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STANDARDIZATION AND SIMPLIFICATION IN THE TEXTILE INDUSTRY

by

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INTRODUCTION

This thesis is an attempt to investigate and present in condensed form the literature now available on the standardization and simplification movement in the textile industry. It proposes to show that because of the complexity of the problem, progress must necessarily be slow and at the present time the net results of this movement are few as compared to what has been accomplished along this line in other industries, but that standardization and simplification are coming, not through legislation, but through the medium of economic necessity and that the application of these two principles to the textile industry will have beneficial results for the producer, the ultimate consumer and the nation.

By standardization is meant the classification or grading and marking of goods according to a scientifically tested set of specifications which measure definite and verifiable quality factors. It means taking the guesswork out of buying by defining and marking quality. It means making industry the servant rather than the master. Standardization is the habit forming process applied to industry for it "relegates the problems that have been solved to their proper place and leaves the creative faculty free for the problems that are still unsolved."[1]

Simplification is the scientific reduction in the useless variety of materials and finished products of any particular

[1] Chase and Schlink. Your Money's Worth. p. 181.

industry. It is out of keeping with all principles of economics to have 78 different kinds and sizes of bed blankets on the market when a thorough investigation has shown that only 12 are necessary to fulfill the needs of the consumer.[2] It has been estimated that the annual waste through preventable fires can not begin to compare with the waste in money and human energy in the production of varying sizes and styles of essentially like things. According to the Chamber of Commerce of the United States one fourth of the industrial effort in America is wasted because of unnecessary overdiversification of styles, types and sizes. This means that the labor power of approximately 500,000 men and women and 25 per cent in the cost of living is wasted annually.[3] Industry needs specific kinds of standards which will control the output of mass production, such as standards of quality, of size and form, of length, mass, time and temperature, of ratings, of practices and of nomenclature.

The argument is always raised that America is over standardized now and that further standardization and simplification, especially in an industry which produces our clothing and household furnishings, is not to be encouraged. The great army of men and women back of the movement, however, advocate technical standardization in all intermediary industrial pro-

[2] Bed Blankets - Simplified Practice Recommendation No. 11, U. S. Department of Commerce, Government Printing Office. 1928. p. 4.

[3] Chase and Schlink. Your Money's Worth. p. 196.

cesses in order to simplify the buying of necessities to the end that there will be less standardization in general living. Standardization will not apply to the buying of luxuries, except perhaps in such qualities as color fastness, truth in advertising, etc., because these we buy not for simple utility, but because they seem to express and project our own individual personalities.

Today over-production in the textile industry as in other industries, has increased the need of advertising and high pressure salesmanship until the department of distribution has become more important than that of production and we as buyers do indeed become "Alices in Wonderland of conflicting claims, bright promises, fancy packages, soaring words and almost impenetrable ignorance"[4] and most of the things we buy "advance upon us from behind a great smoke screen of advertising."[5]

The purposes of standardization and simplification are as follows:

"1. The high ultility in products of industry by setting attainable standards of quality.

2. A scientific basis for fair dealing to avoid disputes and settle differences.

3. Truthful branding and advertising.

4. Precision and avoidance of waste in science and in industry.

[4] Chase and Schlink. Your Money's Worth. p. 2.
[5] Ibid. p. 4.

5. Clearer understanding between the manufacturer, seller, buyer and user.
6. Exact knowledge as the basis of the buyer's choice.
7. A single impersonal standard of practice as the basis for the agreement of all interests, defined in measureable terms.
8. Uniformity of practice in all cases."[6]

Truthful branding and advertising is perhaps the most important to the ultimate consumer because of the growing confidence shown in trade marked goods.

Standardization and simplification are expressions of the trend of the times. High prices and high pressure salesmanship can only be offset by intelligent buying which in turn is possible only through the standardization and simplification of necessities.

[6] Cook, Rosamond. Taking The Guesswork Out Of Buying. Journal of Home Economics. March 1928. p. 165.

CHAPTER I

HISTORICAL BACKGROUND

Although the textile industry is one of the oldest and one of the largest industries in the United States with reference to the number of people employed, it is, nevertheless, one of the least progressive. Where other industries spend millions annually on research, the textile industry spends approximately $50,000.[1] Perhaps the extent of the industry and the antiquity of its origin have tended to make the textile industry more conservative and more hesitant about adopting the newer methods of industrial standardization and simplification.

Nevertheless we find faint beginnings of standardization nearly two hundred years ago when silk conditioning, i.e., giving it a standardized amount of moisture, began as a public operation in Turin in 1750. The King of Sardinia placed at the disposal of merchants a number of large halls each provided with 4 chambers and in which an even temperature was maintained in winter by means of stoves. Silk was suspended in these halls for 48 hours and transactions were based only upon the weight of the dry silk. In 1780 hurdles were installed for the same purpose at Lyons. The drying chamber containing them was officially sealed and at the end of 24 hours the silk was supposed to have reached a good condition.[2] These rather crude processes were improved and instead of drying whole bales,

[1] Schoffstall, C. W. More Research in Textiles Needed. American Silk Journal. October 1928. p. 54.

[2] Conditioning and Testing Textile Materials. Scientific American. July 28, 1900. p. 20554.

samples were taken here and there and the actual conditioned weight of the bale computed.

The first condition house established in Europe was operated on a rather indefinite plan and in 1805 the French government suppressed all private conditioning houses in Lyons by public decree, paying proprietors a certain indemnity and establishing an official station under the supervision of the Chamber of Commerce with definite rules of operation. The decree was modified in 1806, 1809, 1813, 1819, 1820, 1829 and 1832. Contrary to the conditions in article 3 of the rules which gave a certain definite temperature range for a given barometric pressure, the St. Etiene Conditioning House established in 1808 maintained a temperature of 18°-20°, Reaumer (72°-77°F) without regard to the barometric reading.[3] The condition of Paris was established in 1853 and well constructed stoves were placed at the disposal of the merchants of the city. The Chamber of Commerce of Paris in 1900 maintained a laboratory for conditioning and testing silk which was self-supporting from the fees paid by those interested.

Up to within the last half century there was little need for a well developed system of standardization and simplification. When the home produced the cloth, family pride was sufficient to prevent stinting, imitating and deceiving, but when the factory supplanted the home, machines and new methods

[3] Early Lyons Rules for Conditioning Raw Silk. American Silk Journal. June 1927. p. 68.

of manufacture were introduced and family pride in the cloth produced gave way to speed and cost of production. For a time there was no incentive to spend money on research and scientific methods. Natural fibers were abundant and cheap, skilled labor easily obtained and wages were low. There followed a period when the demand for fabrics began to increase faster than the demand could be supplied. Then came the war and America found herself suddenly without dyes, with skilled labor scarce and labor costs high. Higher production costs meant higher prices for the consumer. In order to supply the unceasing public demand for low priced goods and to meet the keen competition in markets as well, the manufacturer was forced to call in the chemist and physicist in order to develop programs of strictist economy and efficiency in manufacturing processes. The results of this cooperation of science and industry, according to a textile chemist are

1. More fibers of better quality are being produced.
2. New natural fibers are being studied to determine their manufacturing value.
3. Synthetic fibers, such as rayon, are being produced faster than silk.
4. There are more and more clever machines for utilizing all grades of fibers and waste and for simplifying tedious processes.
5. There are better chemical methods for bleaching, dying, and finishing fabrics and for recovering used wool.

6. A well organized American dye industry has been developed so that now we make dyes which are inferior to none.
7. There has been a tremendous speeding up of industry with its resulting keen competition for markets.
8. This competition is being met by the ability of the scientist to imitate a good product with a cheaper and inferior one. He mixes and finishes fibers so well one can not tell by appearance whether a fabric is of good or poor wearing quality, whether it is linen or cotton, 10 per cent wool or 50 per cent.[4]

The one great consumer in the United States who has been using standardization methods for years is the federal government who spends millions for materials which are always purchased according to very definite specifications. The beauty of a marching army and to a certain extent its efficiency depends largely upon their uniforms. It requires clever and intelligent buying to select materials which will present the same appearance after months of wear under all kinds of conditions. The material must be of good quality, the tailoring well done, also there must be a uniformity in quality of the material from all parts of the United States. Such exactness can be secured only when materials are purchased according to a standard worked out for each kind of article. The government has supplied

[4] Weirick, Elizabeth. A Textile Laboratory from the Inside. Journal of Home Economics. December 1925. p. 718-719.

centers for drawing up these standards and for close examination of the delivered articles. For everything supplied to the army specifications are drawn up under the direction of the quartermaster general who is in charge of these stations. Every shipment from the wholesaler must conform to these specifications.

In 1911 the government maintained a warehouse on Governor's Island for the storing of uniforms. Here, too, was a station for coats and linings, work blouses and linings, work trousers, dress coats and linings, dress trousers and army blankets. When materials were found which would satisfy the specifications of the government and the cut of the garment was decided upon, it was made and used as a model. Manufacturers soliciting contracts were supplied with samples of the specifications. When the manufacturer was selected, a government man went to the factory to watch the work and to send samples to the contracting officer at the station. When the bolts of goods were delivered at the station, they were again inspected, weighed, measured and tested chemically, and also for tensile strength and wear. After the material was made up, the garments were carefully examined and stored. Any which did not meet the government's tests were rejected and sold elsewhere.

This shows the care and scientific way in which the government was buying its textile materials 20 years ago. In 1914 a naval officer bought a coat for $75.00 and wore it continuously during the winter with occasional alterations to

1925.[5] It is still in good condition, unfaded and of fine appearance. This service was possible because it was bought to specifications.

In the years preceding the war there was a tendency to multiply in commodity manufacture the variety of kinds and sizes in response to a demand fancied or real from distributors and consumers. During the war period, however, needless waste was eliminated in every possible way and the variety and sizes in many lines, especially in articles for personal wear, were drastically cut. The number of colors used in making shoes were reduced; quantities and shades of cloth for men's clothing curtailed; other lines were reduced also.

This waste through useless variety was one of the causes for the creation of the War Industries Board, which was a part of the Council for National Defense. In September 1917, the Chamber of Commerce, at its War Convention of American Business held in Atlantic City, endorsed the idea that each industry organize a committee of its own which should be representative in character to cooperate with the Federal Government in every way. The Council of National Defense approved and more than 300 such committees were organized. The membership of these committees was made up of officials of the industries represented. The investigations made by these committees opened their eyes to the danger into which they had been drifting prior to the war in allowing an increase in the varieties of their

[5] Chase and Schlink. Your Money's Worth. p. 190.

products.

For 5 years following the war there was a tendency to return to the old economic condition of over diversity, but this tendency was checked by the Chamber of Commerce and by the Department of Commerce. Many products which had been simplified by the Conservation Division of the War Industries Board were again offered for sale in a perplexing number of sizes, types and shapes in an effort to break the "buyers' strike" of 1919 and 1920.

The Federated American Engineering Societies, through Herbert Hoover as president, appointed a committee to make a careful study of waste in industry. The committee reported that in the manufacturing of boots and shoes there was a waste of 41 per cent; in textiles there was a waste of 49 per cent and in the production of men's clothing there was a waste of 64 per cent. The committee believed that 50 per cent of this waste was due to poor management, 25 per cent due to labor and the remainder to conditions not directly controlled by either of these groups.[6] This shows that almost one half of the material, labor and human effort were lost through needless waste.

The purchasing power of the consumer has not kept pace with the speeding up of industry. Therefore, part of the producing machinery must be idle with great overhead costs or there will be a surplus of goods on the market which can not be sold

[6] Hudson, Ray. Organized Effort in Simplification. Annals of of the American Academy of Political and Social Science. May 1928. p. 2.

at a profit. This condition has forced production to become second in importance to selling and so we find the high powered salesman drawing a salary of $25,000 to $50,000 a year, while the industrial engineer draws only $3,500.[7]

The consumer is bombarded on all sides by this high pressure salesmanship and by competition between and within industries. He is appealed to through his emotions rather than through his intellect. The emotions aroused through the proper observance of Father's Day is of material benefit to the haberdashers for whom the day was in reality established.

The need for a well worked out system of standardization and simplification in the textile industry which will simplify the intricacies of buying is being keenly felt by the industry itself, by the Federal Government, by educational institutions, and by the public at large. The nature of these cooperating groups which are making at least a beginning in the vast field of textile standardization and simplification will be discussed in the following chapter.

[7] Chase and Schlink. Your Money's Worth. p. 30.

CHAPTER II

COOPERATING AGENCIES

Ever since mass production began there have been attempts at standardization and simplification to reduce industrial losses. At first the efforts were individual and sporadic. Now the principles of mass production are applied to waste elimination itself.

One of the most important factors contributing to the present advance is the fact that individual industrialists are showing a cooperative attitude toward competitors. This attitude astonishes foreign industry, but competition and team work are showing that many problems are common property of the entire business and may be best overcome by group action. Other factors in the progress of standardization and simplification are the widening in scope of the activities of trade associations and technical societies, useful contributions of the federal government agencies, the cooperation between educational institutions and industry and lastly the education of the individual consumer.

The cooperating agencies in the United States which are advancing the idea of standardization and simplification may be divided into 3 groups:- (1) government agencies such as the Bureau of Standards, the Department of Agriculture, with its Bureau of Home Economics, the Federal Trade Commission, state and municipal governments; (2) industrial and trade associations such as the American Standards Association, the Chamber of Commerce, the American Society for Testing Materials, the

National Better Business Bureau, the Better Fabrics League, the American Silk Association and others; (3) educational agencies such as university laboratories, the American Home Economics Association, women's clubs, and the various housekeeping "institutes".

The Bureau of Standards was set up by legislative enactment in 1901 under the control of the Secretary of Commerce, but has always acted rather independently . The director of the Bureau is appointed by the President but nominated by the Secretary of Commerce. The Bureau staff, consisting of 850 scientists and 65 research associates detailed to the laboratories by outside groups, is under civil service regulations and protected from political pressure.[1] At first the duty of the Bureau was to find suitable scientific standards for weights and measures, but now its work is much more complex and exceedingly important. Stuart Chase and J. F. Schlink speak of the Bureau of Standards as "one of the nerve centers of the Federal Government machinery."[2] Its 17 buildings look like that of a college. The government has invested $3,000,000 in the plant and $2,000,000 annually to run it.[3] The Bureau boasts some of the most delicate and powerful testing machinery ever built. It has the best equipped textile laboratory in the country with

1 Chase and Schlink. Your Money's Worth. p. 199.
2 Ibid
3 Ibid

ten full time scientists working on textiles. White House authorities come to the Bureau for advice on such questions as the durability and color fastness of velvet hangings. During the war the Bureau was extensively patronized. It worked out a practical and efficient cotton airplane fabric when linen could not be had which was stronger than linen and just as durable. This fabric was later adopted by the English government. The definiteness with which a government specification for textile materials is worked out is shown in the following:

UNITED STATES LIGHTHOUSE SERVICE
SPECIFICATIONS FOR BLANKETS
WHITE WOOL 60"x84"

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1. The warp and filling shall be made from strictly virgin wool, free from all shoddy or reworked wool, and vegetable impurities, to be of a grade not lower than high quarter blood.

2. The warp shall be laid not less than 89 inches in the loom, so as to have not less than 41 threads to the inch in the finished shrunk blanket.

3. The blankets shall be woven in a double weave and be shrunk so as to be 60 inches wide and 84 inches long when finished, the warp to have at least 41 threads to the inch and the filling to have at least 50 threads to the inch in the finished blanket, each blanket to weigh at least five pounds.

4. Blankets shall be white and napped, and may have three one inch blue or pink stripes, one inch apart located about seven inches from each end.

5. The ends of blankets shall be finished in floss overstitched edging put on by an overstitching machine with not less than 12 stitches per inch.

> 6. The letters "U. S. L. H. S." four inches high to be stitched with thread across the blanket, about 18 inches from one end, the letters to be centered between the two edges. The letters shall be stitched with blue thread if the blankets have no stripes, or if blankets have stripes the letters shall be of the same color as the stripes.[4]

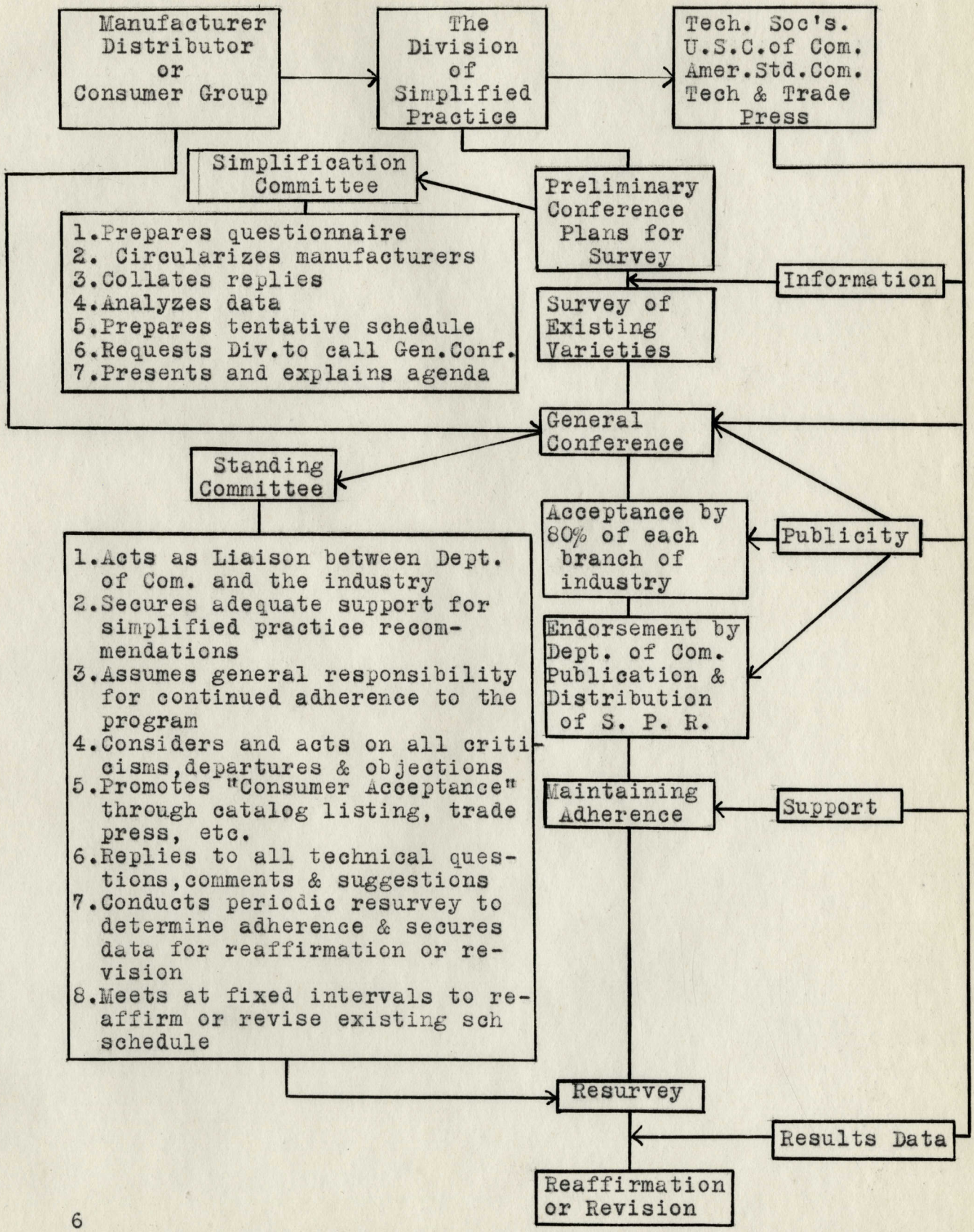
By working out standards and specifications as a basis of buying for the federal purchasing agents, it is estimated that the Bureau of Standards saves the government $1,000,000,000 annually.[5] It is impossible to know to what extent this reaches the ultimate consumer, for although the Bureau is run on the tax payer's money, information concerning competitive products is refused to him. It is argued in favor of this policy that the general release of such information would promote commercial injustice. The author agrees with Mr. Chase and Mr. Schlink that some injustice would result, but that the great good to the manufacturer, the dealer and the ultimate consumer would compensate for this; that the ultimate consumer has the same right to service as the manufacturer and that it would tend to make the manufacturer more honest. The British freely publish the results of their National Physical Laboratories which is the counterpart of our Bureau of Standards.

