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The Effects of Wartime Measures on Cotton Dress Fabrics

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It has been anticipated that many changes would take place in the manufacturing of fabrics for civilian uses as a result of the war. It is of course possible to increase the amount of yardage by lowering the thread count thereby spreading the yarns and there is the probability that dyes of poor quality may be used.[1] Will there be a decrease in the strength and durability of the fabric if such a reduction in thread count occurs? Will the discontinuance of the better quality dyes make it impossible for civilians to secure fabrics with satisfactory color qualities? Since these problems have confronted consumers in their choice of fabrics, this study was designed to ascertain to what extent these measures have affected the cotton fabrics which are used in making house dresses.

Very little assurance of quality and performance is given to the consumer who purchases yard goods. If such information exists it is placed on the end of the bolt or upon an accompanying tag. The consumer seldom looks for or is shown this information and is more inclined to accept the information of the salesperson. Information which salespeople are able to give is, in most cases, very unreliable since they are seldom trained to have a thorough knowledge of the fabrics they sell or of the meanings or implications of the terms used in describing fabrics.

Yard goods chosen and purchased by a consumer are expected to meet certain requirements for the making of a garment. The consumer expects the fabric to be firmly woven with a well-balanced thread count; to have qualities of durability, to be woven or finished in such a way that there is a minimum amount of shrinkage; and to possess colors which are not seriously affected by exposure to light and laundering.

The fabrics which were used in this study were purchased in two groups. The first group was purchased in June, 1942, and consisted of fabrics which were manufactured before the war program went into effect, while the second group was purchased in February, 1943, and consisted of fabrics which would no doubt be affected by measures brought about by the war program. These were subjected to tests which would give indications of their construction, strength, colorfastness to light and laundering and the resistance to shrinkage in order to ascertain whether the manufacturing processes have undergone changes which seriously affect the quality.

[1]Report to Department of Agriculture Extension Service, July 22, 1942. Robert Skliar, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

Tests Used

The laboratory tests generally used to determine the quality and serviceability of fabrics are weight, thread count, tensile strength, colorfastness, as well as the effect of laundering upon the strength of the fabric and the fastness of the colors.

The tests for tensile strength, thread count and weight per square yard were applied according to methods set up by Committee D-13 of the American Society for Testing Materials.[2] The tests for colorfastness to light, wet breaking strength and colorfastness to laundering were applied according to methods set up by National Bureau of Standards in their Commercial Standard C. S. 59-41.[3]

Weight.—The weight in ounces per square yard was determined by weighing samples of the fabric which were cut to be two inches square. The samples were weighed in grams on a Christian Becker Analytical balance and this weight was then converted to ounces per square yard.

Thread Count.—In determining the thread count, the actual number of threads per inch in both the warp and filling directions were counted at five or more places in the fabric and the average calculated.

Tensile Strength.—The tensile strength was obtained from an average of five samples each, for both warp and filling. Since the majority of the fabrics tested had a thread count of over 50 yarns per inch the raveled strip method was used. This method requires strips of the fabric to be cut at least 1¼ inches in width and six inches in length. The width is then raveled until it measures exactly one inch. These strips are then tested under standard conditions with the use of a Scott testing machine geared to travel at a rate of twelve inches a minute with the jaws set three inches apart.

Amount of Water Soluble Sizing.—The test used to calculate the amount of water soluble sizing present in these fabrics was formulated according to methods applicable in home determinations of the amount of water soluble finishing materials present. Samples of the fabrics to be tested were weighed and then treated by being soaked in distilled water and carefully washed in warm water and mild soap suds, being particularly careful that no threads were lost. The samples were then rinsed, oven dried to standard weight, and weighed. The percentage loss of sizing was then calculated.

Colorfastness to Light.—The colorfastness to light was checked by placing samples of the fabrics in an F. D. A. type Fadeometer and exposing them at a temperature of 105° F. and a relative humidity less than 50% for a period of 10, 20, 40, 60, or 80 hours depending upon the fastness. The longest period of exposure the

[2] *A. S. T. M. Standards on Textile Materials*, American Society for Testing Materials, Committee D-13, Philadelphia, Pa., October, 1941, pp. 36, 38, 44.

[3] *National Bureau of Standards.* Woven textile fabrics testing and reporting. Third edition. Commercial Standard C. S. 59-41, 1941, pp. 35.

fabrics will withstand without an appreciable change in color determines the class of fading, according to the following classifications:

Class 1. No appreciable change after 10 hours.
Class 2. No appreciable change after 20 hours.
Class 3. No appreciable change after 40 hours.
Class 4. No appreciable change after 60 hours.
Class 5. No appreciable change after 80 hours.

