotton thread.

Three-cord ordinary cotton sewing thread was not as well balanced, on the whole, as 6-cord sewing thread. Differences between the balance of the two types of 6-cord construction were small. Different types of thread manufactured by the same company were not necessarily equally well balanced. Examples are threads 1, 6, and 10 which were made by the same manufacturer; also threads 3 and 12; 5 and 9; 4 and 8; 11 and 14. Price per 1000 yards was not an indication of balance in ordinary cotton sewing thread of 3-cord construction. On the whole, individual tests of balance for each thread were consistent.

BREAKING STRENGTH OF THREAD

Heavy duty thread was strongest, but there were only small differences among the other types of thread. Probably size of thread was the chief reason for the greater strength of heavy duty thread. Although most of these differences in thread strength are small, all but three differences were significant at the one per cent level. The difference between the mean strength of 6-cord thread and nylon thread was significant at the 5 per cent level. There was not a significant difference between the mean strengths of 3-cord thread and nylon thread or between 6-cord thread and mercerized cotton thread.

Differences between mean strengths of different brands of the same type of thread were significant at the one per cent level for 3-cord and 6-cord ordinary cotton thread and for mercerized cotton thread. Differences were not significant in the case of heavy duty thread or bright and dull nylon thread.

There was no marked relation between price and strength of 3-cord ordinary cotton sewing thread, but the lowest priced 6-cord thread was the weakest of its group.

ELONGATION OF THREAD

Elongation at break of single strands of thread was by far the greatest for nylon, second for 6-cord thread, and about the same for heavy duty thread, mercerized cotton thread, and 3-cord ordinary cotton sewing thread. High elongation may be an advantage in providing more "give" at seams. Variations in elongation among different brands of a given type of thread were small. Elongation was somewhat higher for bright than for dull nylon thread. Elongation was not appreciably related to price of ordinary 3-cord cotton sewing thread.

SEAM STRENGTH

In general, there was a rather close relation between single strand breaking strength and breaking strengths of seams made from various brands of the same type of thread. However, group differences were more pronounced in the seam strength test than in the single strand test. Nylon thread followed heavy duty in strength. Three-cord and 6-cord ordinary cotton threads were somewhat stronger than mercerized thread, which tended to be weakest. All but one of the differences between average seam strength of the different types of thread were significant at the one per cent level. The exception was the seam strength of 3-cord ordinary cotton thread as compared with 6-cord thread. Differences between mean seam strengths for different brands of the same type of thread were significant at the one per cent level in the case of all types of thread. There was no significant difference between the seam strength of bright and dull nylon thread.

A price relationship was apparent only in 6-cord thread, the lowest in price being the weakest.

RUNNING QUALITY

Running quality of all threads was satisfactory on each type of fabric used. No difficulties were encountered with breaking or splitting of thread.

SUITABILITY FOR HAND SEWING

Nylon thread was far less satisfactory for hand sewing than cotton thread. Many knots formed, the thread twisted constantly, and the loose end of the thread untwisted readily. These conditions made it exceedingly difficult to work with nylon thread. There seemed to be more knotting and twisting at the beginning of a hem than toward the end. The greatest number of knots occurred when hemming acetate rayon fabrics, and the smallest number occurred when sewing on wool.

The wiriness of some of the ordinary cotton sewing thread (numbers 1, 5, and 7) made it difficult to handle. Except for this fact, there was not a great deal of difference in results obtained with various brands of ordinary cotton sewing thread. Thread number 5, which was labeled "99¾% knotless," knotted only once. Of the mercerized cotton thread, numbers 9 and 11 caused the most difficulty with knotting and twisting. Heavy duty thread showed a slight tendency to knot and twist.

COLORFASTNESS TO LAUNDERING

There was no perceptible fading of any colored threads except red heavy duty thread number 14 and black ordinary 3-cord and 6-cord cottons numbers 3, 4, 5, 7, and 8. Statements of colorfastness on labels were reliable except in the case of thread number 14. There were no claims of colorfastness on the spools of black ordinary cotton thread.

CONCLUSIONS AND RECOMMENDATIONS

TYPE OF THREAD

One decision which the consumer must make concerns the type of sewing thread to be purchased. Should it be 3- or 6-cord ordinary cotton thread, mercerized thread, heavy duty thread, or, if available, nylon thread? Each type may have certain advantages and disadvantages.

The use of ordinary cotton thread is limited by the fact that it is available only in black and white. Its dullness and relatively hard texture may also make it unsuitable for certain uses on soft, lustrous fabrics. Ordinary cotton thread tended to be the lowest priced type of thread tested.