Herbert Hoover foresaw our present era of competition between businesses, between trades and between nations long before he occupied his cabinet position. He has since established the Division of Simplified Practice and more recently the Commer-

[4] Taken from a letter to Mr. F. X. Ritger, Purchasing Agent, University of Wisconsin, from the Department of Commerce, Lighthouse Service. January 11, 1926.

[5] Chase and Schlink. Your Money's Worth. p. 202.

COOPERATIVE DEVELOPMENT OF A SIMPLIFIED PRACTICE RECOMMENDATION[6]



6 Simplified Practice Recommendation No.74. Issued by the Nat'l. Bureau of Standards. U.S. Government Printing Office 1928. p.9.

cial Standards Group of the Bureau of Standards, through which business men may work out for and by themselves the simplification problems of greatest value. The Commercial Standards Group under an assistant director of the Bureau of Standards was created in 1927 to help coordinate simplification and commercial standards programs with reference to the needs of a partical industry.

The Division of Simplified Practice was established in 1922 as a part of the Bureau of Standards and since that time has promulgated recommendations developed by respective industries. Of interest to textile simplification has been the reduction in the types and sizes of beds, mattresses, springs and bed blankets.

The Department of Agriculture sets up official standards for farm produce and provides inspectors for the same. At first the department was opposed by farmers and business men but it now has their support.

The work of the Bureau of Home Economics comes nearest to the problems of the ultimate consumer, but for the study of problems which affect 20,000,000 homes, the government gives only $120,000, which is a mere pitance as compared to what it gives to the interest of manufacture and business in other bureaus.[7] The textile research laboratory of the Bureau of Home Economics is under the direction of Miss Ruth O'Brien.

The Federal Trade Commission handles cases of mis-

[7] Chase and Schlink. Your Money's Worth. p. 208.

branding on interstate articles at the request of some person or group which is usually a competitor. At first the results of its decisions were published, but now it feels that it is too upsetting to business to have the facts known.

State and municipal governments of which North Dakota is the best example have done much toward establishing specifications and standards of quality in foods, drugs, beverages, and gasoline, but little or nothing in textiles. A few cities, Baltimore, for instance, have passed rules and regulations regarding the marking of materials of inferior grade or seconds when displayed or advertised for sale.

Aside from the government agencies there are hundreds of other organized groups engaged in industrial standardization and simplification. This group standardization movement is a product of this century and is one of the most marked characteristics of our industrial growth. The movement first began within companies. This led, naturally, to standardization between groups and finally to national and international standardization. The World War showed the need of a national standardization clearing house and this is the work with which the American Standards Association is primarily concerned. This association is the "agency by which industrial standardization in this country is passing from the second to the third stage of development, i.e., from standardization by associations, societies and government agencies to standardization on a national scale."[8]

[8] Agnew, P. G. Work of the American Engineering Standards Committee. Annals of the American Academy of Political and Social Science. May 1928. p. 13.

In the fall of 1928 the American Engineering Standards Committee underwent a reconstruction to better adjust its work to the rapid development of the standardization movement in the United States. It has changed its name to American Standards Association. The object of the organization, as stated in its constitution, is: - "To provide a systematic means by which organizations engaged in industrial standardization work may cooperate in establishing American standardization in those fields in which engineering methods apply, thus avoiding duplication of work and the promulgation of conflicting standards; to serve as a clearing house for information on standardization work in the United States and foreign countries; to further the industrial standardization as a means of advancing the national economy, and to promote a knowledge of and the use of approved American industrial and engineering standards, both in the United States and in foreign countries and to act as the authoritative channel in international cooperation in standardization work, except in those fields adequately provided for by existing international organizations."[9] The constitution, after being worked on for a year, was ratified last October. The present association makes it easier for national organizations interested in standardization to take part in the direction of the movement.

The American Standards Association resembles a miniature industrial legislature in its organization and method of

[9] The American Standards Association. Journal of Home Economics December 1928. p. 893.

work. There is a systematic plan by which all organizations interested in a particular project decide whether the work shall be undertaken, formulate the standards, and give the ultimate approval as an American standard. In May 1928 the Association Committee consisted of 63 members, representing 36 national organizations.[10]

That the standardization movement is of vital concern to the ultimate consumer has been growing clearer to the American Standards Association since its first organization 10 years ago and gradually, too, the leaders in the movement have recognized that the consumer's point of view may be of value in setting up standards for commodities which he buys. Many trade associations still feel, however, that the ultimate consumer can have no voice in standardization. Of great interest to the consumer, and especially to women, is the fact that for the first time the consumer's view is to be represented in a national standardization group. The American Home Economics Association represents the voice of the consumer in the person of Miss Faith Williams, with Dean Margaret Justin and Miss Alice L. Edwards as alternates. Dr. Louise Stanley, Chief of the Bureau of Home Economics, is the official representative of the Department of Agriculture. Mr. Wm. J. Serrill, president of the American Standards Association speaks of Dr. Stanley as "the first American woman to enter the technical direction of national industrial standardization activities."[11]

10 Agnew, P.G. Work of the American Engineering Standards Committee. Annals of the American Academy of Political and Social Science. May 1928. pp. 13-16.

11 The American Standards Association. Journal of Home Economics February 1929. p. 145.

The American Society for Testing Materials began in 1898 as the American Section of the International Association for Testing Materials. In 1902 it became an independent organization under its present name. Today it has 4300 members and is a national technical society.[12] Its membership includes producers of raw materials; major groups of consumers, such as railroads, shipping industries, automobile industries, public utilities, federal and municipal governments; and the general interest group of consulting engineers, testing experts, educators, technologists and scientists.

The purpose of the society is (1) the promotion of knowledge of materials of engineering, (2) the formation of specifications defining quality and tests of materials and products, (3) the setting up of standard definitions and systems of nomenclature and (4) the preparation of recommended practices governing certain processes in the utilization of materials. The Society has published two books giving a total of 2750 pages of technical standards.[13] These books are distributed among members of the Society. The Society is supported solely from the dues of its members and the sale of its publications.

One of the most important of the 45 standing committees of the Society is its Committee D-13 on Textile Materials. This committee was organized in 1915 and took as its first problem the development of methods of testing cotton fabrics. The

[12] Application for membership leaflet. American Society for Testing Materials. 1927.

[13] Warwick, C. L. Work in the Field of Standardization of the American Society for Testing Materials. Annals of the American Academy of Political and Social Science. May 1928, p. 52.

activities of the committee now cover fabrics other than cotton, its most recent work being on rayon and asbestos fibers. The work of the committee is assigned to 21 subcommittees as follows:

Sub-committee I - Advisory

Sub-committee II - On Fabric Test Methods

Sub-committee III - On Testing Machines

Sub-committee IV - On Identification of Textile Fibers

Sub-committee V - On Nomenclature and Definitions

Sub-committee VI - On Tire Fabrics

Sub-committee VII - On Cotton Yarn and Thread

Sub-committee VIII - On Humidity

Sub-committee IX - On Hose, Belt and Numbered Duck

Sub-committee X - On Osnaburg Cement Bags

Sub-committee XI - On Knit Goods

Sub-committee XII - On Raw Wool

Sub-committee XIII - On Narrow Fabrics

Sub-committee XIV - On Rope and Cordage

Sub-committee XV - On Rayon

Sub-committee XVI - On Asbestos Textiles

Sub-committee XVII - On Light and Medium Cotton Fabrics

Sub-committee XVIII - On Sugar Bags

Sub-committee XIX - On Wool and Worsted Yarns

Sub-committee XX - On Wool and Worsted Fabrics

Sub-committee XXI - On Raw Cotton

This organization appears to be accomplishing more for the standardization of textiles than any other national organization. Work on the standardization of silk and silk fabrics is noticeably absent from the above list of activities, but a great deal has been done along this line by the Silk Association of America.

The work of the Chamber of Commerce in standardization and simplification has been briefly reviewed in the preceding chapter.

The Better Business Bureaus, which are an outgrowth of the Truth in Advertising Campaign, began some 15 years ago. Today they are to be found in at least 44 of our principal American cities - New York has one, Boston, Cleveland, St. Louis, Buffalo, Baltimore, Kansas City, Los Angeles, San Francisco, and so on.

Up to 1925 the Better Business Bureaus operated under the direction of the National Vigilance Committee, which was a committee of the Associated Advertising Clubs of the World. In May 1925 a resolution was adopted at the annual convention of the Associated Advertising Clubs of the World in Houston, Texas, under which the National Better Business Bureau of the Associated Advertising Clubs of the World was incorporated. In February 1927 the charter was changed and the National Better Business Bureau became the National Better Business Bureau, Inc., by which move it became independent of the Advertising Association, although it still works in close cooperation with it.

Each bureau is an independent corporation, managed and financed locally and directed by the leading citizens of the

home town. Its work is divided into two definite sections, the one known as the financial, the other, the merchandise. It is the merchandise section that is of interest to the work in the standardization of textiles. "It is the effort of the Bureau in the merchandise field to cooperate with groups of industries throughout the country to eliminate unethical practices in advertising and extravagant claims which mislead the public. Today the National Better Business Bureau is in consultation with 26 groups. Hardly a day goes by that some industry does not come to the Bureau for suggestions and cooperation."[14] Many recommendations regarding the true statement of quality in textile goods, such as hosiery, infant wear, and wool blankets have been adopted by the trade and have become codes of practice in the industry.

The institute idea is favored in the textile field. The Cotton Textile Institute, under Mr. Walker D. Hines, is attempting to bring about standardized practices in some unsatisfactory trade conditions which will affect the manufacturer. There is a Wool Institute, A Rayon Fabrics Institute, and a Carpet Institute, with programs similar to the Cotton Institute. A Knitwear Institute will probably soon be organized.

There are many associations of manufacturers interested in the standardization and simplification movement. In 1894, when the National Association of Cotton Manufacturers was in-

[14] Auchincloss, James C. The Better Business Bureau - Its Growth and Work. Pamphlet - National Better Business Bureau, Inc. November 1927. p. 10.

corporated as the New England Cotton Manufacturers' Association, it stated its purpose in its charter to be "for the purpose of encouraging scientific investigation and experiment as to the methods of manufacturing cotton; collecting and imparting information relating to this industry; promoting social intercourse among its members; and establishing and maintaining a library of works on textiles."[15] The purpose remains the same today, although the name of the organization has changed and although this was written before the word "standardization" was much used, it has always been disseminating information which would help its members bring their manufacturing processes up to the best practices found.

The Silk Association of America is active in working out standards in the silk industry both here and in the Orient. The American Cotton Growers Association is advocating cotton coverings for baled cotton and standardized tare weights for bale coverings. The Better Fabrics League of America functions for dyers and cleaners. The Converters Association is active in discouraging misbranding.

The Better Fabrics Testing Bureau, Inc., is a commercial laboratory owned and operated by national organizations. It was established in June 1928 by the National Retail Dry Goods Association and the Better Fabrics League of America, primarily to serve retail merchants and manufacturers offering textiles and fur products in retail stores. Textiles and furs are tested

[15] Shover, John. Standardization of Textiles. Annals of the American Academy of Political and Social Science. May 1928. p. 174.

for cleaning and laundering also. In addition to commercial testing and analyzing of merchandise, retail stores are assisted in the preparation of specifications for buying the different articles of staple textiles in order that the buyer may have definite standards by which to be guided when placing orders with the manufacturers.

Great corporation laboratories, like that of the General Electric Company, and laboratories of smaller industrial companies conduct tests and carry on research work which will lead eventually to more standardization in the textile field. The Directory of Commercial Testing and College Research Laboratories issued by the National Bureau of Standards lists 67 commercial testing laboratories and 57 college research laboratories which are prepared to test textile fibers and textile products to see if they comply with purchase specifications.[16] This directory was compiled as an incentive to induce more purchasers to adopt the specification method of buying commodities.

Another type of organization which is helping to further standardization is the integration of industry. An example of this type may illustrate the point. There is a textile corporation which manufactures and sells coarse cotton cloth of four classes. The plants of this corporation consist of 2 finishing plants in New England and 5 Southern cotton mills, which spin and weave coarse cotton cloth from the raw

[16] Directory of Commercial Testing and College Research Laboratories. Miscellaneous Publication No. 90. National Bureau of Standards. United States Government Printing Office. 1928 and 1929.

cotton.[17] The new owner was attracted by the idea of scientific management and as a result applied research and the establishment of standards and controls of operation all along the line in determining policies, as well as in merchandise, finance and production.

Textile and textile chemistry departments of universities and colleges are assuming a position of considerable importance both for the training of teachers and specialists for business fields and for the notable part they are taking in general textile affairs. A survey carried on by Pauline Beery Mack of the Pennsylvania State College shows that many more schools responded to the call in 1928 than in 1927 and that the subjects for investigation cover a wide range of textile problems.

There has been a close cooperation between the college textile laboratory and the textile manufacturer and merchant. The Bon Marché Department Store of Seattle gives a $600 fellowship to a student in the textile department of the University of Washington. The holder of the fellowship combines textile testing for the store with studies in textiles and textile chemistry.[18] The Ohio State University at Columbus runs tests for the Better Business Bureau as well as for the stores. Pennsylvania State College is the only college textile chemistry laboratory that makes tests for the state institutions before they make purchases.

[17] Shover, John. Standardization of Textiles. Annals of the American Academy of Political and Social Science. May 1928. p. 175.

[18] Mack, Pauline Beery. College Textile Laboratory and Its Possibilities. Journal of Home Economics. February 1929. p. 95.

From an item in the "Womens Wear Daily" the following is taken to show the cooperation between educational and commercial organizations and to show the growing desire on the part of the manufacturer and retailer to cooperate with the consumer on a basis of honesty and mutual interests: "Before offering a collection of silk dresses to the public at $5.75, the Smith Kassan Company made use of the facilities of the schools of Household Administration of the University of Cincinnati and had the dresses tested for fading, thread count and tensile strength. Following the tests, the dresses were displayed in two store windows with cards explaining the tests, showing photographs of the machines used and stating that 'the results enable us to assure you splendid service and fast colors.'"[19] The dresses were of crepe combined with voiles and shantungs, of which 75 per cent was silk and 25 per cent rayon "to intensify the color value", and "each dress was washed 5 times in 1 of the 5 popular laundry soaps and given a light exposure equal to 3 months of summer sunlight."[20] Of course this was a clever bit of advertising, but it was at least honest advertising.

In 1927 a survey showed that only 3 department stores had textile testing laboratories of their own. Now 40 more are either opened or about to open.[21] There is an increased tendency for department stores to turn to the college textile laboratory

[19] Journal of Home Economics. News Notes. August 1928 p. 614.
[20] Ibid.
[21] Mack, Pauline Beery. Progress in Textiles. Journal of Home Economics. October 1928. p. 715.

with problems needing solution.

There are other organizations which may be classed as educational such as the Good Housekeeping Institute and the New York Tribune Institute, which are helping to establish standards of quality. Materials and household appliances are tested in these institutes and if approved are as in the case of the Good Housekeeping Institute stamped with a certain label designating the approval by the Institute. This work is good to a certain degree, but it would be difficult for a magazine or paper to be absolutely unbiased in their judgment of an advertiser's product when that same advertiser pays such enormous sums for the privilege of advertising in that same magazine or paper.

The American Home Economics Association is the great national organization of women most interested in the standardization of textiles. This interest began at the close of the war period when the Textile Section of the Association in 1919 began working on some plan of helping the consumer, to select over the counter the best fabric for the purpose, for the money the consumer has to spend. Many women have worked on this project but Miriam Birdseye, Ruth O'Brien and Rosamond Cook stand out as leaders. A university fellowship has been granted by the Textile Section of the Association each year since 1926 with the understanding that investigations made under it should deal with problems related to the standardization of textiles. Some of the methods by which this organization is adding its bit to the advance of textile standardization and simplification are discussed in Chapter V of this thesis.

The public as a cooperative agency has done very little in the field of standardization and simplification because such work to be effective must be accomplished through some organized channel and the ultimate consumer has not been organized. It is only this year that he has been represented in the meetings of the American Standards Association. Through educational campaigns and the reading of such books as "Through Many Windows" by Helen Woodward and "Your Money's Worth" by Stuart Chase and F. J. Schlink the consumer is being converted to the idea of standardization and the public is becoming "quality conscious."[22] This state of mind on the part of the ultimate consumer will be just one more factor contributing to the advance of this great movement.

[22] Kuhn, Miss W. Paying For What You Get. American Silk Journal. December 1927. p. 57.

CHAPTER III

THE EFFECT OF STANDARDIZATION AND SIMPLIFICATION

If a well organized system of standardization and simplification becomes a part of our industrial program, the question arises as to what benefits or results the producer, the consumer and the nation may expect from it.

That standardization and simplification yields benefits which are attractive to the manufacturer and distributor is shown by the high degree of adherence to the recommendations of the Bureau of Standards. June 1928 found 85 per cent of the manufacturers and distributors adhering to the recommendations.[1] In 1927 there was an increase in the number of associations accepting recommendations from 686 to 898 and an increase in the number of individual concerns reporting a definite money gain from 2,775 to 6,676.[2]

By applying standardization and simplification to production the manufacturer will receive the following benefits:

1. Less capital will be tied up in raw materials, storage space, machinery, etc.

2. There will be more economical manufacturing through larger units of production and more effective stock control.

[1] Standards Year Book. The National Bureau of Standards. 1929. p. 234.

[2] Hudson, Ray. Organized Effort in Simplification. Annals of the American Academy of Political and Social Science. May 1928. pp. 5-6.

3. There will be better and more simplified inspection, less idle equipment, and a reduced amount of equipment.

4. There will be a reduced clerical overhead, a simpler and more accurate cost accounting system and elimination of waste in experimentation.

5. There will be better earnings through increased individual production by longer runs, more contented workmen, more permanent employment and less seasonal work.

6. There will be better service to the trade in a better quality of product, more prompt deliveries, decreased quantity and size of packing and less obsolete material.[3]

To the distributor this program will mean:

1. An increased rate of turnover due to all live numbers.

2. The elimination of slow moving stock, a greater concentration of sales on fewer items of standard patterns that have proven to be best sellers.

3. A decreased capital investment in stock on hand, storage space, less stock depreciation and obsolescence, decreased overhead on handling clerical work.

4. Better service through lower prices and quicker delivery.[4]

[3] Hudson, Ray. Organized Effort in Simplification. Annals of the American Academy of Political and Social Science. May 1928. pp. 5-6.

[4] Ibid.

While to the ultimate consumer the benefits will be:

1. Better prices than is otherwise possible.

2. Better quality of product through the ability of the manufacturer to concentrate on better design and through the reduction of manufacturing expenses.

3. Better services and quicker delivery

4. Less guesswork in buying because the product will have a definite recognizable quality as shown by markings of some kind.[5]

If through simplification the principle that "there need never be made more sizes and shapes of a given thing than can be distinguished as such by the user"[6] be followed a vast amount of confusion on the part of the consumer will be eliminated. One manufacturer makes 2500 varieties of women's handkerchiefs.[7] The buyer would have a better chance to find what she wants if he manufactured only 25 or 30 varieties instead. So far there has been much greater percentage reductions in stock items in industries other than the textile industry - especially is this true in the building trades.