Fabrics such as those which are used for dress fabrics are expected to meet the requirements of Class 3, or to withstand 40 hours of exposure in the Fadeometer.

It has been found by laboratory tests that the 40 hour fading test of colorfastness to light is not sufficient for the accurate prediction of wear performance.[4] However, the 40 hour test is used in this study in order to obtain a standard number of hours upon which to base our determinations of the colorfastness of the fabrics which were tested.

Shrinkage.—The amount of shrinkage was tested on twelve-inch squares of the fabric. These squares were measured with a steel tape and marked by both indelible ink markings and stitching with fine thread. These squares were re-measured after laundering and the amount of shrinkage calculated for both warp and filling.

Laundering.—The samples were checked for colorfastness and durability by washing in an agitator type washing machine for 8½ hours with water approximately 120° F. and Ivory soap flakes. This would correspond to a year's laundering if the fabrics were laundered in this manner for ten minutes each week.

EXPERIMENTAL RESULTS

The fabrics selected for this study were of the types generally selected for house dresses and classified under the following names: Percale prints, gingham, chambray, seersucker, light weight muslins, lawns and dimities.

The first group of sixty-eight fabrics was purchased in the spring of 1942 and consisted of fabrics which were unaffected by the war program. The second group of forty-two fabrics was purchased in February, 1943, and consisted of those fabrics which had been manufactured since the changes in manufacturing were supposed to have been brought about. All fabrics were purchased from local stores but were selected as being representative of the fabrics of such types which would be available in any locality and which would be purchased for house dresses in such communities.

The majority of these fabrics were of the ordinary print type with the remainder being divided between the other groups. (See Table 1).

[4]Colorfastness of Certain Types of Dyes on Women's and Children's Wearing Apparel Fabrics, H. E. Borton, C. B. Walker, P. B. Mack, C. A. Siebert, American Dyestuff Reporter 31, No. 25 (Dec. 7, 1942), pp. 603-627, 641.

TABLE 1.

	Group I (1942)	Group II (1943)
Percale Prints	31	16
Chambray	11	7
Gingham	6	7
Seersucker	3	4
Muslins (sheer)	2	2
Lawn	5	6
Batiste	4	
Dimity	6	
Total	68	42

In purchasing these fabrics, it was found that there was a very noticeable decrease in the number of different types of fabrics available as well as in the amount of total yardage available in 1943. The conservation measures made necessary by the war program were undoubtedly one cause for this decrease since many of the well established manufacturing firms preferred a decrease in the amount of materials which they would weave to a decrease in the quality of the fabrics produced for civilian use. Another reason for the limited choice of fabrics in this group was the season of the year in which they were purchased. In order to carry out this work according to schedule fabrics were purchased in February, 1943, as soon as they were obtained by the local merchants and many of the sheerer fabrics were not available at this time of the year.

Since there is such a wide range in the types of fabrics tested, results of the tests will be more significant if they are given according to the type of fabric rather than as a summary of all types.

The Prices of the Fabrics Tested

The general distribution of the prices of the fabrics tested in the two groups ranged from $.19 to $.79 in the first group and from $.23 to $.79 in the second group, the prices averaging $.37 and $.45 respectively. (See Table 2).

TABLE 2. PRICES OF FABRICS PURCHASED

	No.	Group I Average Prices	(Purchased in 1942) Price Range	No.	Group II Average Prices	(Purchased in 1943) Price Range
Prints	31	$.26	$.23 - $.29	16	$.26	$.23 - $.29
Chambray	11	.46	.35 - .69	7	.59	.29 - .79
Gingham	6	.50	.25 - .75	7	.63	.33 - .75
Seersucker	3	.76	.69 - .79	4	.59	.59
Muslin	2	.59	.59	2	.59	.59
Lawn	5	.33	.19 - .49	6	.49	.39 - .59
Batiste	4	.33	.29 - .35			
Dimity	6	.34	.39 - .45			
SUMMARY	68	$.37	$.19 - $.79	42	$.45	$.23 - $.79

According to the price ranges of the two groups, there is no noticeable increase in prices in general. However, when the fabrics are ranged according to the type, there is a noticeable increase in the average prices of the better grades of fabrics such as the chambrays, ginghams and lawns. Several chambrays and lawns in the second group of fabrics purchased were found to be of slightly better construction than those in the first group. This probably accounts for the slight increase in the prices of these two types of materials.

Weight per Square Yard

In comparing the average weight per square yard for the fabrics in these two groups, there is not perceptible difference in the weight of the fabrics. (See Table 3).