In buying ordinary cotton sewing thread, a choice must be made between 3- and 6-cord thread. The brands of 6-cord thread tested were intermediate in price and thread strength between the extremes for different brands of 3-cord thread. There was not a significant difference in seam strength between the 3- and 6-cord threads taken as groups. However, 6-cord thread was somewhat superior to 3-cord thread in balance and in elongation of thread at break. The difference in balance did not make a noticeable difference in hand or machine sewing. However, the greater elongation of 6-cord thread might be expected to give greater durability.

The finish of ordinary cotton thread also appeared to have some relation to its properties. The most lustrous 3-cord threads had slightly lower thread strength and elongation and lower seam strength than did the duller threads of the same type. The wiriness of some of the silk-finished cotton thread made it difficult to handle. Black thread of both 3- and 6-cord construction usually faded appreciably.

Mercerized cotton thread has the advantage of moderately high luster, resulting from mercerization, and soft texture, probably due to the relatively low twist of the plies. It is available in numerous colors. Its price was higher than that of many brands of ordinary cotton thread; however, its price varied less than that of ordinary cotton thread. It was somewhat finer than ordinary cotton thread of size 50. While the single strand strength of mercerized thread tended to be approximately the same as that of 6-cord ordinary cotton thread, its mean seam strength was slightly lower than that of ordinary cotton thread. There was little difference between the elongation of ordinary 3-cord cotton thread and mercerized thread. The relatively poor balance of mercerized cotton thread may have caused knotting and twisting of the thread in hand sewing. The colors of mercerized cotton thread were fast to laundering.

Heavy duty mercerized cotton thread is coarser than the other types of thread tested. Like the finer mercerized thread, it is lustrous, but it is not available in as wide a range of colors as the finer mercerized thread. Heavy duty thread cost more than ordinary cotton thread or the finer mercerized thread. It was probably chiefly due to its greater size that it had the highest thread strength and seam strength of any type of thread tested. Its elongation was somewhat greater than that of the finer mercerized thread and most of the ordinary 3-cord cotton thread. Probably because it was better balanced than the finer mercerized thread, heavy duty thread showed only a slight tendency to knot and twist in hand sewing. One brand of red thread was the only color of heavy duty thread that faded.

Nylon thread was highest in price of any thread tested and was smallest in size. It was lustrous, smooth, and available in a variety of colors.

Although its thread strength was not significantly higher than that of the other types of thread, it was second only to heavy duty thread in seam strength. The elongation of nylon thread was far higher than that of any other type of thread tested. Nylon thread was most difficult to use for hand sewing because of its tendency to unwind at the cut end, to knot, and to twist. The colors of the nylon thread were fast. There were only very slight, insignificant differences between dull and bright nylon in thread strength and seam strength. The percentage elongation of bright nylon thread was slightly greater than that of dull nylon.

BRAND OF THREAD

Once the consumer has decided which type of thread best suits her needs, she may wonder whether it matters which brand of a given type of thread she buys. Price varied considerably with the brand in the case of ordinary cotton sewing thread but it varied little, if any, in the other types of thread. Size varied little for a given type of thread. For the most part, variations in twist of a given type of thread were small, the greatest variations occurring in 6-cord ordinary cotton thread and in mercerized thread. Balance varied little with the brand except in mercerized thread and heavy duty thread. Thread strength varied significantly with brand in all but heavy duty thread, and seam strength varied significantly with brand in all types of thread. Some variation in elongation of thread at break also occurred, except in heavy duty thread. There was some difference between brands in ease of use for hand sewing, especially in mercerized cotton thread. Various brands also differed in colorfastness to laundering of black ordinary cotton thread and of red heavy duty thread.

PRICE

Price is another guide which the consumer might follow in buying thread. There were few or no price variations for a given type of thread, except ordinary cotton thread. In the case of 3-cord thread, price had no consistent relation to quality. However, the 6-cord thread which was lowest in price was weakest and had the lowest elongation at break. In judging the cost of a spool of thread, it is important to take into account both the price per spool and the yardage per spool. The price of the same brand and variety of thread may vary from one store to another.

LABELS

A further aid to the consumer is the information on the label of a spool of thread. The manufacturer's name or brand name and yardage were always given. As has been pointed out, yardage is an important factor to consider in evaluating cost. Size was usually stated, except on mercerized and heavy duty thread. The number of cords was usually given on ordinary cotton thread but seldom on other types. This is an item which should be noted in buying ordinary cotton thread. Colorfastness was usually stated on mercerized and heavy duty thread and was found to be reliable except in one brand of red heavy duty thread. Ordinary black cotton thread, which was not labeled colorfast, usually faded. Frequently the type of thread was indicated on the label. Statements concerning quality and tendency to knot were stated in general terms which would be of little, if any, aid to the buyer.

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