When the new buying methods based on standards are in operation, there will be no logical reason why the saving of waste will not release sufficient purchasing power to enable the consumer to buy more clothes and so give the same turnover to the industry. It is reported that for every 100 men in the

5 Hudson, Ray. Organized Effort in Simplification. Annals of the American Academy of Political and Social Science. May 1928. pp. 5-6.

6 Chase and Schlink. Your Money's Worth. p. 174.

7 Ibid.

United States there are only 62 who buy suits annually, 52 who buy hats and 18 who buy gloves.[8] With lower prices more suits, hats and gloves can be purchased and the needed turnover to the business secured.

Established standards will help the buyer and seller talk the same language. There will then be no misunderstanding of trade names, such as French Linen, Costume Velvet, Subsilk and Wooleen. It will force sales talk to focus on fundamentals and eliminate much of the emotional appeal which usually misleads the prospective buyer.

With textile standardization, the consumer will often be able to buy cheaper products which tests show are just as good as some of the higher priced ones. For instance, the government tests show that shoddy is just as good as virgin wool for some purposes and much cheaper.

The classification of quality will furnish a basis for correct catalogue and advertising descriptions and for guarantees.

A conservative estimate of the annual cost of advertising in the United States is $1,250,000,000.[9] The cost of advertising for 8 of the industries in 23 of the leading magazines is:

Automotive industry	$ 21,186,884
Building materials	6,790,164

8 Chase and Schlink. Your Money's Worth. p. 174.
9 Agnew, Hugh E. Can Standardization Reduce Advertising Costs. Annals of the American Academy of Political and Social Science. May 1928. p. 253.

Clothing and dry goods	$ 7,438,626
Drugs and toilet articles	19,787,927
Foods and food beverages	21,093,402
Furniture and furnishings	15,354,993
Shoes and shoe furnishings	2,700,833
Musical instruments and radio ..	5,040,632[10]

Dr. Hugh Elmer Agnew, Professor of Marketing at the University of New York believes that the standardization of products will not reduce these advertising costs because the style element, especially in clothing and dry goods, which constitutes a considerable part of this classification, can not be standardized. He says that sheeting and hosiery might offer some possibilities, but that no store wants to admit that it has exactly the same goods as every other store and that this is one reason why many merchants object to handling advertised brands.[11]

Stuart Chase and F. J. Schlink, in their book "Your Money's Worth", take a somewhat different view of the subject and state that if the technique of tests, standards and specifications were in operation much of the selling effort would collapse and that "if science could displace magic in salesmanship, the whole curve of consumption would change."[12] And again, being amusingly and yet understandingly satirical, they

10 Agnew, Hugh E. Can Standardization Reduce Advertising Costs. Annals of the American Academy of Political and Social Science. May 1928. p. 254.
11 Ibid. pp. 253-254.
12 Chase and Schlink. Your Money's Worth. p. 258.

continue "as one of the major chords is flattery, on the whole we like this Wonderland. It is stimulating, colorful, romantic. To read the rear 90 per cent of the Saturday Evening's Post is the next best thing to going to the movies. We know we are becoming constantly disillusioned with nearly every sort of thing we buy, but how charmingly is it done - what car loads of free samples, elegant handbooks in four colors, alluring packages, service, hostesses, rest rooms, manikins, quick deliveries, sympathetic understanding, are ours! While the charge for it all comes painlessly camouflaged in the total price."[13]

While there is much to be considered on both sides of the question, the author feels that the bulk of the argument is in favor of reduced selling and advertising costs through standardization and simplification.

Another phase of the results of this new program is its effect upon labor. In spite of our lack of employment, standardization and simplification has advanced the standard of living many years before such a situation could possibly have been secured under methods and practices which existed before the war. We may have more unemployment than European countries, but we also enjoy a higher standard of living among our laboring classes than do these other countries.

Matthew Woll, Vice President of the American Federation of Labor, says that, "labor favors standardization where standardization does not restrict or standardize human life", and that labor approves of the movement where it simplifies the mechanics

[13] Chase and Schlink. Your Money's Worth. p. 260.

of life, but that labor objects where it seems that standardization will rob life of its diversity, take its beauty or infringe upon its freedom.[14]

There has been a steady decline in the number of employees since 1919 because fewer workers produce a greater output. So far this new program has worked against labor, but that is the result of a faulty application of the method and not the method itself. One of the labor problems ~~is~~ arising because of this faulty application is how to meet the displacement of workers because of increased productivity and seasonal fluctuations in demand. Another problem is how to keep the workers purchasing power growing in proportion to this increased productivity. The wage standards must increase proportionately to the increase in production or there will be no market for the products. The problem of how to develop vocational education methods to meet the new industrial condition is demanding the attention of labor leaders and of educators.

The standardization programs which have been of decided benefit to labor are the safety codes for industry, uniform working conditions and the standardization of machinery. When standardization of the finished product brings about standardization of machinery, processes and operations, a better placement of employees results. Short persons can not reach over large looms, nor over the reeds of a large long chain quiller frame. As a

[14] Woll, Matthew. Standardization. Annals of the American Academy of Political and Social Science. May 1928. pp. 47-48.

result of standardization throughout a plant, employment managers are able to make better assignments of jobs since they can better determine the requirements for each type of work.

There has been a marked improvement in business ethics in the last generation due partly to the work of such organizations as the Better Business Bureaus and the Federal Trade Commission and partly to the changed industrial conditions. The Federal Trade Commission furnishes the best and most authoritative facts about fraudulent and misrepresented goods at the present time. This is not a perfect source, however, because it is interested primarily in questions of trade practices and simple chicane, such as stealing slogans and false advertising. In November, 1926, the Daisy Products Company was ordered to stop marketing and advertising cloth hat bags with shiny coating as "Patent Leather," "Patent Leather Material," etc. On October 30, 1926, the N. B. Bardwell Company of New York was ordered to "cease and desist" selling Chinese lace as Irish lace. Amory Brown and Company were also forced to change their label from "De Lux Pongee" to "De Lux Cotton."[15] These few examples serve to show the results of violating some of the standards already established.

One unsatisfactory trade practice which would be improved by standardization and simplification is that of selling the same quality material under several trade names. For example, the American Feather Bed and Pillow Company sold bedding all of

[15] Chase and Schlink. Your Money's Worth. pp. 96-100.

the same grade and quality under 5 different trade names, such as "Puritan," "Princess," "Ideal," etc., and their prices varied accordingly.[16] Such practices serve only to confuse and mystify the buyer and their elimination will be a decided benefit to all.

The national government will be affected by this new industrial program in two ways. First, economically, there is the direct saving to the government in making its own purchases, and also the fact that individual prosperity means in its turn national prosperity. Secondly, it will affect the nation politically. Good will between the United States and other nations will be fostered by a clear and definite quality standard for imports and exports. For example, the old grade terms used for many years in China and Japan for grading raw silk had never been defined in terms of characteristics which could be measured. The introduction of new grade terms and an increase in the number of buyers and sellers increased the amount of controversy and misunderstanding regarding grades of deliveries between the Orient and the United States. The cooperation and international conferences held by the silk men of the East and representatives of the Silk Association of America in their attempt to establish a satisfactory international standard for the classification of raw silk, will go a long way toward maintaining friendly relations between the United States and Japan and China. Conflicting economic claims are the real and only cause for controversies between nations and if these can be lessened

[16] Chase and Schlink. Your Money's Worth. p. 83.

by establishing mutual interests and understanding through international standards, a great step will have been taken toward a permanent world peace. On the other hand standardization and simplification make possible greater foreign markets, but make them at the expense of someone else. Competition becomes an elbowing out process and in the case of the United States, the nation which is most likely to be pushed out is Great Britian. In our foreign commerce we are 25 per cent ahead of the best we did before the war - England is 10 per cent behind her best.[17] Such a situation is bound to cause international jealousy, with a possible cause for wars. The international aspect of standardization has potentialities for both good and evil and is a problem which will require careful diplomatic handling.

Standardization and simplification will tend to remove the need of a protective tariff. When we can produce cotton duck cheaper than any other country in the world, where is the need of a 65 per cent tariff on it?[18]

The far reaching effects of this new movement make it a problem worthy of the most serious consideration on the part of individual and nation alike.

[17] Russell, Charles Edward. The New Industrial Era. Century Magazine. 1926. Vol. 112, p. 7.

[18] Russell, Charles Edward. Take Them or Leave Them. Century Magazine. June 1926. p. 168.

CHAPTER IV

THE PROGRESS MADE IN STANDARDIZATION AND SIMPLIFICATION OF TEXTILES IN FOREIGN COUNTRIES

There has been an astonishing amount of standardization work carried on in the industries of Europe since the war. Such a program was very important to the rehabilitation of Europe after 1918 and will be an absolute necessity to her in the future. At first standardization and simplification was of interest only to the technical man, but now managers of industry realize its importance if they are to compete for foreign markets. Business representatives from practically every country in Europe visit the United States to study the efficiency of the movement here that they may the better apply its principles in their own country so that they too may sell at a profit in the markets of the world. "Simplification and standardization in Europe have become a part of the very important movement of rationalization of industry"[1] and their interest was shown at the World Economic Conference held at Geneva May 4-23, 1927, where rationalization was an important topic for discussion. Europe defines rationalization in industry as "the methods of technique and of organization designed to secure the minimum waste of effort or material with the following aims in mind:

1. To secure the maximum efficiency of labor with the minimum of effort.

[1] Karabasz, Victor S. Simplification and Standardization in Europe. Annals of the American Academy of Political and Social Science. May 1928. p. 25.

2. To facilitate by deduction in variety of patterns the design, manufacture, use and replacement of standardized parts.

3. To avoid the waste of raw materials and power.

4. To simplify the distribution of goods.

5. To avoid in distribution the unnecessary transport, burdensome financial charges and useless interposition of middlemen.[2]

The results of this program should secure to the community greater stability and a higher standard of living; to the consumer lower prices and goods more carefully adapted to general requirements; to the producer, higher and steadier remuneration to be equitably distributed among them.

This great growth of standardization in Europe since the war is due to (1) the industrial condition of Europe after the war, (2) the fact that standardization and simplification have become an important part of the rationalization movement, (3) the realization that standardization and simplification have an important bearing on foreign trade, (4) to the general use of sectional committees which practically insures the utilization of the standard after adoption, (5) to the publications which keep industry informed of the progress made in standardization throughout the country.

Interest is also shown in Europe in articles published in technical magazines and in two recent books, one of which is "Simplified Practice" by Cecil Chrisholm of England and the other

[2] Karabasz, Victor S. Simplification and Standardization in Europe. Annals of the American Academy of Political and Social Science. May 1928. p. 25.

"The Elimination of Waste Movement in the United States" in which Mr. B. Birnbaum, a member of the German Merchants Delegation to the United States, discusses the work of the Division of Simplified Practice of the United States Department of Commerce.

Before the war there existed only one national engineering body in Europe, that of the British Engineering Standards Association. Now there are 16 European countries with such bodies at the present time and there is probably not a single country that does not carry on the work in some form. The national standards committees or associations in the order of organization are Great Britian 1901, Holland 1916, Germany 1917, Switzerland 1918, France 1918, (reorganized in 1926), Belgium 1919, Canada 1919, Austria 1920, Italy 1921, Japan 1921, Hungary 1921, Australia 1922, Sweden 1922, Czechoslovakia 1922, Norway 1923, Russia 1923, Denmark 1924, Poland 1924 and Finland 1924.[3]

Standardization work began on a national scale in Germany, May 1917, when the Normalienausschuss für den Machinenbau was organized for standardization of fundamental machine elements. By December 1917 the work had spread to other industries and the name was changed to Normalienausschuss der Deutchen Industrie. In November 1926 the name was again changed to Deuscher Normenausschuss to indicate the wider scope of work. This is now the standardizing body in Germany and operates on a commercial basis. This organization employs a staff of 262 and occupies 9 buildings.[4] There is important work now being

[3] Standards Yearbook. The National Bureau of Standards. 1928.p.31.
[4] Ibid. p. 34.

done in the standardization of textiles, agricultural implements enamel ware, leather, oil, building material, etc., but the outstanding characteristic of German standardization work, besides the fact that they have established at least 2100 standards is that most of the standardization is dimensional with little reference to quality.[5] One problem they are now working on through dimensional standardization is the elimination of excess colors for felt hats. The Journal of Home Economics for October 1928 carries the following item concerning some clothing standardization in Germany; "The German government, having previously adopted a standard format for pocket books, the Institute for Efficiency in Public Administration has proposed that uniforms worn by officials of those departments have pockets of corresponding size."[6] The Consul General, A. T. Haberle of Dresden reported to the United States Department of Commerce that "according to recent newspaper reports, the principal German manufacturers of rayon contemplate making an agreement regarding the standardization of manufacturing methods of the make up and packing of this product for the purpose of reducing the cost of manufacturing."[7] Consul Hamilton C. Claiborn of Frankfort on the Main reports that "very intensive work is being carried on in the German laboratories toward improving the quality of the product (rayon) particularly the fine acetate yarn and

[5] Karabasz, Victor S. Simplification and Standardization in Europe. Annals of the American Academy of Political and Social Science. May 1928. p. 27.

[6] Standard Pockets. Journal of Home Economics. October 1928.p.773.

[7] Shover, John C. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. May 1928. p. 175.

producing a thread whose affinity for different dyes may be depended upon as uniform."[8]

Standardization work in Great Britian has developed slower than in the United States and Germany, but the interest which Great Britian has taken in her textile industry has done much to make English textiles acceptable in all the fabric markets of the world. The British Engineering Standards Association was established in 1901 with a budget of $80,000 per year.[9] It now employs a staff of 570, is housed in 20 buildings and has a library of 9,000 volumes.[10] The program is similar to that of the United States except that it is handicapped by not having a Division of Simplified Practice as the United States Department of Commerce has. There is a great deal of emphasis placed on foreign trade possibilities and standards are translated into foreign languages with the hope of increasing the market for British goods. England has an official trade mark and keeps a list of the licenses authorizing manufacturers to employ the official mark. This list is open for public inspection at any time. Textile manufacturers of England are probably doing a great deal for textile standardization, although no information could be secured on this point.

Czechoslovakia has also adopted an official trade mark for goods manufactured in accordance with its specifications.

8 Shover, John C. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. May 1928. p. 175.

9 Karabasz, Victor S. Simplification and Standardization in Europe. Annals of the American Academy of Political and Social Science. May 1928. p. 28.

10 Standards Year Book. National Bureau of Standards. 1928. p. 31.

France has the Laboratoire d'Essais under the Conservatoire National des Arts et Metiers which is a national testing laboratory. This laboratory has a staff of 180 members, which is 3 times the pre war status.[11] Russia is at present preparing standards for flax fiber and woolen goods.

A recent press dispatch of interest to textile manufacturers and users of textiles reports that European manufacturers of rayon have formed a committee to obtain the adoption of uniform standards and the employment of uniform commercial practices in the various branches of the rayon industry.[12]

China and Japan are showing an active interest in the testing and grading of their silk. There is an International Testing House at Shanghai which conducts a course for filature operatives and does commercial testing for clients in China and in the United States. The Kwangtung Provincial Government in 1927 was considering a budget for establishing a silk testing house at their capitol, Canton. Reelers were anxious to have such a testing house for grading their silk and it was suggested that the United States Testing Company, Inc., prepare a statement of the requirements for the establishment of a house in Canton similar to the one in Shanghai.

After the American Japanese Technical Conference held in Japan early in 1928 and their unofficial visit to China, William Cheney reported that the visit created a great dela of

[11]Standards Year Book. National Bureau of Standards. 1928. p.39.
[12]Rayon Standardization. Journal of Home Economics. April 1929. p. 304.

interest among the young silk men of China.[13] Science has not been utilized as it should be in the rearing of good quality cacoons and silk worms so that the quality of cacoons varies from year to year depending upon the climate and weather conditions. Recently there has been much complaint on the part of American consumers regarding the quality of Chinese raw silk. There is a movement on foot in China now to classify their raw silk on a scientific basis. Toward this end they plan to group all silks produced by steam filatures in Central China into 7 or 8 grades, following the Japanese example. The silk men will submit 3 sample skeins of each chop to the International Testing House for testing size, evenness and cleanliness. Through cooperation with the Testing House they hope before long to have a tentative standard for each grade worked out. Hitherto raw silk has been sold by its chop, say "Anchor" at 1300 taels, or "Centaure" at 1200 taels.[14] To the layman these quotations are a puzzle and Anchor and Centaure do not tell the quality of the silk.

The fact that the Technical Committee of the American Silk Association did not include China in their official visit to the Orient was keenly felt by the silk men of China and is acting as one of the incentives to bring Chinese raw silk up to a standard which will equal that of Japan in its importance to the United States.

[13] Cheney, William. American Silk Journal. August 1928. p. 39.
[14] Whang, Paul K. Awakening of Chinese Silk Men. American Silk Journal. February 1929. p. 61.

There has been a great amount of work done in Japan on the standardization of her silk industry and there has been close cooperation with the American Silk Association in an attempt to establish standards which will meet the quality specifications demanded by the American manufacturer. The best grade of silk is required for silk hose. The Yodasha Silk Reeling Factory at Marikomachi, Japan, uses the Cheney standardized seriplane to test the grading of their silk threads and in this way meet the high standards of production needed for American goods. A runner in silk hose may be traced to a poor knot or a weak spot in the silk threads so only a limited number of knots and thick places are allowed in the best grades.

At the Imperial Silk Conditioning House, all raw silk shipments may be tested for quality of size, color, uniformity, breaking strength and for the percentage of water. The government tests are made just before shipment because silk changes weight in storage. After inspection, the raw silk or yard goods is officially stamped to show the grading. At Yokohama the Government Silk Inspection Bureau inspects yards goods for quality, including weight, length, width, and defects, such as stains or breaks. The inspection stamp is placed on the outside end of the 50 yard bolts. Printed ovals in red ink are used for stamping first grades and the same stamp in blue for second grades. These stamps may be seen on the new bolts of Japanese Pongee, Figi Silk, Habutai or Jap Silk in our retail stores.

The Yokohama Bourse has adopted a system of classification of raw silk as follows:

CHOP ADVERTISEMENTS WHICH DO NOT

DEFINE QUALITY

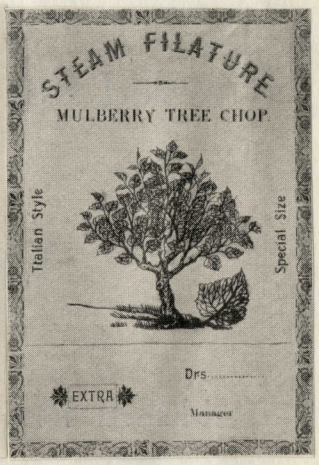
You will be satisfied with the quality of our silk.

CHOPS:

"Eight Horses"
"Mulberry Tree" and
"Flying Eagle"

Zung Fong Silk Filature

Shanghai, China



Raw Silk reeled from the selected cocoons and under the best supervision.

Hong Zun Silk Filature

Shanghai, China

Chops:—**"Matchlessness"** and **"Rat and Cow"**

Raw Silk of Well-known Chops:

"T. S."

"Gold Flying Dragon"

Sui Foong Silk Filature

Shanghai, China

Manager: Shoa Chun Kuo

American Silk Journal. 1929.