TABLE 3. COMPARISON OF THE WEIGHT PER SQUARE YARD OF THE FABRICS TESTED

	No.	Group I (1942)		No.	Group II (1943)	
		Average	Range		Average	Range
		Ounces per sq. yd.			Ounces per sq. yd.	
Prints	31	3.1	2.8 - 3.8	16	3.1	2.7 - 3.5
Chambray	11	2.8	2.5 - 3.3	7	3.0	2.7 - 3.3
Gingham	6	2.6	2.5 - 2.7	7	2.6	2.4 - 3.2
Seersucker	3	3.5	2.5 - 4.4	4	3.3	2.8 - 4.0
Muslin	2	2.1	2.0 - 2.3	2	1.9	1.9
Lawn	5	1.5	1.3 - 1.8	6	1.8	1.5 - 2.1
Batiste	4	1.5	1.4 - 1.6			
Dimity	6	1.8	1.5 - 2.6			
SUMMARY	68	2.6	1.3 - 4.4	42	2.5	1.5 - 4.0

The average weight per square yard of the fabrics of each type in Group I were quite similar to the average weight of those of the same type in Group II. Furthermore the average of the total number in Group I was practically the same as the average of the total number in Group II since the weights were 2.6 and 2.5 ounces per square yard respectively.

Thread Count

Slight differences in thread count were apparent when the various classes of fabrics in Group I were compared with the same classes of fabrics in Group II. The prints, seersuckers and muslins in Group II showed slight decreases in thread count averages, lower ranges in thread count and were of noticeably looser construction than the same fabrics in Group I. (See Table 4).

The ginghams and lawns of Group II showed a slight increase in the average thread count over the same fabrics in Group I; whereas the ranges in thread count in the ginghams were quite similar and the range in thread count in the lawns in Group II was higher than

TABLE 4. COMPARISON OF THE RANGES IN THREAD COUNT

	No.	WARP			FILLING
	No.	Av.	Range	Av.	Range
Group I.		(Purchased in June 1942)			
Prints	31	84	66 - 91	76	54 - 82
Chambray	11	91	70 -122	70	56 - 98
Gingham	6	76	68 - 91	64	50 - 82
Seersucker	3	105	80 -122	90	93 -100
Muslin	2	108	107 -110	82	79 - 85
Lawn	5	71	58 - 77	58	42 - 78
Batiste	4	79	78 - 81	69	67 - 73
Dimity	6	100	91 -117	60	51 - 73
Summary	68	86	66 -122	71	42 -100
Group II.		(Purchased in February 1943)			
Prints	16	82	68 - 88	72	67 - 78
Chambray	7	90	71 -114	69	59 - 82
Gingham	7	79	64 - 92	69	45 - 85
Seersucker	4	87	75 -116	64	51 - 85
Muslin	2	98	96 -101	78	77 - 82
Lawn	6	81	77 - 86	63	56 - 71
Batiste					
Dimity					
Summary	42	84	64 -116	69	51 - 85

in Group I since the fabrics in this group were of noticeably finer texture.

The general averages of both groups showed that the fabrics of Group II were slightly lower in thread count than those of Group I. The ranges of the averages of the two groups also showed a similar decrease.

These decreases in thread count were not so great as to cause the fabrics to be of poor construction or appearance, however the effects of this decrease in thread count may influence the strength and the amount of shrinkage of the fabrics.

Amount of Sizing

The fabrics purchased in 1943 contained considerably more water soluble sizing than those purchased the preceding year. In the first group sizing amounted to 2.9 per cent and in the second group to 6.8 per cent of the weights of the fabrics. This is an increase of over twice as much sizing in the second group as in the first group. (See Table 5).

When considered according to the type of fabric, the increases in the amount of sizing found occurred in the prints, ginghams, seersuckers and muslins, while the chambrays and the lawns contained about the same amount of sizing as did these types in the first group.

The types of fabrics showing increases in the amount of sizing are, with one exception, the same fabrics showing decreases in the number of threads used in their construction. The one exception was in the case of the ginghams. This type showed a slight increase in thread count and also an increase in the amount of sizing.

TABLE 5. PERCENTAGE OF WATER SOLUBLE SIZING

	GROUP I (1942) % Sizing			GROUP II (1943) % Sizing			
	No.	Av.	Range	No.	Av.	Range	Comment
Prints	31	2.6	.2-4.3	16	3.8	2.5-7.3	Increase
Chambray	11	2.5	.5-5.7	7	2.6	1.9-3.7	Approx. the same
Gingham	6	1.0	.2-2.0	7	3.1	1.9-6.7	Increase
Seersucker	3	1.5	.3-3.8	4	2.1	1.9-2.3	Increase
Muslin	2	1.5	1.2-1.9	2	2.9	2.4-3.5	Increase
Lawn	5	6.2	3.1-8.3	6	6.1	5.4-7.9	Approx. the same
Batiste	4	3.8	.7-7.9				
Dimity	6	4.9	3.6-8.3				
SUMMARY	68	2.9	.2-8.3	42	6.8	1.9-7.9	

Additional sizing is used as a filler in the fabrics to prevent a sleazy appearance when the fabric is new and to aid in retaining the dimensions of the fabric. Since the sizing is water soluble, this closely woven appearance is lost unless shrinkage occurs to pull the yarns together more closely.