STANDARDIZATION STAMP OF THE

IMPERIAL JAPANESE GOVERNMENT

	A	B	C	D	E
Size variation on 13/15 denier	13.75-14.40	13.75-14.40	13.70-14.50	13.70-14.50	
Winding - no. breaks 100 turns per min. should be below	5	6	6	7	7
Evenness by seriplane - average should be	80	75	70	65	60
Range of denier variation should be	80	75	70	65	60

Each grade is decided by the merits of the physical quality of the raw silk determined by sizing, winding, evenness and cleanness tests - 50 per cent merits for evenness and sizing tests, 25 per cent for cleanness and 25 per cent for winding tests. Under this calculation the per cent of merits on all tests are applied as follows:

Above 80 per cent ..... Grade A
" 75 " " ..... " B
" 70 " " ..... " C
" 65 " " ..... " D
" 60 " " ..... " E [15]

The American Japanese Technical Conference held in Japan in the spring of 1928 for the purpose of working out an international standard for the testing and grading of raw silk was very successful, It did much to establish friendly relations between the United States and Japan and to stimulate interest in the establishment of the proposed international standard.

[15] A World Standard for Raw Silk? American Silk Journal. February 1928. p. 61.

This brief review of the work in foreign fields shows that while textile standardization and simplification have not progressed far, they have, nevertheless, been started and are destined to make rapid strides forward in the near future.

CHAPTER V

ATTEMPTS AT STANDARDIZATION OF TEXTILES THROUGH LEGISLATION

For more than 20 years there has been an endless number of bills presented before congress in an attempt to regulate the misbranding of articles or to provide for compulsory labels on fabrics or articles made therefrom. These bills have from time to time been represented and sponsored by important trade and educational organizations, but because they were impractical or because their passage would have complicated matters without helping, no legislation has resulted. The majority of the witnesses who have testified and offered suggestions at the committee hearings on these bills have been heartily in favor of some type of legislation which will improve the ethical status of advertising and selling textile materials in this country. The fundamental contention is the advisability of a compulsory branding of all or specified articles which will designate with more or less accuracy the material of which the fabric is made and the amount or proportion of each material, or a bill which would not make branding compulsory, but which would prohibit misrepresentation on the label.

The agitation for textile labelling legislation began in earnest around the period of the 62nd and 63rd congress, during the years of 1911 to 1914. Prior to 1911 articles had been appearing in various magazines trying to arouse the interest of the purchasing public to the need for legislation which would

prevent the unlabelled adulteration of textile materials. Nellie Crook wrote several articles for Harper's Magazine about this time in which she based her argument for textile legislation upon tests and investigations which she herself had conducted. In 1910 her tests showed that linen toweling selling as pure linen was linen and cotton; that wool dress material selling for 75 cents per yard as all wool was 65.88 per cent wool and 34.12 per cent cotton; that silk selling at 59 cents per yard contained 71.14 per cent weighting and that handkerchiefs stamped "Warranted Pure Linen" and selling at 55 cents per dozen contained no linen at all![1] In 1911 she published the following results on a fiber content test which she had made on ladies' ready to wear coats;

	Cost	Wool	Cotton
Ladies ready to wear coat	$ 8.00	77 per cent	23 per cent
Ladies ready to wear coat	$15-$20	77 per cent	30 per cent
Ladies ready to wear coat	$25.00	55 per cent	45 per cent
Ladies sweater sold as all wool		51 per cent	49 per cent
Ladies sweater sold as all wool		47 per cent	53 per cent
Ladies sweater sold as all wool		53 per cent	47 per cent
Ladies union suit sold as 90 per cent wool		16 per cent	84 per cent

[2]

[1] Crook, Nellie. Deceiving the Shopper. Harper's, March 5,1910.p.12
[2] Ibid. December 30, 1911. pp. 7-8.

It was Miss Crook's opinion that the honest manufacturer was forced to adulterate materials in order to compete with the unscrupulous and that the manufacturer's label meant very little, therefore, she felt that there should be laws requiring the manufacturer to label his goods correctly.

Almost 20 years have passed since Miss Crook carried on her investigations and made her deductions. No laws have been passed and yet today the manufacturer's label does in general mean something, concealed adulteration has greatly diminished and business ethics on the whole are vastly improved. This has been accomplished, not by legal pressure from without, but by self government within industry itself, which is, after all, the most effective and economical method by which to bring about industrial reforms. It would be a difficult undertaking to attempt to make individuals honest through legislation. The manufacturer must be made to see the economic need of honesty and the purchaser must be educated to demand it, then honesty will come naturally and be permanent.

A review of the bills which have been introduced into congress during these last 20 years will reveal the fact that the producers of wool have been the principal interests back of the proposed textile legislation. Their efforts have always been toward the passage of laws which will give the kind and proportion of virgin and used wool. They have given their bill the attractive name of "Truth in Fabrics" bill and have argued that the purchaser was entitled to know what he is buying, but the testimony given in committee hearings and before congress

shows that the majority of those favoring the legislation were primarily interested in the sheep industry and hoped to increase the price of raw wool by increasing the demand for fabrics made from raw wool.

In a study of the Congressional Records no proposed textile legislation was found prior to 1911. In the 2nd session of the 62nd congress, a bill, HR25685, providing for labelling and tagging of all fabrics and articles of clothing intended for sale which enter into interstate commerce and providing penalties for misbranding, was introduced by Mr. Murdock of Kansas, and was referred to the Committee on Interstate and Foreign Commerce. No further trace could be found of this bill, in fact, this seems to have been the fate of most of the textile bills which are recorded in the Congressional Record. They are introduced, referred to the Committee on Interstate Commerce or to the Committee on Interstate and Foreign Commerce, a hearing is held, time and money wasted and then the bill is dropped only to reappear in the next session of congress.

During the 1st and 2nd sessions of the 63rd congress no less than 10 bills were introduced which related to the branding of textiles. No report could be found in the Congressional Record of the bills introduced by Mr. Murdock and by Mr. Palmer of Pennsylvania on April 7, 1913, by Mr. Johnson of Utah on May 10, 1913, and by Mr. Pepper of Iowa on September 5, 1913. Of the other 7 bills, one was reported back, one debated and the remaining 5 were referred to the Committee on Interstate and Foreign Commerce and dropped.

On April 9, 1913, Mr. Meyers of Montana presented the bill known as S646, which was the same as the house bill, HR25685, reported above in the previous congress. This was reported back as S.Rept.818. The committee recommended certain changes and insertions, such as providing that from time to time the Bureau of Chemistry should publish the results of all examinations of fabrics tested under this act, stating the kind of fabric, composition, and name, and giving only the name of the person who misbranded in connection with the misbranded fabric. The committee considered an article to be misbranded when the tag failed (1) to state clearly the kind of fiber or proportions of two or more kinds; (2) to state the amount of fibers that have been used in another fabric; (3) to state accurately the weight per unit length of all the fabric in the piece; (4) to state accurately the amount of weighting and sizing; (5) or when the tag contained any misleading statement. The Department of Agriculture to whom the bill had been referred was heartily in favor of its passage and reported that the testing of fabrics was entirely feasible. The committee recommended that the bill be passed. It was not, however.

The house bill, known as HR2970 and introduced by Mr. Campbell of Kansas, April 17, 1913, was for the purpose of prohibiting fraud upon the public by requiring the manufacturer to certify the materials of which a manufactured product is composed and to place his name upon the manufactured article or container. This bill held the man who made clothing responsible for all the content of the different parts. A label was to be placed

on the last end of a bolt of cloth so that it could be seen at all times. The example of a celebrated manufacturer of England, who stamps his goods every 3 yards so that every suit pattern had his stamp upon it, was cited. This stamp did not tell the percentage of wool, but it did give his guaranty that it was first class in every respect. It was stated in the debate on this bill that America is farther behind than England, France and Germany in such matters. In these countries the highest possible standard is demanded of every manufacturer who enters their commerce. The manufacturer is held strictly to account for the nature of the article he produces and he gives his name and address and holds himself responsible to the public for every article that he places on the market.

On December 8, 1913, Mr. Lindquist, a woolen manufacturer of Michigan introduced the bill, HR10080, which carried the provisions that (1) it was unlawful for a person to misrepresent or misbrand any article of clothing, carpets, leather goods, etc. (2) or to carry on interstate commerce or import misbranded articles (3) the articles must be fumigated and disinfected, that specimens were to be collected for examination in the Bureau of Chemistry of the Department of Agriculture (4) offenders were to be prosecuted by the district attorney (5) defined the terms wool, silk, cotton, etc. (6) all articles for interstate commerce had to be labelled as to the contents and amounts, (7) no dealer should be prosecuted if he could show a written guaranty from the manufacturer. One of the criticisms of the bill was that it attempted to name separately every class of article when

it was obviously impossible to name all the known kinds and new types were appearing constantly, also it would be difficult to enforce the bill because it is difficult to identify the fibers and determine the percentage of substitution especially in the case of shoddy and virgin wool.

On December 19, 1913, Mr. Lafferty of Oregon presented the bill HR11024 for preventing the sale or transportation in interstate or foreign commerce of misbranded commodities. Mr. Raker of California on January 13, 1914, introduced a bill HR11518, which was identical with the one Mr. Lindquist had introduced on December 8, 1913. Mr. Rogers of Massachusetts introduced the bill HR13492 on February 17, 1914, to prevent the manufacture, sale or transportation of misbranded articles and for regulating traffic therein. On December 10, 1914, Mr. Lindquist again presented a bill known as HR19739, which was the same as the one he had introduced on December 8 of the preceding year. These 5 bills were referred to the Committee on Interstate and Foreign Commerce for hearings and ended there.

In the 1st session of the 64th congress the senate bill, S1072, introduced by Mr. Meyers, provided for the labelling and tagging of all fabrics and articles made therefrom intended for sale which entered into interstate commerce and provided penalties for misbranding. This bill was referred to the Committee on Interstate Commerce. Another bill, HR383, providing for the labelling, marking and tagging of all fabrics and leather goods, and providing for their fumigation was introduced by

Mr. Raker and also referred to the Committee on Interstate and Foreign Commerce. During the 2nd session of this congress the only textile legislation recorded in the Congressional Record was the bill HJR309, authorizing the attorney general to make an immediate investigation to determine the unreasonable advance in the price of foodstuffs, fabrics, paper and fuel. This was during the war period of 1916 and 1917.

In the 1st session of the 65th congress, October 2 to October 6, 1917, Mr. Barkley introduced the bill, HR3666, which was identical with the bill HR383 of the 64th congress. It was referred as usual to the Committee on Interstate and Foreign Commerce.

In 1916 Representative Barkley of Kentucky had introduced into the house a bill patterned on the British Merchandise Marks Act which had been successful in the United Kingdom for over 30 years. The war prevented the consideration of the bill at that time. Now, in November 1919, Mr. Barkley again presented the bill, HR2855, to the 66th congress. This bill, which prohibited the manufacture, sale or transportation in interstate commerce of misbranded articles and regulated the traffic therein, was endorsed by the Council of the American Home Economics Association at their meeting in Chicago, by women's clubs and by individuals. The Journal of Home Economics urged its readers to write to their representatives and to congress to endorse it. The bill was referred to the Committee on Interstate and Foreign Commerce, and received no further consideration in that congress.

The Rogers bills, HR13136 and HR13073, were very much

like the Barkley Bill, except for sections which dealt with trademarks and trade descriptions and provided larger penalties for its violations. The Kneider Bill, HR9283, of this congress prohibited fraud upon the public by making or diseminating false statements concerning any merchandise, commodities or service and provided penalties for violation of the bill. This bill did not include definitions and was not as comprehensive as the other proposed textile bills had been. Its aim was to prevent fraudulent advertising. The French Bill, HR1164, and the Capper Bill, S3686, were identical and aimed "to prevent the deceit and profiteering of substitutes for virgin wool in woven fabrics, purporting to contain wool and in garments or articles of apparel made therefrom."[3] The general opinion concerning these two bills was that they would benefit the wool growers, work hardships on the manufacturer, require federal appropriations for their enforcement and would ultimately increase the price of wool cloth to the consumer by raising the price of raw wool. It was decided in the committee hearings that the French-Capper bill would not give the desired effects and that the real need was for legislation along the line of misbranding acts, such as the Rogers and Barkley Bills. The American Home Economics Association was represented at the committee hearings by Miss Ina Ritner, who presented the case of the consumer.

In the 1st session of the 67th congress, Mr. Lodge introduced a senate bill S1882, which was the same as the Rogers

[3]Present Status of Misbranding Acts and Other Textile Legislation. Journal of Home Economics. May 1920. p. 221.

Bill, HR13136, and which was referred to the Committee on Interstate Commerce, for hearings. In the November meeting of this session, Mr. Kelly presented the bill HR11 to protect the public against false pretenses in merchandise under the trademark or special brand of articles of standard quality. Mr. Rogers again introduced his misbranding bill, this time called HR16 and Mr. Barkley introduced his bill now called HR147. All of these bills were referred to the Committee on Interstate and Foreign Commerce and then dropped.

In the 4th session of the 67th congress, the French-Capper Bill as S799 was again brought up for hearings. The purpose of the bill was practically the same as before, i.e., to prevent deceit and unfair prices resulting from the unrevealed presence of substitutes for virgin wool in woven fabrics supposed to contain wool and in garments or articles of apparel made therefrom, manufactured in any Territory of the United States or District of Columbia, or transported or intended for transportation in interstate or foreign commerce and providing penalties for the violation of the provisions of this act. The bill was reported with amendments, but no further action was taken. Mr. French and Mr. Capper both omitted knitted wool fabrics and excluded all fabrics which were not made from wool, thus greatly limiting the scope of their bill.

In the 68th congress there was another deluge of proposed bills relating to textile legislation. During the 1st session, December 3, 1923, to June 7, 1924, Senator Lodge introduced the senate bill, S1188, which was the same as the house

bill, HR13136, by Mr. Rogers in the 66th congress. This bill was referred to the Committee of the Judiciary. The Barkley Bill, HR3225, was introduced and was very similar to the Roger's Bill. The house bill HR732, introduced by Mr. Raker, was similar to the French-Capper Bill, S799, and the French Bill, HR739. It related only to woven fabrics, especially those made from wool and was a compulsory branding bill. The Reese Bill, HR4141, was another compulsory branding bill and applied to specific articles. Other textile bills of this congress were the HR65 and the HR742 by Mr. Johnson, the HR738 by Mr. French, the HR7758 by Mr. Haugen, the HR7822 by Mr. Griest, the HR7965 by Mr. Burtness and the HR7997 by Mr. Kindred. These were all misbranding bills applying to specific articles and were referred to the Committee on Interstate and Foreign Commerce for the usual hearings.

Another bill, known as HR11723, was introduced by Mr. Merritt, to protect the public against fraud by prohibiting the sale or shipment in interstate or foreign commerce of misbranded articles, was considered by the Committee on Interstate and Foreign Commerce and was reported back to the house. This same bill appeared in the 1st session of the 69th congress as the Merritt Bill, HR3904, was considered by the same committee and again reported back to the house. In the committee hearing on this bill, the representative for the Federal Trade Commission explained that the Commission had been upheld by the United States Supreme Court in enough cases so that it is now well established that prohibition against the use of unfair

methods of competition includes both misbranding and false advertising. The action of the Commission is preventive and cooperative rather than the application of a criminal law which can be used only in case of the completed act. The Commission's representative felt that the passage of the bill would result in unfairness to competitors and that the application of law would be periodic and sporadic.

The purposes of the bill, as reported, (1) defined specifically what constituted misbranding and removed some doubts upon the jurisdiction of the Federal Trade Commission, (2) reinforced the enforcement powers of the Commission very materially by providing for judicial condemnation of misbranded articles, (3) removed the necessity of applying the test of competition in cases of this kind under the Federal Trade Commission Act and adopted a policy of protection to the public as well as of protection of one competitor against another. The committee decided to place the enforcement of the act in the hands of the Federal Trade Commission and to let it decide from the facts of the case under which law it should proceed to prevent the practice of which the complaint was made.

In the 2nd session of this congress, a senate bill, S 1618, which was identical with the French-Capper Bill of the 67th congress and known also as the "Truth in Fabrics Bill" was again introduced and debated. On January 17, 1927, objection was raised to a discussion of the bill in the senate and the vice president ruled that it go over. On February 23, 1927, the bill was again passed over. In the same congress, Mr. Smoot intro-

duced another misbranding bill known as S4845, which was referred to the Committee on Interstate Commerce, but went no farther.

In the 70th congress the "Truth in Fabrics Bill" again appeared, this time as HR145, and was introduced by Mr. French. It, too, was referred to the Committee on Interstate and Foreign Commerce. To date no textile legislation has been introduced in the 71st congress, which is the congress now in session.

To sum up the present status of the attempts at standardization through legislation is to say simply - nothing has been done. The concensus of opinion seems to be opposed to compulsory branding laws, but is in favor of some type of legislation which will prevent false advertising and misbranding. As yet this type of legislation has not been worked out in such a form that it is acceptable to the majority of the interests concerned. The opposition to the compulsory branding bills which have been introduced centers around the following facts:

1. Many have been too narrow in scope.

2. The real purpose of the bills had been to benefit the wool growers rather than the purchasing public.

3. The quality of a fabric depends more upon the construction and finish than upon the content of the fiber. For example, virgin wool may be worth from a few cents to over a dollar per pound and yet the labels would be the same for all grades.

4. Labels showing the content of fiber may be more misleading than the present condition. A mixture of virgin

and reworked wool is often better than poor grades of all virgin wool and yet if the average buyer sees from the label that a certain material contains some shoddy, he will be prejudiced against it in favor of the poorer grade of all virgin wool.

5. Labels can not be used on very thin materials, such as georgette without injury to the fabric.

6. The great majority of textile fabrics is sold in the manufactured form, i.e., as articles of clothing, house furnishings, etc., and a large per cent of these are sold under an absolute guaranty of satisfaction or your money back. It would be difficult for the dealer who sells the garment to be sure his descriptive tags are accurate and still more difficult for the consumer or government inspector to prove that they violate the law.

7. Most of the fiber content can be detected by physical and chemical tests but it is very difficult to distinguish shoddy from virgin wool. Laws of this kind would mean more law breaking which is not a desirable situation in industry.

8. The passage of a compulsory branding law would necessitate an army of government inspectors, a large appropriation from the federal government and eventually higher textile prices for the consumer.

9. A practical label or tag could not be attached which would comply with the law and yet really give valuable information to the consumer.

10. The average buyer relies on the reputation of the seller or on an absolute guaranty of the manufacturer, therefore why interfere with a staple industry and add a useless expense to the public?

The chief opposition to the misbranding bills has been based on the injustice, real or imagined, to competitors which would result. For example, one manufacturer or dealer may be tried under the criminal law for violation of the law, while his competitor may be brought before the Federal Trade Commission. The Merritt Bill attempted to take care of this difficulty by giving the Federal Trade Commission the right to decide under which law the case should be tried.

The only advantage to be gained from a textile misbranding law, as the author sees it, is the protection afforded the individual consumer through the activities of the Federal Trade Commission, as well as the trade competitor, but the author also believes that the same situation will come about under the present plan of self government in industry, without the aid of additional legislation. Trade associations are formulating practical standards of production and ethical standards of selling largely through their own initiative, economic necessity and consumer demand. The Federal Trade Commission has held that when an association or trade organization agrees to adopt a certain standardized practice and the majority of the members sign the agreement, the violation of the agreement by any member of the association shall constitute unfair competition and shall be subject to the jurisdiction of the Com-

mission. A demand on the part of the consumming public for standardized textiles will speed up standardization, therefore, the great need is for education of the consumer rather than the legislation of honesty into the textile industry.

CHAPTER VI

SOME OF THE TESTS AND INVESTIGATIONS MADE IN THE INTEREST OF TEXTILE STANDARDIZATION AND SIMPLIFICATION

A review of some of the investigations and studies made in order to establish standards and bring about simplifications in the textile industry will give a clearer idea of the tremendous task which confronts the leaders of this movement.