Amount of Shrinkage

The increase in the amount of shrinkage which was expected to occur in Group II due to the slightly lower thread count and increased sizing failed to appear. The only fabrics showing decided increases in the amount of shrinkage were the seersuckers, in both warp and filling, and the lawns, in the filling direction only.

According to the averages Group II showed a small increase in shrinkage in the warp and a slight decrease in the filling. (See Table 6).

TABLE 6. PER CENT SHRINKAGE

	GROUP I (1942) Per Cent Shrinkage					GROUP II (1943) Per Cent Shrinkage					
	Warp			Filling		Warp			Filling		
	No.	Av.	Range	Av.	Range	No.	Av.	Range	Av.	Range	Comments
Prints	31	4.1	0.0-6.8	1.6	0.0-4.0	16	3.9	3.0-5.1	1.5	0.0-3.0	About same
Chambray	11	3.7	1.0-8.1	1.3	0.0-4.0	7	3.5	0.0-7.1	1.6	0.0-5.1	About same
Gingham	6	6.2	2.0-8.1	5.9	1.0-14.2	7	6.2	4.0-10.0	12.6	0.0-5.1	Decrease in
Seersucker	3	3.7	3.0-4.0	1.0	0.0-2.0	4	4.5	4.0-6.1	2.2	0.0-4.0	Increase
Muslin	2	3.0	2.0-4.0	2.5	1.0-4.0	2	.5	0.0-1.0	.05	0.0-0.1	Decrease
Lawn	5	4.5	1.0-8.1	3.4	2.0-6.1	6	4.5	2.0-8.1	4.9	0.0-11.2	Increase
Batiste	4	2.8	1.0-5.1	6.7	2.0-8.8						
Dimity	6	2.4	1.0-3.0	2.8	1.0-8.1						
SUMMARY	68	3.9	0.0-8.1	2.5	1.0-14.2	42	4.2	0.0-10	12.2	0.0-11.2	

The amount of shrinkage occurring in these fabrics was quite variable, and in many cases, very objectionable. The ideal fabric is

one treated in the manufacturing process to avoid shrinkage. One per cent is considered a negligible amount, two per cent the maximum amount of shrinkage which could occur in laundering without producing disastrous results. The range in shrinkage of these fabrics was from no shrinkage to 14.2 per cent distributed according to the following table. (See Table 7).

TABLE 7. DISTRIBUTION OF SHRINKAGE

Shrinkage	GROUP I				GROUP II			
	Warp	Approx. Percent	Filling	Approx. Percent	Warp	Approx. Percent	Filling	Approx. Percent
Less than 1%	10	4.7	16	23.5	0		18	42.9
1.1%-2%	6	8.8	11	16.2	6	14.3	7	16.6
2.1%-4%	23	33.8	17	25.0	19	45.2	10	23.8
4.1%-6%	13	19.1	8	11.8	8	19.1	6	14.3
6.1%-7%	10	14.7	11	16.2	5	11.9		
8.1%-10%	6	8.8	4	5.9	3	7.1		
10.1%-12%					1	2.4		
12.1%-14%							1	
Over 14%			1	1.4				2.4
SUMMARY	68		68		42		42	

This table indicates that the majority of the fabrics had over 2 per cent shrinkage in both warp and filling since in Group I, 52 or 77.9 per cent fabrics shrank over 2 per cent in the warp and 40 or 58.8 per cent shrank over 2 per cent in the filling. The fabrics in Group II reacted similarly with 36 or 85.1 per cent shrinking over 2 per cent in the warp and 16 or 38.1 per cent over 2 per cent in the filling.

Tensile Strength

There were no signs of decreased strength in the fabrics of Group II due to the very slight decrease in the thread count of the fabrics.

In all cases the characteristic increase in tensile strength of fabrics when in a wet condition was noticeable.

When the tensile strength of the fabrics was tested before laundering the ginghams were the only fabrics in Group II which failed to show increases in strength over the same types of fabrics in Group I. The decrease in the case of this type of fabrics should not be alarming since it is undoubtedly influenced by the increase in sheerness of the fabrics in this group as compared with the ginghams in Group I. (See Table 8).

After laundering the tensile strength of the fabrics in Group II tended in most cases to be practically equal to or greater than the tensile strength of the same fabrics in Group I. The fabrics in Group II which showed marked evidences of being weaker than those of Group I were the ginghams in both warp and filling directions when wet, and the seersuckers which showed a slight decrease in the filling when dry and a more marked increase when wet. (See Table 9).

TABLE 8. TENSILE STRENGTH BEFORE LAUNDERING

		Dry Tensile Strength (pounds)				Wet Tensile Strength (pounds)			
		Warp		Filling		Warp		Filling	
	No.	Av.	Range	Av.	Range	Av.	Range	Av.	Range
GROUP I. Purchased in 1942									
Prints	31	42.4	20.0-49.2	24.8	18.2-36.0	44.4	29.0-59.0	28.0	19.0-38.8
Chambray	11	35.9	29.7-46.2	21.6	14.6-29.8	43.7	37.4-59.2	28.6	22.8-36.0
Gingham	6	34.1	26.6-40.0	21.2	17.2-25.6	41.9	36.2-39.2	32.4	28.2-37.2
Seersucker	3	23.5	14.6-34.0	22.7	13.6-33.8	27.4	16.2-36.0	29.0	15.0-52.0
Muslin	2	25.2	22.4-28.0	15.1	15.0-15.2	39.0	35.4-42.6	18.5	17.0-20.0
Lawn	5	22.0	19.0-25.2	10.7	7.2-13.0	22.5	20.6-25.0	12.7	9.0-16.0
Batiste	4	22.1	20.0-23.5	10.5	9.4-11.0	22.6	17.0-26.0	13.2	9.0-15.0
Dimity	6	32.9	25.4-39.0	12.0	9.0-15.6	33.5	25.2-46.0	12.8	9.6-16.0
SUMMARY	68	35.9	14.6-49.2	20.6	99.0-36.0	39.8	16.2-59.0	24.5	9.0-52.0
GROUP II. Purchased in 1943									
Prints	16	43.8	39.4-51.4	27.8	22.8-39.2	49.9	35.0-64.0	32.6	39.2-42.4
Chambray	7	41.6	29.2-48.0	25.7	17.0-31.2	46.8	40.8-61.8	35.4	22.0-47.4
Gingham	7	32.8	22.4-38.4	24.0	20.0-30.2	37.9	18.8-45.6	30.9	25.0-39.4
Seersucker	4	24.4	26.4-43.6	25.8	20.0-33.6	24.9	39.8-40.8	33.1	25.2-40.2
Muslin	2	28.7	24.8-32.6	22.2	20.8-23.6	36.7	36.4-37.0	27.3	25.2-29.4
Lawn	6	23.4	21.6-25.6	15.1	12.2-19.2	25.3	20.2-32.0	16.1	12.8-20.6
SUMMARY	42	36.9	21.6-51.4	24.5	12.2-39.2	41.8	20.2-64.0	30.4	12.8-49.4

TABLE 9. TENSILE STRENGTH AFTER LAUNDERING

		Dry Tensile Strength (pounds)				Wet Tensile Strength (pounds)			
		Warp		Filling		Warp		Filling	
	No.	Av.	Range	Av.	Range	Av.	Range	Av.	Range
GROUP I. Purchased in 1942									
Prints	31	32.9	20.0-37.6	24.8	18.6-28.6	43.7	26.6-55.2	32.5	25.2-39.0
Chambray	11	29.8	24.0-35.4	22.8	18.2-30.4	40.6	33.6-47.0	31.5	23.2-44.8
Gingham	6	25.9	20.6-33.2	22.4	19.2-24.2	40.7	37.2-46.6	31.7	28.0-33.6
Seersucker	3	23.5	14.6-43.4	30.1	19.2-27.6	30.9	20.0-41.6	32.9	19.8-51.2
Muslin	2	22.3	21.6-23.0	15.8	13.0-19.6	33.8	24.0-43.6	17.9	17.4-18.4
Lawn	5	16.1	12.6-20.0	12.2	10.0-14.8	20.9	10.8-32.0	14.1	10.4-19.0
Batiste	4	20.1	18.0-22.4	13.1	11.6-14.2	25.3	22.6-28.0	15.2	15.5-16.8
Dimity	6	20.7	18.4-22.0	12.0	11.0-13.8	31.9	23.2-43.2	15.4	13.6-18.0
SUMMARY	68	28.0	12.6-43.4	21.5	10.0-38.6	38.5	10.8-47.0	28.0	10.4-44.8
GROUP II Purchased in 1943									
Prints	16	36.9	30.4-44.2	26.5	20.0-28.8	46.6	39.8-58.8	33.3	29.0-40.0
Chambray	7	38.1	25.8-46.4	24.5	19.2-35.4	44.8	31.2-62.6	33.0	20.0-42.8
Gingham	7	28.7	18.4-37.8	24.1	20.0-26.8	33.9	19.4-48.0	29.6	22.0-36.6
Seersucker	4	28.9	22.6-36.4	23.5	18.6-32.2	35.4	32.4-37.6	26.4	19.2-37.0
Muslin	2	26.6	18.0-35.2	22.3	18.0-26.6	35.6	26.4-44.8	29.8	23.0-36.6
Lawn	6	18.3	15.4-23.0	12.7	10.8-15.4	23.3	19.5-29.8	13.9	11.6-17.0
Batiste									
Dimity									
SUMMARY	42	32.1	18.0-46.4	23.7	10.8-35.4	39.2	19.5-62.6	28.4	19.2-42.8