Testing textiles has always been important to commercial textile laboratories, but only comparatively recently has it become important to schools and educational institutions. In 1917, Jean Mackinnon of the Home Economics Department of the University of Illinois conducted a study which would lead to more standardized methods of testing wool and silk by the alkali method. She found that, while most of the text books said to boil the sample in a 5 per cent solution of potassium hydroxide for 15 minutes, only 2 minutes boiling is necessary to destroy it under these conditions, 20 minutes in a 1 per cent solution, 10 minutes for a 2 per cent solution, and 4 minutes in a 3 per cent solution. She found that for silk only 4 minutes boiling in a 5 per cent solution was necessary to destroy the fiber, 10 to 15 minutes in a 3 per cent solution and 15 to 20 minutes in a 2 per cent solution.[1] The use of this investigation cuts down the laboratory time and saves materials.

[1] Mackinnon, Jean. A Desirable Change in Tests for Silk and Wool. Journal of Home Economics. August 1917. pp.357-358.

There has been a great deal of interest aroused in the various colleges as shown by the increasing number of research problems conducted in their textile laboratories. A few of these will illustrate the type of work being done by some of the higher educational institutions for the ultimate standardization of textiles.

Wearing Tests of Kitchen Toweling.

Comparative Wearing Quality of Bleached and Unbleached Linen Toweling of Plain and Twill Weave.

A Study of the Relation of Yarn Strength to Fiber Strength in a 23-5-3 Cord.

A Study of Cotton Crepes to Determine their Suitability for General Wear.

The Effect of Alkaline Cleansing Agents Upon the Tensile Strength of Fabrics.

The Durability of Sheets and Pillow cases.

Wearing and Fading Tests for Cotton Materials Used for Children's Clothing.

Chemical and Physical Tests of Silks Suitable for Office Dresses of Professional Women.[2]

The American Home Economics Association has for many years been very active in textile standardization work. More than 10 years ago the Association appointed a Committee on Standardization of Textiles as a part of its Textile Section.

[2] Abry, Cecelia. The Comparative Wearing Quality of Bleached and Unbleached Linen Toweling of Plain and Twill Weave. Thesis - Iowa State College. 1926. pp. 11-13.

This Committee has worked tirelessly on standardization problems which vitally affect the ultimate consumer of textiles. In 1919 when the Central Committee began its work in the textile market it found that the elements of the problem were (1) an unprecendated labor turnover, resulting in irresponsibility and temporary inefficiency, (2) a tremendous volume of buying by consumers, resulting in competition among retailers for the output of factories, (3) the large foreign demands, (4) the high prices of certain raw materials, and (5) the dye situation. The market condition which this group of women were to study and improve resembled a boiling, seething caldron.

At a meeting of the Association at Blue Ridge, North Carolina in 1919, the Textile Section proposed and secured the adoption of 2 resolutions: (1) That, since women are the greatest buyers and should be trained, it was resolved to urge teachers in elementary and high schools, vocational and normal schools, colleges and extension divisions to stress the selection of textile fabrics and clothing budgets and to request the cooperation of the National Federations of Womens Clubs and magazines; (2) That they believed women were ready to create a market for standardized fabrics and knew they could reach these women, therefore it was resolved that the Association invite the cooperation of the associations of manufacturers, jobbers, and retailers in determining standards and in putting on the market a limited number of standard fabrics of various grades with identifying symbols to signify such a standard. This was the beginning of a movement by the American Home Economics Association which progressed slowly

and for a long time showed no tangible results.

The Advisory Committee of the Committee on the Standardization of Textiles, with its 40 members representing 20 states, in the following year carried on a study of purchasing habits as a basis for the forming of standards; brought the committee program before state home economic associations, state federations of women's clubs, organizations of consumers; carried on laboratory tests; secured samples for wearing tests and helped in publicity work.

At a conference in New York on October 10 and 11, 1919, seven members of the Central Committee met representatives of textile manufacturers, retailers and others to discover some of the difficulties in the way of standardization and to get constructive suggestions. There was skepticism at first on the part of the trade, but this gradually changed to interest and the committee in the end did receive much valuable information.

The trade suggested minimum standards based on manufacturing specifications and on wearing and laboratory tests and that fabrics which met or surpassed these standards be so marked that they could be recognized by the consumer and salesperson, rather than develop and push a few fabrics precisely meeting the standards and by so doing ignore or deny recognition of the fabrics which surpassed the standard. The committee acknowledged its conversion to the minimum standard idea on October 10, 1919. The committee had not meant to diminish the value of the individual trade mark or to necessarily reduce the number of different fabrics on the market. It had aimed to give the consumer assur-

ance that the materials she selected would give real service for a definite purpose and thus to guard against a loss of money and material. The committee now outlined its problems as follows:

(1) The lack of laws protecting the consumer of textiles and clothing from misrepresentation.

(2) The ignorance or indifference on the part of women and girls as to the real values which should be sought in the buying of textiles.

(3) The post war extravagance in spending

(4) The indifference and antagonism on the part of the trade.

(5) The lack of data on which to base suggestions for minimum standards.

(6) The need for determining the most effective way of identifying fabrics which reach or pass the minimum standard.

The work of this committee in attempting to bring about protective textile legislation has been discussed in the chapter on legislation.

In order to establish minimum standards, the committee worked out 3 tests for silk and began work on cotton for lingerie and serge for service dresses. The tests on silk were conducted by Mrs. Ellen B. McGowan of Teachers College of the University of Columbia, Miss Ruth O'Brien of Iowa State Teachers College, Miss Trilling of the University of Chicago, and Miss Weirick of Sears, Roebuck and Company, and included the following:

(1) The worn garment test - samples of outworn silk lining or underskirts were collected with data for laboratory analysis and tests.

(2) The small piece test - a new piece of material was sewed to the part where the wear comes, the wearing qualities were recorded and the unworn sample sent in with it for tests.

(3) The new garment test - silk was purchased which came up to a tentative standard, made into skirts and sold to women who were interested and who recorded the wear and returned the skirt to the committee on a certain date.

Manufacturers had said that laboratory tests cannot tell the whole story of the wear on silk, so the committee aimed to conduct tests on a large scale which would supplement the laboratory tests. Experimental silks were manufactured by the Stehli Silks Corporation of New York City. Taffeta and messaline were selected in 3 grades - Grade A, slightly weighted, Grades B and C were of the so-called pure dye silk. The color in each case was changeable navy and green. The specifications were worked out by Mary Schenck Woolman, Mrs. Ellen B. McGowan, and E. M. Barlow, the general manager of the Stehli Silks Corporation, while the designs for the skirts were approved by a class in dress design at Teachers College, Columbia. The results of the tests were rather unsatisfactory, but showed that the personal equation is one of the leading factors in the endurance of silk, i.e., that bodily excretions or acid exhalations may cause greater deterioration in some than in others. Different activities and habits of movement, type of garment worn over and under the silk undershirt, weight and size of the wearer, all affect the wearing quality of the material.

The committee also launched an educational program through its cooperation with the editors of women's magazines, the National Federation of Women's Clubs, Consumer's League, schools, etc., and worked the following suggestions for carrying the minimum standards into effect:

(1) The establishment of testing stations by the American Home Economics Association to (a) examine fabrics submitted by the manufacturer and decide whether or not they met or surpassed the standards proposed by the Association either independently or in cooperation with the national textile associations and (b) to authorize labels (copyrighted) protected by licenses.

(2) The establishment of similar stations by organizations of consumers, manufacturers and retailers.

A survey of the purchasing habits of buyers was one phase of the work of standardization begun by the committee in 1919. Data was collected from 545 questionnaires returned on underskirts and underwear, 573 on coat linings and dress foundations and 467 on children's dresses.[3] Over one half of the questionnaires returned were from homemakers, about one half from teachers and the remainder from college students. The results showed that all types of materials were not of equal importance for the types of garments used. Silk was almost as popular as cotton for underskirts, but cotton was markedly preferred for

[3] Phelps, Ethel. Further Data on Purchasing Habits. Journal of Home Economics. December 1921. p. 600.

undergarments. Silk was 3 times as popular for coat linings as cotton, but cotton was used more than silk for dress linings. Cotton only was used for children's dresses. In summarizing the whole survey, the committee decided that only a few fabrics in each group or class of materials, i.e., wool, silk and cotton were of outstanding importance. The following table shows the percentage of the reports using each material:[4]

Wool (1144 cases)		Silk (1612 cases)		Cotton (1229 cases)	
	per cent		per cent		per cent
Serge	55	Satin	28	Nainsook	15
Tricotine	11	Taffeta	22	Sateen	14
Jersey	10	Jersey	9	Longcloth	12
Poplin	5	Crepe de chine	9	Muslin	11
Broadcloth	5	China silk	6.5	Cambric	10
Gabardine	4	Georgette	5.5	Gingham	9
Velour	4	Pussy Willow	5	Net	7
		Tricolette	2.5	Lawn	4
		Poplin	2.5	Percaline	2
		Velvet	2	Voile	2
		Foulard	2	Crepe	2
				Batiste	2
				Percale	2
				Devonshire	1.5

The committee felt that these 32 materials were worthy of consideration for standardization.

[4] Phelps, Ethel. Further Data on Purchasing Habits. Journal of Home Economics. December 1921. p. 603.

In September 1921 the committee turned over its problems related to accelerated wearing tests and minimum standards to the United States Bureau of Standards and to the National Research Council in Washington, D. C.

"Tests Leading to the Standardization of Serge" was reported by Katherine Cranor and Jane V. Rice of Iowa State College in the Journal of Home Economics for June 1924.[5] Serge in 64 varieties were used from various parts of the United States - from large city stores and from small country stores. The tests were made according to the directions of the Bureau of Standards on the thread count, weight per square yard, twist of the yarn, wool content and general characteristics of appearance, feel, etc. Abrasion and wearing tests could not be made because there were no standard machines for this purpose available in 1924. The results showed that:

(1) The thread count fluctuated and on the whole increased in the better materials.

(2) The weight varied, increasing with the price.

(3) The twist varied with the finish and weight of the cloth. In some of the lighter weights the yarn was tightly twisted and in some of the heavier ones it was loosely twisted.

(4) The poorer grades were wiry and stiff, loosely woven and with a rough finish. The best materials had a fine yarn light in weight and usually with a soft finish.

[5] Cranor and Rice. Tests Leading Toward the Standardization of Serge. Journal of Home Economics. June 1924. p. 314.

(5) The hard finished materials had a relatively high twist count, the soft finished materials a medium or light weight and fairly close weave.

(6) Only a few samples showed cotton mixed with wool.

(7) As the price increased, there was an improvement in quality.

(8) Practically all of the samples came from 10 different manufacturers of the North Western United States.

(9) Neither size nor location of the retail store caused much variation in price.

Simplification of types and sizes of beds, bed springs and mattresses attracted attention to the possibility of extending this economic movement to include blankets; consequently, in February 1923 the Committee on the Standardization of Textiles met with the Division of Simplified Practice and the representatives of manufacturers, distributors and users of blankets to discuss the advisability of eliminating some of the 78 sizes of bed blankets then on the market. At a second conference held in February, 1924, this same committee met with representatives from the United States Chamber of Commerce, the American Hospital Association, the American Hotel Association, manufacturers and distributors. The result of this second conference was the issuance of the following recommendations signed by George K. Burgess, Director of the Bureau of Standards and Herbert Hoover, Secretary of Commerce on June 2, 1924, subject to regular annual revision by similar conferences:

"In accordance with unanimous action of the joint conference of representatives of manufacturers, distributors and users (of blankets).....the United States Department of Commerce through the Bureau of Standards recommends that recognized sizes of bed blankets be reduced to the following:

Sizes in Inches			
Width	Length	Width	Length
54	76	66	84
60	76	66	90
60	80	68	80
60	84	70	80
64	76	72	84
66	80	80	90

Results: 78 sizes reduced to 12
Elimination of 84.6 per cent

This recommendation to be effective as applying to new production November 1, 1924, and every effort is to be made to clear current order and existing stock of eliminated varieties before that date."[6]

In 1926 a rather important study was made in the interest of textile standardization by Rosamond Cook, of the University of Cincinnati, Mrs. Ellen B. McGowan and Dr. B. R. Andrews of Columbia Teachers College. This investigation was an analysis

[6] Bed Blankets - Simplified Practice Recommendation No. 11, United States Bureau of Standards. 1924. p. 4.

of buying practices and sheeting was the material chosen for the study, because it had few conflicting characteristics. Durability was the one most desired. The consumer judges the value of goods by scrutiny, by feeling, pulling and rubbing. He also asks the salesperson for his judgment of the value of different prices and compares the goods with the prices. For this study 9 brands of sheeting were tested for tensile strength, weight and thread count in a laboratory and by combining these results statistically, a quality rating was determined for each. The consumers in the test included many textile teachers who rated generous samples by the usual store method. Salespeople in two stores were asked to judge in the same way. The following table shows the result of the test:[7]

	Rating in Laboratory	Laboratory Score	Rating by Consumer	Rating by Salesperson	Price per yard 45 in. wide
1	C	1.8	4	5[1]	36 cents
2	B	3.5	7	7	35 cents
3	E	3.6	5[1]	1	86 cents
4	G	3.8	2	5[2]	36 cents
5	I	4.1	1	4	42 cents
6	F	5.3	5[2]	3	26 cents
7	D	7	3	2	44 cents
8[1]	H	7.8	8	9	36 cents
8[2]	H	7.8	9	8	31 cents

[7] Cook, Rosamond. How Can Our Methods of Buying Textiles Be Made More Reliable. Journal of Home Economics. January 1927. p. 34.

The results showed that the consumer's judgment of quality based on the usual buying methods is poor, and that the judgment of the salespersons is no better. "The true significance of these faulty judgments is even better appreciated in the light of the relative prices of these sheetings; thus, I, costing 42 cents per yard and rated 4th by the laboratory tests was thought by the consumer to be 1st in value, while C, costing 36 cents, was 1st in the laboratory ratings. Thus the consumer not only misjudged the quality of the sheeting, but paid one sixth more than she would have for the best sheeting. Again, D was rated 3rd by the consumer though the laboratory tests placed it 7th and in this case the price was almost 25 per cent higher than B, which was 2nd in the laboratory quality. The salespeople placed E, costing 86 cents per yard 1st, though by test it ranked 3rd; like the consumer, they also placed D 2nd, though its true place was 7th. C ranked 1st by the laboratory tests and was placed 4th and 5th by the consumer and salespeople respectively."[8] These results show conclusively that our present buying practices are not reliable and that some system of marking by which quality is rated intelligently to the consumer will greatly expedite buying and will be more economic from all points of view.

This data was placed before Mr. Ray Hudson, Chief of the Division of Simplified Practice, Department of Commerce, to see if some plan could be worked out with the manufacturer by

[8] Cook, Rosamond. How Can Our Methods of Buying Textiles Be Made More Reliable. Journal of Home Economics. January 1927. p. 34.

which sheeting could be graded and classed so that the consumer could have more definite knowledge of qualities at the time of purchase. Mr. Hudson recognized the need and suggested that more data be amassed so as to get specific and positive conclusions. He suggested also that interest be aroused in the subject among clubs, home economics groups, etc., and the cooperation of manufacturer and distributor gained since they were interested in quality standards as a basis for guarantees. When this had been done, a written request should be sent to the Division of Simplified Practice and a conference would be called to discuss the matter and take such action as to insure the results sought. Petitions were then sent out and signed by 2,000 and a request was also sent to carry on the study in other brands of sheeting.[9]

In 1925, the American Hospital Association made a survey to determine the sizes of bedding then in use by the hospitals in the United States. From the replies of 452 hospitals, a tentative list of requirements was prepared and sent by the Division of Simplified Practice at the request of the Association, to 1300 hospitals for approval and suggestions. Out of the 399 answers received only 58 desired a change.[10] A conference of manufacturers, distributors and consumers was then held June 10, 1927 at the Department of Commerce. At this meeting it was reported that there had been a 70 per cent adherence to the Simplified Practice Recommendation No. 24, regarding the reduction in the

[9] Cook, Rosamond. How Can Our Methods of Buying Textiles Be Made More Reliable. Journal of Home Economics. January 1927. p. 5-6.

[10] Hospitals and Institutional Cotton Textiles - Elimination of Waste. Simplified Practice Recommendation No. 74. p. 1. Issued by the Bureau of Standards.

the variety and size of hospital beds.[11] The advisability of making recommendations for uniform hems at both ends of sheets and for pillow cases was discussed, but it was decided to let this go until the next revision meeting in October 1928. Many desired only the 108 inch length sheet, but because there were many 72 inch beds still in use, the 99 inch sheet was retained. The accompanying tables show the sizes and types of textile bedding which were adopted as standard by the conference and which are known as Simplified Practice Recommendation No. 74, to be effective October 1, 1927.

[11] Hospitals and Institutional Cotton Textiles - Elimination of Waste. Simplified Practice Recommendation No. 74, p.1. Issued by the Bureau of Standards.

TABLE I[12]

Sizes of Textiles for Adult Beds

Item	Size (inches)	Torn or Finished Size	Depth of hem	Present standard packing (per case)
Bed Pads	36x36 36x72 36x76	Finished		
Pillow cases	42x36 45x36	Torn	3 inches	50 dozen
Sheets	63x99 63x108 72x99 72x108	do	Top, 3 inch Bottom 1 "	20 dozen
Drawsheets	45x72 54x72	do	Top, 1 inch Bottom, 1 "	20 dozen
Spreads	63x90 72x90	Cut or torn	3/4 inch	50 and 100
Bureau Scarfs	18x45 18 wide by bolt	Cut		5 dozen
Towels (bath)	18x36 22x44	Finished		50 dozen, 50 and 25 dozen
Towels	14x20 16x32 18x36	do		200 dozen 100 dozen 100 dozen
Face and hand	18 wide by bolt			40/50 yards per piece; 2,000 yards per case.

[12] Simplified Practice Recommendation No. 74. p. 1. Issued by Bureau of Standards. Effective October 1, 1927.

TABLE II[13]

Sizes of textiles for cribs and bassinets

Item	Size (inches)	Torn or finished size	Present standard packing (per case)
Sheets			
Crib	45x64;54x90	Torn	20 dozen
Bassinet	36 wide sheeting by bolt		
Spreads			
Crib	45x60;54x90	Cut	50 and 100
Bed Pads			
Crib	18x18	Finished	
Bassinet	18x18		

The drastic reduction in the number of sizes produced will greatly simplify, for the average housekeeper, the task of selecting her textile bedding and will probably lower the price somewhat. Face and hand towels were on the market in 129 sizes - this group agreed upon 3 as sufficient. The number of sizes of sheets were cut from 50 to 4, and of spreads from 54 to 2.[14] The term "linen" in reference to these goods in question was changed to "textiles". The number of trained home economics women present at the conference was noteworthy and they made a genuine contribution to the discussions.

There was an important meeting held after the conference to consider the establishment of specifications for sheeting. The work of Rosamond Cook on buying practices in sheeting

[13] Simplified Practice Recommendation No. 74. p. 1. Issued by Bureau of Standards. Effective October 1, 1927.

[14] Sheet Standardization and Home Economics. Journal of Home Economics. August 1927. pp. 451-452.

was much discussed. Some felt that sheeting could not be standardized without revealing trade secrets, but Mr. Schlink of the American Standards Committee explained that they were interested in the type of specification dealing with the performance to be expected of the finished product and not with processes of production.

During the preceding year, Margaret Furry, holder of the fellowship granted by the Textile Section of the American Home Economics Association, had undertaken the analysis of different brands of wide cotton sheetings, which would help in establishing definite standards of durability for this type of textile bedding. The materials which she used included 130 brands of wide cotton sheetings, 12 unbleached and 118 bleached. Of the 130 brands of wide cotton sheetings analyzed, 62 were obtained in the form of sheets. Among these sheetings there were 59 mill brands, 31 department store brands, 21 wholesale house brands, 7 mail order house brands, and 3 chain store brands.[15] These sheetings were analyzed for weight, thickness, thread count, percentage gloss, yarn count and diameter, yarn twist, yarn crimp, length and diameter of the fiber, linear shrinkage of fabric, breaking strength and elasticity of new, wet and laundered fabrics, bursting strength of new, wet and laundered fabrics, water extract, inorganic content, and detection of mercerization. The results of this analysis are given in tabular form

[15] Furry and Edgar. An Analysis of Wide Cotton Sheetings. Journal of Home Economics. June 1928. pp.429-431.

in the Journal of Home Economics for June 1928, pp. 434-440.

At the Ashville meeting of the Association in 1927, a committee was appointed to investigate the testing now being done of consumers' goods on an unbiased and scientific basis to find out how such tests can be made of use to a larger number of housewives and to determine for what types of goods tests are most needed. No published report of the results of this work could be found.

In December 1928 at a meeting of the committee on standardization of sheets and sheeting held at the call of the American Standards Committee, it was decided to appoint a sub-committee to set up final specifications and standards which can be submitted to the consumer as a guide in buying sheets. This sub-committee includes 7 members of the main committee and their alternates with representatives of manufacturers, distributors, reconditioning groups, institutional purchasers, governing bodies and individual consumers. Members of the last group are Mrs. Pauline Beery Mack of the American Home Economics Association and Miss Ruth O'Brien of the Bureau of Home Economics of the Department of Agriculture. Before the end of 1929, these standards will probably be adopted.

In 1924 the Bureau of Standards published the results of their investigation on the measurement of heat insulation and related properties of blankets. Apparatus and tests were developed to test for the thermol resistance measurement, duplicating as nearly as possible the service conditions as an index of the heat insulating value of blankets. The Bureau also conducted a

study in standard hosiery lengths for the purpose of selecting a method for measuring hosiery and to formulate proposed standard lengths and tolerances for men's, ladies', and children's hosiery. Other investigations which the Bureau has conducted and the results published are "The Influence of Sheeting Upon the Heat Retaining Properties of Blankets," "Standardization of Automobile Tire Fabric Testing," "Comparative Wearing Qualities of Pima and Ordinary Cotton Used in Mail Bags," "The Related Merits of Cotton and Jute Cement Sacks" and the "Development of the Standard Numbered Cotton Duck Specifications."

The National Vigilance Committee of the Associated Advertising Clubs of the World conducted an important investigation which will help in the standardization of textile trade terms used.

A publication by the American Society for Testing Materials entitled "Specifications and Methods of Test for Textile Materials" for 1927 shows that this Society has also carried on some extensive investigations in behalf of the standardization of textiles.

The Silk Association of America began its organized efforts to establish an international standard for the classification of raw silk in 1915, when it appointed its first Raw Silk Classification Committee. The first committee devoted its time to the standardization of the tests then in use, such as sizing, winding, and serimeter tests. The committee gave its first report to the Association in 1921. Then, in 1924, after giving the industry over two years in which to try out the suggestions in

Textile Trade Terms

Report on Misleading Textile Trade Terms, Their Causes and Remedies

PREPARED BY

NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

The New York University Bureau of Business Research has completed for the National Vigilance Committee of the Associated Advertising Clubs of the World a comprehensive survey of the trade terms and names used in the textile industry. In this industry, as in many others, there appears to be much confusion in the meaning of the various terms used to designate different products; a confusion which particularly affects consumers although it exists throughout the trade. Buyers do not know from the name what the nature of the fabrics is and two or more fabrics of different weave or finish or content are frequently sold under the same name.

This situation is serious as it not only encourages fraud, but also retards business by preventing sale by description and slows up turnover. The prevailing situation requires that the buyer should analyze samples of the various fabrics with little regard to what they are called and makes it necessary for dealers to run the risks arising from carrying a large number of similar fabrics bearing different names.

In order to provide a basis for clarifying the situation it is important to know what the consumer thinks the different textile terms mean and to secure objective tests for determining what terms are apt to be misleading. It is not sufficient to reason deductively in such matters, for theories based exclusively upon abstract considerations will possibly be erroneous. *A sure method is to go to the consumer and find out what is actually in his mind.*

This is what the Bureau has done. Briefly, the nature of the investigation here reported is as follows:

NATURE OF THE INVESTIGATION

A list of 100 textile trade names has been taken as representing all phases of textile terminology. This list covers various kinds of goods which are called silks, linens, woolens, ranging from Aledo Silk to Woolspun. This list has been supplemented by another containing the names of 33 fabrics which are not trade marked but which are general terms designating different weaves, finishes and kinds of material current in the trade, such as Alpaca, Brocade, Plush, Pongee, Voile, Worsted. This supplementary list is important for the reason that there appears to be great confusion in the mind of the consumer as to what these general terms indicate, which adds to the confusion arising from the numerous trade names adopted by different companies, such as Irish Poplin, Woolnap and Pongeea.

Most of the names included in the list of 100 are terms concerning which more or less misunderstanding has arisen in the past. That, however, is only incidental as the list is made up to represent all phases of trade-name building. The supplementary list of 33 fabrics has been chosen from among those which seemed to be most likely to cause confusion as to content.

This list was incorporated in questionnaires, copies of which will be found in the appendix of this report. Those to whom the questionnaires were sent were merely asked to indicate what they believed to be the content of the various textile products and in addition were asked to name any textiles by whose names they had been misled in the past.

These questionnaires were submitted to approximately 1,000 women in all parts of the country, including women in country districts as well as city dwellers. Approximately 600 replies were received, the larger number of which came from the following states: Florida, Illinois, Massachusetts, Maine, Nebraska, New Jersey, New York, Ohio, Texas and Washington.

Valuable assistance in placing these questionnaires was given by women's clubs, the home economics departments of universities, and farm organizations.

It is important to observe that the questionnaires were tabulated in several groups and that the results secured from all groups were so similar that the weight of the conclusions to be drawn from them is greatly increased. It was thought that possibly the country women would show different results from the city women, but no significant difference appeared. Furthermore, a group of approximately 100 Columbia University women students gave results which differ little from the others. It may thus be confidently stated that the results arrived at are not chance results or due to local conditions. Furthermore, there are no great differences concealed in the average percentages which will be reported herewith and the range of variation is small.

The questionnaires addressed to women all over the country were supplemented by one sent to a number of department stores, a copy of which will be found in the appendix. While the response to this questionnaire was small, it is significant as showing that the present situation is unsatisfactory not only to consumer but also to retailer.

In order to have a complete understanding of the situation the N.Y.U. Bureau has had a considerable number of samples of various textile fabrics analyzed, thus enabling it to know more certainly whether or not the understanding of the consumer as to the content of the several fabrics is correct.*

In a considerable number of cases, however, reliance has been placed upon such sources as the Directory of Textile Merchandise, published by the Textile World and the findings of the Federal Trade Commission. The directory referred to contains a long list of fabrics known in the trade to be cotton piece goods although designated by various names which might lead one to think them to be silk, linen or wool. This directory is recognized as standard and while the Bureau assumes no responsibility for its classifications, it is believed that they are essentially correct.

*This work was done by Mrs. Ella McGowan of Teachers College, Columbia University, and the Bureau wishes to express its indebtedness to Mrs. McGowan.

The general method of basing conclusions has been as follows: the questionnaires have been carefully tabulated to ascertain how many women thought each fabric to fall under one or more of the following heads:

All Silk
All Wool
All Cotton
All Linen
Part Cotton
Silk & Cotton
Silk & Linen
Artificial Silk
Part Wool
Wool & Cotton
Part Linen
Linen & Cotton
Merely a finish or weave
Don't know
Silk & Wool

The number of replies received varied with the different fabrics, ranging from about 350 up to over 500. From the total number of replies concerning each fabric the number of those who indicated that they did not have any idea as to the content or nature of the goods was subtracted, leaving as a balance those who felt able to express an opinion as to the content. This balance was taken as a basis for computing the percentages of those who thought it to contain one or another of the different materials. For example, 454 of the questionnaires contain replies on the term "Boulevard Velvet," and 262 placed the check mark in the "Don't know" column, leaving a balance for this fabric of 192,—which is below the average. On this balance were computed the percentages of those who thought that "Boulevard Velvet" is all silk, which was 44%, those who thought it part silk, etc.

THE TEST OF "MISLEADING"

In order to draw conclusions from the tabulations made from the questionnaires it is necessary to arrive at some standard for deciding what is meant by "misleading." Obviously, a term may be wholly misleading or only partly so. It may mislead some

people and not others. It may merely arouse a question in the mind of the prospective purchaser which could be answered by inquiry or investigation on his part, or it may actually mislead him in his purchases. Undoubtedly some purchasers do not exercise the minimum of judgment which may be assumed in human affairs. Accordingly the N.Y.U. Bureau has adopted the following test. It has taken a group of textile fabrics, the names of which are old and well established and well known to all women of experience. It finds that with great regularity these terms are erroneously reported by a little over 20% of the women who filled in questionnaires. Thus 20% stated the opinion that Canton Flannel contains some wool. Twenty-three per cent stated the same of Outing Flannel, and 20% thought that Silkateen contains some silk. This test is confirmed by the fact that 22% stated that Artificial Silk contains some silk and that such a term as "All But Linen" designates a fabric which contains some linen. These facts seem to warrant the conclusion that between 20 and 23% must be allowed as a margin of error. Within this 23%, fall those who are abnormally ignorant of textiles and those—always found in a large group—who answer hastily or in caprice.

In dealing with the following tables, therefore, the Bureau has confidently concluded that when a term is misunderstood by more than 23% it is seriously misleading, but that when it is misunderstood by a smaller percentage, its misleading character is less serious.

TRADE NAMES WHICH TEST SHOWS ARE MISLEADING

There is presented next a list (List I.) of those textile trade-names which are clearly and obviously misleading in the sense that one group having over 23% of the replies stated their contents to be one material, while another group also having over 23% held them to contain some other material. Regardless of the actual content of the fabrics mentioned in the following list, it may be positively stated that they are seriously misleading; for one or the other of the two groups which think it contains different materials must be wrong.

This list shows that out of the 100 trade-names 40 are clearly and necessarily so misleading as to be a serious matter. The seriousness of the misleading character, however, differs rather widely, a few cases being on the border line. Thus, the term Union Linen, which was thought by exactly 23% to contain all linen, might have been omitted, while the term French Linon and Taffateen are very misleading in that about as many think them to contain some linen or some silk as those who know them to be of cotton.

A generalization which applies to a large percentage of the terms contained in the following list is that they involve a mixture of materials as is perhaps suggested in many of the names,—Silk Finished Poplin, Silk Lisle, Economy Silk, Woolene, etc. It is noteable that few of the terms in this list were thought by the women to be all or entirely composed of silk, wool, or linen, as the case may be. The confusion, in other words, comes from the fact that the terms suggest that they contain some part of the pure material which they indicate. Even a term like Wool Processed apparently suggests to the ultimate consumer that some wool must be contained, the replies in this case showing that while only 26% thought the material to be all wool, 70% thought it to contain some wool.

Attention is again called to the fact that the conclusion as to the misleading character of the following terms does not depend upon the actual content of the fabrics. In some cases the majority of the replies correctly designate the content, and in a considerable number of cases a plurality does so. The point is that in all cases, a group of over 23% of the women thought the fabric contained something else.

List II. contains those textile trade names contained in the Bureau's questionnaire which are misleading in the sense that over 23% of the women gave replies as to the content which are at variance with the actual content. These names in part duplicate those on the preceding list of misleading terms but a majority are in addition thereto. This fact means that in addition to the confusion arising from difference of opinion as to the content, there is a considerable group of terms concerning which a serious proportion of consumers are misled. Take "Australian Wool" for example: 95% of the women

LIST I.

Textile Trade Names Which Are Clearly Misleading, Regardless of Actual Content

(Two groups of women have different opinions of contents, each group being over 23% of the total.)
Terms in italics are doubly misleading—see List II.

	Per Cent naming one material			Per Cent naming different material
Baronette Satin	51			30
Domet Flannel	47%			52%
French Linon	54			44
India Linen	73			26
Irish Poplin	56			29
Linflax	42			33
Maisilk	31			45
Near Linen	52			44
Nu Satin	40			43
Pongeen	39			45
Ramie Linene	56			35
Seco Silk	38			25
Silkataff	48			37
Silk Finished Poplin	64			33
Silk Gingham	57			39
Silkolette	54			29
Silk Lisle	47			50
Skinner's Satin	50			32
Soisette	65			26
Subsilk	43			40
Suesenne Silk	36			51
Surf Satin	49			45
Taffateen	45			45
Union Linen	23			73
Velour Plush	45			38
Velvetta	50			30
Velveteen	61			36
Woolene	75	(Some Wool)	(Some Cotton)	55
Woolnap *	29			59
Wool Processed	26			70
Wulsylk	57			37**
Woolspun	27			65
Alaflax	43			28
Aledo Silk	31			36
Boulevard Velvet	44			37
Clachan Serge	69			24
Lingerie Silk	45			37
Pongeea	27			40
Suskana Silk	33			26
Tezzo Silk	32			28

*The manufacturer has recently discontinued the use of this term.

**Cotton, Silk and Cotton, Wool and Cotton, Art silk.

LIST II.

Textile Trade Names Which Are Clearly Misleading on the Basis of Actual Content

(A large proportion of women think they consist of material other than that usually found in them.)

	Actual Content	*Consumer's opinion as to contents*	*Per Cent Naming the Material*
Alaflax	Cotton	Linen	43% All — 71% All or Part
Aledo Silk	Part Cotton	Silk	31 " 67 " " "
Amazon Silk	Cotton	"	49 " 67 " " "
American Taffeta	"	"	69 " 83 " " "
Australian Wool	Part Cotton	Wool	95 " 99 " " "
Beauty Satin	" "	Silk	64 " 86 " " "
Boulevard Velvet	Cotton	"	44 " 81 " " "
Brazos Silk	"	"	46 " 63 " " "
Clachan Serge	"	Silk	35 " 75 " " "
Costume Velvet	"	Wool	69 " 93 " " "
Deluxknit Silk	Part Cotton	"	52 " 70 " " "
Dew Kist Silk	" "	"	65 " 76 " " "
Feather Silk	Cotton	"	48 " 69 " " "
French Serge	Part Cotton	Wool	73 " 93 " " "
Golden Fleece	" "	"	48 " 71 " " "
Killarney Linen	Cotton	Linen	86 " 93 " " "
Kumsi Kumsa Silk	Artificial Silk	Silk	63 " 75 " " "
Lingerie Silk	Part Cotton	"	45 " 82 " " "
Maisilk	Cotton	"	16 " 45 " " "
Marvel Silk	"	"	40 " 59 " " "
Nu-satin	"	"	40 " 43 " " "
Palmer Linen	"	Linen	46 " 69 " " "
Persian Fleece	Part Cotton	Wool	65 " 77 " " "
Pongeea	Cotton	Silk	27 " 67 " " "
Radio Silk	"	"	66 " 81 " " "
Satin de Chine	Part Cotton	"	81 " 94 " " "
Scotch Linen	Cotton	Linen	78 " 84 " " "
Saxony Wool	Part Cotton	Wool	95 " 97 " " "
Suskana Silk	" Silk	Silk	33
Tezzo Silk	Part Cotton	"	32 " 60 " " "
Tricolette	Artificial Silk	"	47 " 61 " " "
Union Linen	Cotton & Linen*	Linen	23 " 73 " " "
Velour Plush	Cotton	Silk	14 " 59 " " "
Venetian Satin	"	"	51 " 69 " " "
Woolene	"	Wool	66 " 75 " " "
Wool processed	"	"	26 " 70 " " "
Woolspun	"	"	65 " 90 " " "
Wulsylk	"	Silk	67 " " "

*Content uncertain; most common usage is to designate a fabric composed partly of cotton and partly of linen.

thought that such a fabric would be all wool and accordingly there was little difference of opinion or confusion arising from uncertainty. But the term may be seriously misleading because the fabric formerly sold under that name contained some cotton. The larger part of the terms in the following list might or might not have been misleading in themselves; the determining factor is the actual content of the goods. (a)

The foregoing list contains 38 terms and it may, therefore, be concluded that in approximately 38% of the cases the women were seriously misled as to the actual content of the goods sold under the names submitted to them. The 16 terms which are in italics are those which are also contained in the first list and these may, therefore, be said to be doubly misleading. It will be noted, however, that in this part of the list the percentages which consider the goods to be all wool, linen or silk are very small which is due to the fact already pointed out that a majority of the terms in the first list are mixtures or are thought to be so, and their misleading character is largely due to that fact.

In fact, the notable thing about the second list is that in all cases a large percentage of the consumers thought that the textile products designated were entirely composed of the material suggested by the name. Thus, 65% thought Dew Kist Silk was *all* silk, 81% thought Satin de Chine was *all* silk, 78% thought Scotch linen was *all* linen, 95% thought Saxony Wool was *all* wool.

The corollary of this situation is the fact that the great majority of the terms in the second list contain a separate and unmodified use of the term which means a single pure material. A glance at the list shows that in nearly all cases the term ends with such words as wool, silk, linen, fleece, velvet and satin. These words evidently suggest to the consumer that the fabric is an all pure fabric containing nothing but the material designated.

The Bureau's questionnaire contained the following question—*"Name any term, not checked above, that has misled you."* In response to this question the following textile terms were given, those in italics being mentioned more than once.

LIST III.

Additional misleading names mentioned by consumers.

*A.B.C. Silk (b)
*Carnation Linen
*China Silk
Damask
Fibre Silk
*French Serge
*Flaxon
*Irish Linen
*Linenized Percales
**Linen Damask*
Persian Fleece
Pongeea
*Scotch Serge
*Silk Broadcloth
Silk Lisle
Tricollette
Venetian Satin
*Wash Silks
*Wear Test Wool.

The terms shown in italics are those which were mentioned by more than one woman.

A number of these terms were listed in the questionnaires, but those marked with an asterisk in the above list are in addition to those covered by the Bureau's list. Concerning these additional terms there is nothing to be said except that a number of women have stated that they have been misled thereby. Whether these are seriously misleading or not this investigation does not show.

It is of interest, however, to note that a few of the terms specially mentioned in replies to questionnaire are found in the two preceding lists of misleading terms. These are *Persian Fleece, Silk Lisle, Tricolette, Venetian Satin.* In a subsequent list it will be found that *"Damask"* is also mentioned as a general term which is unsatisfactory. It may, therefore, be said that there is some reason for considering these five terms as especially troublesome.

Some comments volunteered by the women who filled in questionnaires are of interest, and are pre-

(a) *With reference to the determination of the actual content the Bureau would here state that with the exception of the terms indicated by an asterisk, the content is that commonly reported in trade sources and no responsibility is assumed for the classification here given. There is a good reason, however, to believe that the content as designated is correct.
(b) The manufacturer now designates this product as A.B.C. Silk and Cotton Fabric.

sented as throwing light on the consumer's understanding of textile terms.

"Fabrics have been so misnamed that now the trade name gives little clue to actual composition." (Washington, D. C.).

"Most of the 'silks' and 'silkenes', etc. that are not *silk* and the *linons* and *linenes* which came from the cotton plant—and *wooltex* and *woolettes* that never saw a sheep are very misleading. *Damask* used to mean 'Linen' now it means anything. One wearies of constantly being led to think a thing is that which it is not." (Chevy Chase, Md.)

"Artificial silk is often combined with real silk. Many of these terms I do not know." (Boston Mass.)

"I think if the manufacturers displayed more common sense by having fewer names for their materials, they would find the purchasing public more content." (Cambridge, Mass.)

"I have a feeling of distrust for material with which I am not personally acquainted—a feeling that goods can't be judged by names or by advertisement." (Fort Wayne, Indiana.)

"Personally, my common sense would tell me that some of those silk-sounding, linen-looking names aren't as silk or linen as they sound and look."