When the averages of the two groups of fabrics are compared the fabrics of Group II show evidences of greater tensile strength than

the fabrics in Group I. This increase was evident in both warp and filling directions when tested dry as well as when tested wet. Therefore the tensile strength of Group II was not decreased as a result of the slight decrease in the thread count of the fabrics and it also indicates that the fabrics purchased in 1943 might possess a coarser or stronger yarn construction than the fabrics purchased in 1942.

Colorfastness

Since color and design are the major factors which determine the choice of dress materials it is most important that the colors used prove satisfactory to the consumer's needs.

The dyes used in these fabrics should be such that there will be little or no evidence of loss of color by crocking—when either wet or dry, by bleeding, by exposure to sunlight or laundering procedures.

Resistance to crocking is important to assure no damages to undergarments due to a rubbing off of colors from these fabrics when in a dry or wet condition. Resistance to bleeding is necessary to assure no running of colors when wet as this in some cases may ruin the appearance of the garment. This loss of color often occurs in laundering, discoloring other fabrics or the trimming on the garment. The color changes which have occurred in these fabrics have been classified here in four groups.

(1) Those which showed no loss of color whatsoever.
(2) Those which showed a slight color change.
(3) Those which faded quite noticeable.
(4) Those which showed an objectionable change in color.

The majority of the fabrics were quite satisfactory when given tests to determine the amount of color lost in crocking and bleeding.

Of the sixty-eight fabrics purchased in 1942, 63 per cent showed no loss of color by crocking when dry, while 54 per cent showed no loss of color when wet. Of the forty-two fabrics purchased in 1943, 66 per cent failed to show any loss of color by crocking when dry and approximately 64 per cent failed to show any loss of color when wet. (See Table 10).

TABLE 10. LOSS OF COLOR BY CROCKING AND BLEEDING

	GROUP I PURCHASED IN 1942													GROUP II PURCHASED IN 1943											
	CROCKING											BLEEDING		CROCKING									BLEEDING		
	DRY					WET								DRY					WET						
	Total	No loss	Slight	Noticeable	Objectionable	No loss	Slight	Noticeable	Objectionable	No loss	Slight	Noticeable	Objectionable	Total	No loss	Slight	Noticeable	Objectionable	No loss	Slight	Noticeable	Objectionable	No loss	Slight	Noticeable	Objectionable
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Prints	31	11	15	4	1	8	14	7	2	25	6			16	6	10			5	11			16			
Chambray	11	10	1			10	1			11				7	5	2										
Gingham	6	5	1			4	2			6				7	6	1			2	2			7			
Seersucker	3	3				2	1			3				4	3	1			6	1			7			
Muslin	2	2				2				2				2	2				3	1			4			
Lawn	5	4	1			4		1		4		1		6	6				2				2			
Batiste	4	4				4				4									6				6			
Dimity	6	4	2			3	2	1		5	1															
SUMMARY	68	43	20	4	1	37	20	9	2	60	7	1		42	28	14			27	15			42			

Of the fabrics in the first group, which showed losses of color by crocking less than 30 per cent showed slight losses of color in both wet and dry crocking. A little less than 6 per cent shed color noticeably when dry and 13.23 per cent when wet. Only one fabric had an objectionable loss of color while two had an objectionable loss when wet.

Of the fabrics in Group II, one-third of them showed slight losses of color when dry as compared with 35.7 per cent when wet. None of the fabrics in this group had noticeable or objectionable losses of color. Very few evidences of bleeding of colors were apparent. Only eight, or approximately 12% of the sixty-eight fabrics purchased in 1942 showed any tendency toward bleeding and only one of these was a noticeable loss of color. None of the fabrics in Group II showed any trace of bleeding.

More numerous color losses were evident when those fabrics which had been laundered for what would be the equivalent of a year's washing if they were washed for approximately ten minutes each week were compared with the original fabrics.