"If, however, I were of a more confiding, trustful nature, I should expect everything containing the word 'linen' in its trade name to be *all* linen. The same thing goes with silk and wool." (St. Louis, Mo.)

Two hundred questionnaires were sent to department stores. Only 23 replies were received. Of these replies, about one-half, or to be exact 12 stated that they had received no complaints from customers and had not themselves been misled. On the other hand, nearly one-third (7 replies) stated that complaints had been received from customers and 6 stated that they had themselves been misled by textile terms. The various terms mentioned by this dealer questionnaire as having been misleading are as follows:

LIST IV.

Misleading names reported by dealers.

*A.B.C. Silk
Art. Silk

LIST IV. *Continued*

Australian (as applied to blankets)
Fibre Silk
Kamura Silk
Khaki Kool
Pongee
Seco Silk
*Silk Broadcloth
*Silko
Tricolette
Union Linen
Woolnap
Worsted

The items in italics are mentioned by two or more dealers. Those marked with an asterisk are in addition to terms found in the Bureau's questionnaire.

A number of the terms given by the dealers appear in the lists of misleading terms as determined by the Bureau, thus corroborating the Bureau's findings. These are,

Australian (as applied to blankets)
Seco Silk
Tricollette
Union Linen
Woolnap

The attitude of many retail dealers is indicated in the following quotation from a letter written by the secretary of the National Retail Dry Goods Association:

"There has been great activity in the production of other similar misleading names and that process goes on today almost unchecked. I assume the great benefit from an attempt such as you propose would be to bring about a condition under which such misleading terms would not be tolerated. From time to time the use of these misleading trade names gets a retailer into difficulty, as for example, the Federal Trade Commission recently has had several cases against Washington, D. C. retail stores for misleading advertising based upon the use of such trade names. It would certainly be a relief to have such a possibility removed."

TRADE NAMES WHICH ARE LESS THAN SERIOUSLY MISLEADING

The Bureau finds that a large group of the terms contained in its questionnaire do not appear in themselves to be seriously misleading to consumers. The lists which are presented next are probably of equal importance with those which precede. Certainly it is just as helpful toward arriving at a solution of the problem presented by misleading textile terms to know which ones are not seriously misleading as to know which ones are.

The following statement shows two lists. The first column contains terms concerning which there was no serious difference of opinion, that is to say, not over 23% of the replies differed from those of the majority in expressing an opinion as to the content of the textiles designated. The second column contains a list of those terms in which over 50% of the replies were in agreement with the actual content of the product named. Consequently, it may be stated that the consumers were not seriously misled by these terms. Those terms which are mentioned in both lists are shown in italics.

While by actual tests these terms do not mislead more than 23%, some on their face are inaccurate and can easily deceive the uninformed. It is a harmful corruption of human speech or language to take terms which clearly mean one thing and use them to indicate another thing which is an inferior substitute.

LIST V.

List of Textile Terms Found Not To Be Seriously Misleading

No serious difference of opinion among consumers as to contents	*Not over 23% misled on basis of actual content*
All-But Linen	*All-But Linen*
*(American Silk)	*Aeroplane Linen*
Aeroplane linen	*Boudoir Silk*
Art. Silk	*Brilliant Satine*
Boudoir Silk	*Canton Flannel*
Brilliant Satine	*Canton Silk*
Canton Flannel	*Economy Silk*
Canton Silk	*French flannel* (a)
Economy Silk	*Georgette silk*
French Flannel (a)	*Gloveskin Woolens*
French linen	*India linen*
Georgette silk	*Italian silk*
Gloveskin Woolens	*Jap silk*
India linen	Khaki-kool
Italian silk	*Linene*
Jap silk	*Linenized cretonnes*
*(Lackawanna wool)	Linflax suitings
Linene	*Lin-N-like*
Linenized cretonnes	*Linonette*
Lin-N-like	*Marronette silk*
Linonette	*Mohcilque*
Marronette silk	Near linen
Mohcilque	*Outing flannel*
Outing flannel	*Satin Charmeuse*
Satin Charmeuse	*Shantung silk*
Shantung silk	*Silkaline*
Silkaline (b)	*Silkateen*
Silkateen	*Silkine*
Silkine	*Soisette*
Soisette (e)	*Taffeta plaid*
Taffeta plaid	Tub silk

*These terms are uncertain as to classification, as the Bureau is not advised as to the content of the fabrics.
(a) French flannel is often part cotton. Sample analyzed by the Bureau, however, was all wool.
(b) 24% thought some silk was contained.
(c) 26% thought some silk was contained.

It should first be noted that the first column contains terms which do not appear to be misleading for the reason that there is no important difference of opinion concerning the content of the fabric designated and does not contain any terms which are found to be actually misleading to the majority. That is, those terms in which a majority were misled on the basis of actual content are not included, even though there was substantial unanimity of opinion. This is obviously logical inasmuch as the purpose of the list is to present only terms which are *not* seriously misleading.

Recent Federal Trade Commission rulings on Silkaline and Art Silk show that the 23% margin adopted in this report, is conservative.

A study of the lists will show that there are 31 terms concerning which there appears to be no serious confusion in the minds of consumers and 32 terms which did not actually mislead consumers. The italicized terms, which are those that appear in both lists, number 28, and it may be concluded with especial confidence that these 28 terms are only mildly misleading.

The 8 terms which appear only in one of the lists are doubtful and may be more or less seriously misleading.*

It is important to inquire the reasons why these 28 terms were not misleading to over 500 women who replied to the questionnaire.

Part of the terms did not mislead for the reason that long usage has established in the public mind an understanding of the true content of the fabrics designated. Among these terms are: Canton Flannel, India Linen, Outing Flannel, Silkaline, and possibly French Linen.

In some cases extensive advertising or other publicity which included a true statement of contents, appears to have helped avoid deception. Such terms may include "Irish Poplin," "Economy Silk," and "Linene." The term Seco Silk (now discontinued by the manufacturer) was found to be only slightly misleading, for the same reason.

Such cases do not appear to give a precedent for the adoption of similar terms in the future. The fact that persistent advertising and explanation has been necessary to establish in the minds of consumers the true content of the fabrics, is, in itself, proof that the terms are inherently misleading.

In other cases the non-misleading character of the term is due to the fact that it gives sufficient indication of the true content of the fabric to which it is applied. Such terms are: All-but-Linen, Brilliant Satine, Linene, Linenized Cretonnes, Lin-N-Like, Silkine, etc.

The means and degree of indication in such cases as the foregoing, differ. (1) A fabric which is all-pure silk, wool, or linen, has its content correctly indicated by calling it "silk;" "wool," or "linen" as the case may be. Thus, "Italian Silk," "Gloveskin Woolens," and "Aeroplane Linen" are not misleading, barring fraudulent use. (2) Terms which obviously imply *mere resemblance* to silk, wool, or linen, may not be misleading. This is found to be true of "Lin-N-Like" and "Linenized Cretonne." (3) Some terms are not misleading for the reason that they indicate by their form that they are of cotton. Such terms are "Brilliant Satine," "Linonette," "Silkine," and "Silkatine." It seems reasonably clear that the "ine" or "een" type of ending, when added to the work "silk," "satin" or "velvet," is recognized by a majority of persons as indicating a cotton fabric. In the case of linen and wool, this is not so clear. The difference would appear to be due to the long use of "Sateen," "Velveteen" and "Silkaline" to designate cotton fabrics.

In connection with the analysis of non-misleading terms, the Bureau finds that certain trade terms are only misleading as to a *part* of the contents of the fabric designated. This fact is of interest, for it shows degrees in the misleading effect of terms, and throws light on the causes of deception. These *partially* misleading terms are shown in the following list, those in italics not being seriously misleading.

Terms Misleading Only as to part of Content
(Under 10 persons saying all silk, wool, etc.)

Art. Silk
Linenized Cretonnes
Linonette
Near Linen
Silkateen
Silk Finished Poplin
Silkaline

*(American Silk, Art Silk, Boudoir Silk, Khaki-kool Silk, Lackawanna Wool, Linflax suitings, Near linen, Tub Silk.)

Silkine
Silkolette
Linene
Lin-N-Like
Mohcilque
Subsilk
Velvetta
Velveteen
Wulsylk

The Consumer's Understanding of the General Trade Terms Commonly Used to Designate Textiles

The foregoing lists of names are all taken from the Bureau's questionnaire which purported to contain trade names of the type which are commonly trade marked. With but few exceptions they are brands, and the essential feature is not a general trade designation of some weave or finish. The following list includes only the more general trade terms which designate some weave or finish or material which any one is free to use, such, for example, as Alpaca, Batiste, Brocade, Satin, etc. The significance of this second group of terms lies in the fact that there is great confusion especially among consumers, as to what various terms mean. It is thought to be a valuable service to determine once for all what the average woman thinks such materials as satin, serge and flannel are, and it is hoped that such a determination will help lay the basis for a more standardized trade terminology.

Many of these terms have been in use for a long time and it may not be possible to alter trade custom to the extent of abolishing, changing or standardizing them. By squarely confronting the facts, however, it is possible that by the use of modifying terms the existing confusion may be reduced to a minimum. The Bureau would emphasize the fact that while through long usage a general understanding of the meaning may be established, the adoption of new similar terms would be misleading. Investigation shows that young women who have not had experience in buying or using textiles often do not know the true content even of "Canton Flannel," "India Linen," etc. While therefore, it may be practically expedient to retain those terms, the true significance of which has become established, the adoption of similar terms would be misleading.

It is recommended that such terms be used in advertising only when accompanied by a word designating actual content.

An examination of the following table shows that serious confusion exists with regard to a number of the terms contained. "Silk Lisle," which has already been mentioned among the misleading trade terms, is thought to contain silk by over 50% of those who replied. In the case of "Taffateen" 42% thought it was a silk and cotton fabric and 3% more thought it was silk and wool; consequently the total of 45% thought it contained some silk. Tussah, which appears to be a fabric composed of wild silk and cotton, was thought to be of silk by 55%. While 43% thought crepe to be all cotton, 18% thought it all or part silk.

LIST VI.

List of Basic Textile Trade Terms Showing What Materials Consumers Think They Indicate

	Chief Material Reported	Per Cent So Reporting
Alpaca	All Wool	52%
Batiste	All Cotton	80
Brocade	All Silk	35
Canton Flannel	All Cotton	73
Chiffon	All Silk	76
Crepe	All Cotton	43
Crepe De Chine	All Silk	84
Damask	All Linen	62
Duvetyn	All Wool	33
Fibre Silk	Artificial Silk	69
Flannel	All Wool	72
Foulard	All Silk	65
Georgette Crepe	All Silk	67
Linene	All Cotton	61
Outing Flannel	All Cotton	77
Plush	Silk & Cotton	45
Pongee	All Silk	66
Poplin	All Cotton	21
Sateen	All Cotton	75
Satin	All Silk	72
Serge	All Wool	75
Shantung silk	All Silk	66
Silk Lisle	Silk & Cotton	57
Taffeta	All Silk	89
Taffateen	Silk & Cotton	42
Tulle	All Silk	61
Tussah	All Silk	55
Tweed	All Wool	65
Velour	All Wool	38
Velvet	All Silk	45
Velveteen	All Cotton	52
Voile	All Cotton	72
Worsted	All Wool	71

The following terms show considerable confusion in the minds of consumers.

LIST VII.

Fabric names which are especially confusing.

Brocade	Linene	Taffateen
Crepe	Plush	Tussah
Damask	Poplin	Velour
Duvetyn	Silk Lisle	

Only the opinion held by the greatest number is shown in List VI, but the detailed facts with regard to the fabrics just mentioned are shown in the following supplementary statement:

LIST VIII.

PERCENTAGE OF REPLIES

Fabric	All Silk	All Wool	All Cotton	All Linen	Part Silk	Part Wool	Part Linen	Merely Finish or Weave
Brocade	35	1.7	3.4		19	5		20
Crepe	12		43		6			11
Damask			5.7	62	1.8		4	11
Duvetyn	9.6	33	1.7		30	31		5.2
Linene			61				28	4.8
Plush	16	4.4	7		45	6.7		7
Poplin	9.8	2.7	22		27	8		3.7
Silk Lisle	5.5		23		52		1.7	4.8
Taffateen	2		40		43			9
*Tussah	55	2	1.7		22			4
Velour	8.5	38	2.5		22	7		6

*9.2% think Tussah is artificial silk.

It is a noteworthy fact that in the case of all the foregoing fabrics, an unusually large number of replies indicated that no opinion was held regarding the content. A large number checked the "Don't know" column. *This was particularly true of Brocade, Duvetyn, Plush, Taffateen, Tussah, Silk Lisle, Velour. Clearly it is of special importance that these seven terms should be accompanied by some explanatory word or words to indicate true content.*

Types of Misleading Textile Terms

An examination of the various terms included in the Bureau's lists shows that various ideas lie back of those terms and that they may be grouped into a number of distinct classes. This group might be made on different bases but the following will serve to illustrate the situation.

The Chief Groups of Textile Trade Names

I. Names containing the name of a single pure textile material without modification.

1. Name joined with a separate name of a country or foreign term.
   - American Silk
   - Australian Wool
   - China Silk
   - French Linen
   - French Linon
   - French Serge
   - India Linen
   - Irish Linen
   - Irish Poplin
   - Italian Silk
   - Kamura Silk
   - Killarney Linen
   - Kumsi Kumsa Silk
   - Suesenne Silk
   - Venetian Satin

2. Name joined with separate trade name which gives no indication of content.
   - A.B.C. Silk
   - Aledo Silk
   - Amazon Silk
   - Beauty Satin
   - Boulevard Velvet
   - Carnation Linen
   - Domet Flannel
   - Georgette Silk
   - Hero Flannel
   - Skinner's Satin
   - Union Linen

II. Name of a single material joined with a descriptive term calculated to indicate something as to the nature of the fabric or its content.

1. The modifying term separate.
   - Art. Silk
   - Deluxknit Silk
   - Economy Silk
   - Feather Silk
   - Fibre Silk
   - Khaki-Kool
   - Near Linen
   - Nu-Satin
   - Tub silk
   - Weartex Serge
   - Costume Velvet
   - Lingerie Silk
   - Scarf Satin
   - Surf Satin

2. The modifying name combined with basic term.
   - Subsilk
   - Sportsilk

III. Name of a single material modified by a diminutive ending.	Linene Linonette Pongeen Silkateen Silkine Silko Silkolette Taffateen Veldyne Velveteen Velvetta Wooleen
IV. Name composed of combination of two materials.	Mohcilque Ramie Linene Silk Gingham Silk Lisle Velour Plush Wulsylk
V. Names indicating appearance or finish.	Krepe Knit Lin-N-Like Linenized Cretonnes Linenized Percale Silk finished poplin Wool processed Woolnap Woolspun Wooltex
VI. Names indicating the raw material.	Alaflax Australian Wool Flaxon Golden Fleece Linflax Persian Fleece
VII. Names containing a combination of raw material and a fabric generally woven from the same material.	Silkataff Linflax
VIII. Names based on a general term such as "cloth."	Beach Cloth Kelly Kloth Kool Kloth Kitten's Ear Cloth

One point of interest in the various trade names is the practice of misspelling. The terms might be all divided into two groups on this basis. An illustrative list of those names in which liberties are taken with spelling is as follows:

Art Silk
French Linon
Kool Kloth
Linonette
Lin-N-Like
Mohcilque

The term "Art Silk" is mentioned, as it is correctly written "Art. Silk," being an abbreviation of "Artificial Silk." When misspelled, this term is as clearly misleading.

GENERAL PRINCIPLES

A study of the lists of those terms which are found to be misleading and those found not to be misleading makes it possible to draw certain general conclusions which may serve as the basis for determining the correct usage in this regard. These conclusions are tentatively formulated in the following paragraphs.

(1.) When such terms as silk, wool and linen are essentially unmodified they can have only one general meaning—they must indicate an all-pure material. This is true both in law and in ethics, and the results of the Bureau's investigation show that consumers in fact have the same opinion.

In this connection it is interesting to note the basis of reasoning used by the the Federal Trade Commission. "The word silk when applied to thread or textile goods both in the technical and popular usage, has a precise and exact meaning and is only accurately and properly used in identifying and describing materials derived from the cocoon of the silk worm." This establishes an unequivocal principle which not only applies to silk but all standard fabrics.

(2.) When a term which primarily indicates some weave or finish which by custom comes also to indicate a kind of material such as silk, wool or linen, the foregoing statement applies. That is, such terms should denote an all-pure material content. Such terms are: Chiffon, Foulard, Georgette, Pongee, Satin, Taffeta, Tulle, Tussah, Velvet, all of which denote silk; and Alpaca, Flannel, Serge, Tweed, worsted, all of which denote wool. Damask denotes linen.

Even within the all-pure materials there may be a considerable range as to grade or quality. For example, all-pure silk may under present conditions be wild silk, thread silk, filled silk or any one of a considerable number of similar descriptions. This condition is not desirable, but under present trade arrangements the Bureau is not prepared to draw definite conclusions. It is merely suggested that careful manufacturers and dealers will indicate in their descriptions the grade or quality of the material contained.

(3.) The use, in connection with the name of a fabric, of colorless firm or brand names, or names of countries which have no special significance, does not affect the significance of the basic term. Such a use does not affect the responsibility of the manufacturer or dealer who sells a product as silk, wool or linen nor modify the conclusion that the fabric is all-pure. This observation applies to such names as, Aledo Silk, Australian Wool, Carnation Linen, China Silk, Italian Silk, Seco Silk, Skinner's Satin. Such brand names do not essentially modify the name of the basic material.

Two special points, however, may be made with regard to the use of the name of a country:

(a) The name of a foreign country used to modify some basic term such as silk, wool or linen may reasonably be assumed to indicate that the fabric so designated is produced in the foreign country named and accordingly is apt to be misleading when in reality the fabric is made in the United States. This is true even when the raw material comes from the foreign country named and the weave or finish is like the product of the said foreign country; for the term silk, wool or linen as applied to a woven textile product indicates the finished fabric. Accordingly, such terms as Irish Poplin, India Linen, Italian Silk, English Broadcloth, and other well-known combinations of this order are in the Bureau's opinion undesirable and should be discouraged by the textile trade.

(b) The use of the name of a foreign country may make a textile term doubly misleading in case that country is one well-known to produce a high-

grade or characteristic fabric which might be confused with the product sold under the trade name. In the term Persian Fleece, for example, a country is named which is well-known for fine wool. The use of the word Irish in connection with linen fabrics has a special significance, as is also the case with Italian names when coupled with silk, such as Venetian Satin.

(4.) When the fabric to be named is not an all-pure material, the words silk, wool, and linen must be essentially modified if they are not to be misleading. It is a vital question, then, to inquire what constitutes an essential modification appropriate to cover fabrics which are not all-pure. The Bureau's investigation of textile terms indicates the various methods that have been used, such as, modification of spelling, addition of diminutive endings, and the joining with other words which to some extent indicate the content, appearance, or use of the fabric.

One conclusion which stands out clearly is that any fabric which bears a name containing the words silk, wool, or linen (or such names as satin, serge, velvet, or worsted) which are not *essentially* modified, will be thought by consumers to be all-pure, with rare exceptions established by long usage. As already indicated, the addition of a firm name or a meaningless brand name does not constitute an essential modification.

VARIABLE ELEMENTS IN TEXTILE FABRICS

The several factors as to which fabrics may vary and which may accordingly be made the basis either for a correct modification of the basic term, or for a misleading terminology, are the following:

(1) Material content
(2) Weave or finish
(3) Appearance
(4) Use or adaptation for special purposes.
(5) Economy
(6) "Quality" (Workmanship, weight, etc.)

It follows that any manufacturer or dealer who desires to describe his product must consider one or more of these factors in choosing a name which is to be descriptive and essentially to modify any basic word such as silk, wool or linen. When modification is in the interest of truth and service to the consumer it will accurately describe the fabric.