Of the 68 fabrics purchased in 1942, 20 showed no change in color; 27 showed slight changes in color; 17 showed noticeable changes in color; and four showed an objectionable loss of color. Those fabrics in the second group reacted similarly with 15 showing no loss of color; 19 showed a slight loss and eight showed a noticeable loss of color. None of the fabrics in this group had shown an objectionable loss of color. (See Table 11).

TABLE 11. COLORFASTNESS IN LAUNDERING

	GROUP I (1942)					GROUP II (1943)				
	Total	No loss	Slight	Noticeable	Objectionable	Total	No loss	Slight	Noticeable	Objectionable
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Prints	31	8	11	10	2	16	3	6	7	
Chambray	11	4	7			7	2	5		
Gingham	6	4	1	1		7	5	2		
Seersucker	3		1	2		4	1	3		
Muslin	2	1		1		2	1	1		
Lawn	5	1	2	1	1	6	3	2	1	
Batiste	4	1	2	1						
Dimity	6	1	3	1	1					
SUMMARY	68	20	27	17	4	42	15	19	8	

The test for exposure to light was carried out in the Fadeometer by exposing the fabrics to a strong carbon light for definite periods of time. Those which are generally used for fabrics to be made into garments were exposed for 20 hours and 40 hours. To be satisfactory in this test, the fabric should show no change of color after 40 hours of exposure in the Fadeometer. Those which show changes after only 20 hours of exposure are highly unsatisfactory for use in wearing apparel.

Forty-two, approximately 62%, of the sixty-eight fabrics purchased in 1942 showed no loss of color after 20 hours of exposure while eighteen, approximately 43%, failed to show a loss of color after 40 hours exposure. Fourteen of the fabrics in this group showed slight changes in color after 20 hours of exposure; nine showed noticeable changes and three showed objectionable changes after the same exposure. After 40 hours of exposure the numbers had increased to 25 showing slight changes, fifteen showed noticeable changes and ten were very objectionable in their loss of color. (See Table 12).

TABLE 12. COLORFASTNESS TO LAUNDERING. HOURS OF EXPOSURE IN FADEOMETER

	GROUP I									GROUP II								
	20 hours					40 hours				20 hours					40 hours			
	Total	No loss	Slight	Noticeable	Objectionable	No loss	Slight	Noticeable	Objectionable	Total	No loss	Slight	Noticeable	Objectionable	No loss	Slight	Noticeable	Objectionable
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No
Prints	31	15	9	5	2	2	14	7	8	16	12	2	2	-	4	8	2	2
Chambrays	11	9	1	1	-	4	5	1	1	7	6	1			4	3		
Gingham	6	5	1			3	3			7	7				6	1		
Seersucker	3	2	1			2		1		4	3	1			3	1		
Muslin	2	2					2			2	2				2			
Lawn	5	3	2			2	1	1	1	6	6				5	1		
Batiste	4	2		2		2		2										
Dimity	6	4		1	1	3		3										
SUMMARY	68	42	14	9	3	18	25	15	10	42	36	4	2		24	14	2	2

Of the fabrics purchased in 1943, thirty-six, or 85%, showed no loss of color after 20 hours of exposure, while twenty-four, or 57%, showed no loss after 40 hours of exposure. Of those fabrics which did show evidences of fading, four showed a slight loss and two a noticeable loss of color after 20 hours. After 40 hours of exposure, fourteen fabrics showed a slight loss, two a noticeable loss, and two an objectionable loss of color.

By these tests for colorfastness it is apparent that the dyes used in the fabrics purchased in 1943 were not poorer than those used in the fabrics purchased the preceding year, since, in each test performed, the fabrics purchased in 1943 were more satisfactory than those purchased in 1942.

In all tests for colorfastness, the print fabrics showed much more evidences of color loss than the other types of fabrics. This was not unusual since the fabrics in this group had the lowest cost and it would be assumed that they would also have the poorest construction and finish.

The chambrays and ginghams being yarn dyed were most satisfactory in color fastness in all of these tests.

The colors which showed the most evidence of being affected by these color tests were rose, green, tan and blue. These colors were used in all of the fabrics which showed objectionable losses of color in any of the tests. The red fabrics and also the yellow fabrics did not show alarming losses of color, although they did appear to be darkened or subdued in intensity. No labels, guarantees of quality or factual information on the part of the salesperson accompanied any of the fabrics. Therefore the consumer's knowledge and judgment of fabrics and fabric construction will have to be depended upon to obtain satisfactory purchases. According to the results shown here, yard goods of high quality have not been greatly affected by the war measures, which had been put into effect up to the time the samples were collected. The consumer therefore must inform herself about textile materials and their construction.

House Dresses Tested

Eight house dresses commercially made from materials similar to those used in this study were tested. Very little difference was noticed between the fabrics purchased by the yard and those made up into garments.

The fabrics were closely woven and all possessed good tensile strength in both wet and dry condition. The tensile strength was not greatly affected by washing the fabrics equivalent to a year's laundering. There was little or no sizing.

Only two of the fabrics used in these garments possessed water soluble sizing in amounts which would affect the appearance and the durability. These fabrics were less satisfactory when tested for shrinkage and color fastness. The amount of shrinkage in all cases was quite varied ranging from 2 per cent to 10.4 per cent in the warp and from 1 per cent to 6.2 per cent in the filling. This shrinkage would be quite objectionable since no allowances were made for this shrinkage in the construction of the garments. The hems used were in no case greater than one inch in width.

The reactions to the various color tests were also quite unsatisfactory. All fabrics showed tendencies toward crocking and bleeding but the losses of color were slight in all cases. Two of the garments showed noticeable losses of color after laundering while the remaining six showed a slight loss. After 20 hours exposure in the Fadeometer only three showed no loss of color, two showed

a slight change while three showed a noticeable loss. The 40 hour exposure proved the dresses to be still more unsatisfactory since all of them showed color losses. Three showed only a slight loss, two showed a noticeable loss and the remaining three were quite objectionable in the amount of color lost.

Although the prices of these garments ranged from $1.66 to $3.98, no indication of fabric quality could be derived from the price. Furthermore, the price of the garment in no way affected the construction of the garment. In fact, the construction of the garments was so poor in all cases that the consumer's satisfaction would be greatly affected. Large loose stitches were used in all cases. Seams were poorly constructed and poorly finished. Hems were narrow and put in with a chain stitch which would pull out quite easily. The finishing touches such as trimming, buttons, and buttonholes were very poorly applied.

This poor quality construction is to be expected since such garments are constructed under poor manufacturing conditions and with very little consideration as to the quality of the work done. With the absence of labels pertaining to either the quality of the fabric or the quality of construction the consumer has no assurance of satisfaction until more attention is given to the standardization and labeling of both fabrics and garments.

SUMMARY

1. Fewer types of fabrics and less total yardage of materials were available in 1943 than in 1942.
2. Apparently many well-established manufacturers preferred a decrease in the amount of materials rather than decrease the quality of fabrics woven.
3. Many of the fabrics available in 1943 were coarser and less firmly woven than those purchased in 1942 particularly percale prints.
4. Prices of fabrics purchased ranged from $.19 to $.79 in 1942 and from $.23 to $.79 in 1943 averaging $.37 and $.45 respectively.
5. The better grade fabrics, such a chambrays, ginghams and lawns were higher priced in 1943.
6. No perceptible difference was noted in the weights of the fabrics when compared either according to the type or the year they were purchased.
7. Thread count was slightly less in the fabrics purchased in 1943 particularly in the prints, seersuckers and muslins.
8. The fabrics purchased in 1943 contained more water soluble sizing than those in 1942. The sizing amounted to 6.8 per cent of the weight of the fabrics in 1943 as compared to 2.9 per cent in 1942.
9. There was very little difference in the shrinkage of the fabrics purchased in 1942 and in 1943.
10. The majority of the fabrics tested had over 2 per cent shrinkage in both warp and filling. Seventy-six per cent of the fabrics purchased in 1942 exceeded 2 per cent shrinkage in the warp and 59 per cent in the filling. Eighty-six per cent of the fabrics purchased in 1943 exceeded 2 per cent shrinkage in the warp and 38 per cent in the filling.
11. Fabrics purchased in 1943 were stronger than those bought in 1942 probably resulting from the use of larger and stronger yarns.
12. Most of the fabrics showed little loss of color by crocking. Thirty-seven per cent of the 1942 purchases showed loss of color when dry and 46 per cent when wet. Of the 1943 purchase thirty-five per cent showed loss of color when dry and approximately 36 per cent when wet.
13. Only 12 per cent of the fabrics purchased in 1942 and none purchased in 1943 showed loss of color by bleeding.
14. Color losses were more frequent after laundering since 70 per cent of the 1942 purchase and 64 per cent of the 1943 showed loss of color.

15. Approximately 27 per cent of the fabrics purchased in 1942 failed to show a loss of color after 40 hours of exposure in the Fadeometer as compared with 57 per cent purchased in 1943.
16. The colors used in the group of fabrics purchased in 1943 are no poorer than those used in the preceding year.
17. In all tests for colorfastness the percale prints showed the greatest tendencies toward loss of color.
18. The colors which seemed to be least permanent were rose, green, tan, and blue.
19. Up to February, 1943, the high quality of dress fabrics have been affected very little by war-time measures.