To avoid misleading consumers when the question involved is one of material content, it is clearly necessary that the name should correctly indicate the material or mixture of materials. How definite an indication of the content may be necessary depends on circumstances. One important point to note is that if some general term such as satin, velvet, or poplin forms the basis of the name, it is essential that the material contained be definitely indicated; for such fabrics as those named and others listed on page 14 are shown by this investigation to be very confusing to consumers. Accordingly, it should be indicated whether the poplin is cotton, linen or woolen poplin; whether the velvet is silk, or cotton, or cotton back, etc. Another point to note is that in some cases, at least, the ending "ine" or "ene" or "een" may suffice to indicate a cotton mixture or even an all cotton material. Thus, such terms, as silkine, sateen and linene, while misleading, are not seriously misleading.

When the question involved is not one of material content but of form (weave, appearance, etc.) it is a general rule that care is necessary that the term used should not indicate a material content which the fabric does not actually have. For illustration, the term "Scotch Linen" is bad for the reason that it indicates a linen content while as a matter of fact the material so named is made entirely of cotton and is merely finished to resemble linen.

A less objectionable usage is suggested by the term "Lin-N-Like," for this term does not suggest that the fabric is made of linen but merely that it is made to look like linen. (Lin-N-Like, however, should be sold for what it is, cotton, and no attempt should be made to trade on a better product by simulating its name.) Similarly, when the question is one of the use or adaptation for a special purpose, the term should not wrongly indicate content. "Surf Satin" and "Costume Velvet" are bad because they mislead the consumer by implying that the fabrics are made of silk and the terms "Surf" and "Costume" do not give any warning. Of course, if the fabrics are actually made of silk, (e. g., "Boudoir Silk,, and "Tub Silk,") no question is involved.

It is desirable in such cases as those just mentioned to use as a base term for fabrics which are not all-pure silk, linen, or wool, some general term such as "cloth," or "fabric." An illustration of correct usage of this sort would be the term "Beach Cloth" and "Kool Kloth" which do not indicate to the consumer that they are made of wool or linen.

An outstanding point made by the evidence of the questionnaires is the fact that terms implying resemblance are dangerous and require great care if they are not to be misleading. Among the misleading terms are, *"Near Linen,"* "Woolspun," and "Wool processed." Abstractly considered, one might think these terms innocuous, on the ground that they only claim some resemblance to the materials named. A large part of the women who replied to the questionnaire, however, thought the fabrics to contain *some* of the material named. Apparently, their idea is that to be "Near Linen," the fabric must contain at least a little linen, and to be "Wool Processed" the goods must be part wool.

The motives which lead to departure from the foregoing principles are of interest and these seem to be reducible to three:

1. A desire to sell some cheap material at the price of a more valuable material.
2. A desire to make some cheap material attractive without selling it at an unreasonably high price.
3. A desire to identify some special fabric.

With reference to the first of these motives it may be concluded that, where it is uppermost, the term adopted to designate the fabrics concerned will always be misleading. It is this motive which often leads manufacturers or dealers to sell goods which are all or part cotton as silks, linens, or woolens. Illustrations of this charge appear in the use of such terms as "American Taffeta," "Australian Wool," "Boulevard Velvet," and several others which can be found in the list of misleading terms on pages 6 & 7.

Unfortunately, however, long custom has established the use of some terms, as "India Linen" and "Canton Flannel," which while they may have originally been introduced under the first motive, are now general terms which are understood by the great majority of consumers. Moreover, it seems probable that for lack of vocabulary or other honest motive some fabrics have been given names which imply a more expensive material than that of which they are really composed, but are sold at reasonable prices based on actual content. The fact that much continuous effort has been required to overcome the inherent misleading character of the terms shows that they intend to mislead. It is possible to render men and animals immune to many poisons by inoculation. Nevertheless, the poisons are still poisonous. In the same way, *new* terms similar to "Canton Flannel," and "Economy Silk," would be misleading, and the old terms do not appear to furnish a precedent which can justify their adoption.

This suggests the second motive, the desire to make some cheaper material appear attractive without charging an undue price therefor. This motive may or may not lead to the use of misleading trade terms, although it must frequently do so. It is perhaps illustrated by the term "Economy Silk," which is a fabric composed partly of silk and partly of cotton. Undoubtedly those responsible for this name thought it would make a stronger appeal if called a "silk" than if it were merely called by some general term such as "Economy Fabric." Such terms as Skinner's Satin and Woolnap may also be mentioned, both of which are misleading.

The third motive, which is merely to identify some special fabric, may or may not result in the use of misleading terms, depending upon whether or not the term adopted conforms with the principles laid down on pages 18-19. The ground of identification may be weave or finish, special mixture or combination of materials, quality of material or workmanship, or merely a distinctive, and in no sense misleading name, or something else. The simple principle which should guide in determining the name is that it should not give an incorrect indication as to the nature of the material. The trade marked names "Dew Kist," "Palm Beach," "Khaki-Kool" and "Fruit of the Loom," are terms calculated to identify the fabrics sold under those names without conveying any misleading impressions. When, however, a product is called "Suskana Silk," "Nu-Satin," "Satin de Chine," "Venetian Satin," or "Wulsylk," the authors of the terms exceed the bounds of mere identification and convey the idea that cotton fabrics are at least partly silk. Of course, common honesty is involved in this matter. Even when joined with

the word silk, Khaki-Kool is not misleading because it designates a pongee silk suiting; while Kumsi Kumsa, when joined with the word silk, is misleading, because under that name a product composed of artificial silk is sold.

SUMMARY OF CONCLUSIONS

A group of principles or general conclusions based on the Bureau's research may be formulated as follows:

(1) Terms such as silk, wool, and linen, if they are not to be misleading, must be confined to fabrics which contain nothing but the pure material specified.

(2) Terms indicating a fabric which has a certain weave or finish, but which may contain any one of several different materials, if they are not to be misleading, must be accompanied by words which correctly indicate the content. Such terms are Brocade, Duvetyn, Poplin, Plush, Taffeta, Tussah, Velour, and others.

(3) Terms which indicate a combination of materials are especially apt to be misleading and require especial care. This is true because the very fact that a mixture is indicated seems to show that an effort is being made at greater precision; that is, such terms seem to assert definitely that some quantity of each of the materials indicated is present. By simulating or conveying the impression of accuracy, such terms are more apt to mislead than if they did not imply a mixture.

Some anomalous terms are not only apt to be misleading on the foregoing ground but are so highly illogical as to be little short of absurd. Such terms are "Silk Lisle," "Fibre Silk," "Velour Plush," and "Ramie Linene."

(4) Terms containing a combination of both the name of a country (or some word suggesting a country) and a material which is used in the manufacture of some fabric for which the country is well known, are apt to have a strongly misleading effect when used inaccurately. For illustration, the following terms may be mentioned: Venetian Satin, Australian Wool, Irish Linen, Kamura Silk.

(5) Terms which contain the name of some raw material instead of a fabric are apt to be highly misleading, e. g., Linflax, Australian Wool.

(6) The term "fleece" clearly suggests wool to the average consumer, and, when used to designate fabrics or materials which are not wool, is misleading.

(7) A small percentage of consumers (apparently a little over 20%) do not make reasonable distinctions in buying fabrics. While their misunderstandings are ignored by many retailers, they can be constructively served by simon pure accuracy in advertising description and names of fabrics.

(8) Certain long established terms which, though they may once have been misleading, are now generally understood by consumers, may be admitted as not now misleading although, abstractly considered, they are undesirable. Such terms are Canton Flannel, Outing Flannel, India Linen, and possibly Velveteen. It is suggested that it may be well to indicate the exceptional character of these terms by always placing after them in parentheses the name of the material of which they are composed. For instance, outing flannel should be described as follows: "Outing Flannel," (Cotton).

More particularly, however, those modifications which follow the well established form of joining to the base term a diminutive ending are less misleading. By this is meant such terms as Velveteen, Sateen, Silkaline and the like. On the basis of the Bureau's questionnaire it may be concluded that a majority of consumers take the ending "een" or variations thereof to indicate the presence of cotton, and it will be observed that few of these terms are contained in the list of misleading terms and none have been found which are highly misleading.

Custom is no excuse in law for the existence of these terms. The United States Supreme Court in the Winsted Hosiery Company decision sees no defense for misleading trade names in the excuse that they are a custom of the trade, but says that "A method inherently unfair does not cease to be so because those competed against have become aware of the wrongful practice. Nor does it cease to be unfair because the falsity of the manufacturer's representation has become so well known to the trade that dealers, as distinguished from consumers, are no longer deceived. The honest manufacturer's business may suffer, not merely through a competitor's deceiving his direct customer, the retailer, but also

through the competitor's putting into the hands of the retailer an unlawful instrument, which enables the retailer to increase his own sales of the dishonest goods, thereby lessening the market for the honest product."

(10) When the fabric to be named is not all-pure, the use of general terms such as fabric, cloth, material, suiting, etc., is desirable in place of such terms as silk, wool or woolen, and linen. The latter are apt to mislead because they not only indicate the fabric, but also the materials used in its composition. There appears to be no logical reason why such terms as "A. B. C. Silk" should have been used instead of "A. B. C. Fabric," or "A. B. C. Cloth." (Recently the manufacturer has followed the procedure here suggested.)

Several illustrations of this last principle might be mentioned from actual practice, as, for example, the fabric called "Ramie Linene" was changed to "American Cloth," which is a move in the right direction and removes all misleading implications.

(11) The use of the word, "near," with the word, linen, does not prevent consumers from being misled when the fabric concerned is cotton.

(12) Such terms as "Woolspun" and "Wool Processed" are misleading when applied to products which contain no wool.

The two foregoing points show that many women reason that to be "Near Linen" or "Woolspun," etc., the fabric must contain *some* of the material named

their report, they began work again and in 1927 published their second report. In the spring of 1928 the Technical Committee attended a conference in Japan to explain the classification program of the National Raw Silk Exchange and to discuss the possibility of adopting an international classification for raw silk and made an unofficial visit to China for the same purpose. A similar conference will be held in the United States in the fall of 1929. The National Raw Silk Exchange which was opened for the first time in New York in September 1928 is very active in helping to bring about greater standardization in the raw silk trade.

The Certified Silk Service, Inc., has almost completed the study of a method, which they have worked on for years, to forecast manufacturing results by a scientific, all mechanical test for raw silk. In fact, the development of mechanical methods of making tests in the textile laboratory marks tremendous strides toward the standardization of the industry. Not long ago there was no such machine as a Cheney seriplane, a serigraph, a sizing reel, a gage machine, Seem and Duplane cohesion testers in use in silk testing. Their substitution for manual means of testing quality was at first opposed, but now they are to be found in all up-to-date silk testing laboratories.

It is very essential that the manufacturer know the percentage shrinkage of the materials that he makes. Even a 2 per cent shrinkage in width may mean a difference of an inch or two in width of the loom. Up to the latter part of 1920 the testing of shrinkage was done by hand, i.e., the threads were

ravelled, and the difference between the length as they lay curved and wavy and the distance when pulled out straight by hand represented the amount of shrinkage. Skill was required to use the right amount of tension. A machine for measuring this mechanically was invented by Professor Barker of Leeds University.

The United States Department of Commerce reports a device invented in England and now manufactured and sold in the United States which will make a 60 second test by which one may distinguish between the various animal fibers, the various types of artificial silk and the various vegetable fibers. This will mean a speeding up of laboratory tests.

The studies and investigations reviewed in this chapter tell only a small part of the story of standardization and simplification in the textile industry, but they are sufficient to show the type of investigations which are essential as a basis for standardization and simplification and to show that because of the complexity of the problem advance in the application of these principles to textile manufacture and distribution must necessarily be slow.

CHAPTER VII

PRESENT STATUS OF STANDARDIZATION AND SIMPLIFICATION IN THE TEXTILE INDUSTRY

A very good summary of the work accomplished in textiles through this movement up to May 1928 is given by John C. Shover, Ph. D., Head of the Production Research Department of the Aberfoyle Manufacturing Company of Chester Pennsylvania, in a paper on "Standardization in the Textile Industry" in the Annals of the American Academy of Political and Social Science for May 1928. In this he states that the textile industry should be served well by standardization, since its purpose is "to effect in a plant or industry uniform adoption of the most economical and useful materials, machinery, equipment, processes, methods, and practices of production and distribution, and to maintain definite and suitable quality of products consistent with the economics and uses desired."[1] On the whole, however, standardization in this field has not been carried far, but a beginning has been made, interest has been aroused, investigations and studies are being carried on and slowly but surely standardization and simplification will become a definite and important part of our textile industry.

The cotton trade has been helped much by standardization, which has developed over a long period of years. Over a

[1] Shover, John C. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. May 1928. p. 168.

half billion dollars' worth of cotton passes through the markets of the world each year. With a volume so large it has been necessary to have a fair degree of standardization in terminology and in methods of testing cotton. Because cotton sold by weight varies according to the grade, specific price quotation figures and descriptions are given which tell the average length of fiber or staple and its grade as to the amount of dirt, particles of seed, and so on in it, of gin cut fibers, strength and color. Further detailed descriptions about these qualities are given - for example, the color gradations are white, tinged and stained. Quotations in the United States are based on cotton of a certain grade, known as middling. Mr. Shover says that "in spite of complicated variations, cotton may be so well graded and classified that a buyer can find a common terminology with which to describe definitely his specifications for its purpose. English cotton manufacturers no longer send buyers to America as they did in early days, but now rely upon standard descriptions with no inspection by the buyer until delivery."[2] Before August 1924 two standards for raw cotton were in use - that of Liverpool and of America. This chaotic condition caused trouble in the trade, consequently the Liverpool standard was abolished and the American standard adopted as the world standard for raw cotton.

Standardization in rayon is coming about largely because of the demand by dyers and printers that rayon goods be definitely marked as to type and make of rayon in the material,

[2] Shover, John C. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. May 1928. p. 169.

otherwise they can make no guarantee as to the results. In the American Silk Journal for October 1926 appears the following statement: "It is an understood fact that even when two lines are made by the same process by two different rayon producing firms, they vary considerably in quality and utility and do not show the same chemical reaction to dyeing and finishing. The result is that the dyers and printers abroad are insisting that the manufacturers and converters must identify the particular make as well as process of the fiber submitted to them for processing."[3] European and American manufacturers are this year making studies and investigations which will lead to standardization both here and abroad. Rayon, being a synthetic fiber should lend itself readily to standardization. The United States Bureau of Standards has worked out a study of the wet tensile properties and the effect of aging. A positive method for distinguishing cupranium rayon was also worked out by this Bureau and published in the "Textile World" for October 19, 1926.[4]

At the recommendation of the National Better Business Bureau, linen dealers have adopted standard markings for linen according to actual size. Because of trade conditions and customs a large part of the linen on the market was misbranded as to this characteristic.

In the wool industry one of the first standard processes to which the raw fiber is subjected is a standardized method

[3] Better Rayon Identification. American Silk Journal. October 1926. p. 34.
[4] Textile World. October 19, 1926. p. 2029.

for removing the burrs from the fleece. This is done by heating the fleece to a temperature which chars the burrs, but does not injure the wool. The burrs are then crushed and blown or beaten out. Without a standard heat this would be difficult. After cleaning and washing it is called scoured wool and is classified as to whether it is fine, half blood, three eighths or quarter blood. These and other standard terms identify the quality of the fleece or parts of fleece.

The silk industry is at present struggling with the problems of (1) standardization of raw silk, (2) the fiber content of raw silk, (3) legitimate weighting and, (4) intelligently controlled production. For years both Japan and America have been working on a desirable classification for raw silk. The fact that these two countries have been trading in raw silk for 75 years and that they still have no standard classification shows how difficult is the problem. America and Japan are in accord upon many items of raw silk classification and the American Technical Committee of the Silk Association of America suggests that these items be formulated and given recognition as standards by some type of official action. The second international conference of the major silk producing countries is to be held in New York this year for further discussion and possible adoption of an international classification code which will be acceptable to all. The Technical Raw Silk Committee has charge of this conference and technical experts from the raw silk associations of Japan, China, France, Switzerland and Italy are expected to attend.

The first National Silk Exchange in the United States opened in New York on September 11, 1928, and during the first two months of operation the Inspection Bureau certified 2,095 bales of raw silk valued at $1,500,000. During this period 2,350 bales were offered for inspection - 355 or 15 per cent were rejected because they could not meet the strict requirements of silk tenderable against exchange contracts.[5] Before the opening of the National Raw Silk Exchange, there was no such thing as certification, the silk being merely tested. Today, after the raw silk has passed through the Inspection Bureau of the Exchange, it is possible to definitely state the exact character of the silk. When silk is offered for inspection, 2 original skeins are drawn from a 5 bale lot and subjected to tests for evenness, cleanness, neatness, degree of size deviation, average size variation, tenacity, elongation by serigraph and conditional weight. The accompanying table presents this classification as it is used by the National Raw Silk Exchange.

CLASSIFICATION PROGRAM OF THE NATIONAL RAW SILK EXCHANGE[6]

Quality Tests for Grading	13 - 15 Deniers White - Six Grades						20-22 denier Two Grades	
							W	Y
							White	
							X	Z
	A	B	C	D	E	F	Yellow	
Evenness 80 panels	85	83	81	78	73	68		80
Evenness 20 low panels	75	73	71	66	60	55		70
Cleanness RSCC	90	90	85	80	80	75		85
Neatness RSCC	85	85	85	80	75	75		80

[6] Classification Program of the National Raw Silk Exchange. American Silk Journal. August 1928. p. 46.

Auxiliary Tests	A	B	C	A	B
Degree of size deviation (Japanese system)	1 - 1.10	1.20-1.30	1.40-1.50	1.50	2.
Average size variation	13.75-14.50	13.70-14.50	13.50-14.50	20.50	21.50
Tenacity (by serigraph) gm per denier	3.5	3.3	3.	3.5	3.3
Elongation (by serigraph) per cent	20	19	18	20	19
Windings - Breaks per hour 13-15 den.150 yd.per min. 20-22 den.180 yd.per min.	5	10	15	5	10

Late in 1927 a petition was circulated among users of raw silk who were members of the Silk Association of America, Inc., requesting all such dealers to recognize the justice of the early adoption of conditioned weight as the one to be used in this market. On December 12, 1928, at a meeting held under the auspices of the Piece Dyers and Furnishers Protective Association at Patterson, New Jersey, silk manufacturers and dyers decried over weighting and favored the adoption of a schedule limiting and regulating the control of silk fabrics. At this meeting they stressed the point that if dyers and manufacturers did not join in the movement to stop overweighting the following results could be expected:

(1) The Federal Trade Commission will step in and call before them all manufacturers who ask for weighted goods and dyers who produce them.

(2) There will be a decline in the demand for silk as there was 20 years ago when yarn was so heaily weighted.

(3) Rayon will push out silk as queen of fabrics.

By January 1929 at least 75 per cent of the dyeing industry

and a majority of the silk manufacturers had signed the agreement against overweighting. This agreement which went into effect January 15, 1929, states that the weighting of silk materials offered for sale shall not exceed the following proportions:[7]

Satins	50 per cent
Crepe de chine and Canton crepe	45 per cent
Georgette	30 per cent
Chiffon	10 per cent
Fabrics for printing	30 per cent

There has been much standardization in yarns. The "count" for cotton, worsted or merino yarns refers to its size, for example, a cotton yarn of count 1 is that size of which it will required 840 yards to weigh 1 pound, count 10 requires 8400 yards per pound and is 1/10 as coarse as count 1. For worsted and merino yarn, count 1 requires 560 yards per pound.[8] The size of wool is designated by "cut" or "run". The term "denier" tells the size of silk or rayon yarn and is the weight in grams of 900 meters. There would be 4,464,528 yards of yarn in No. 1 denier.[9] The larger the denier figure the coarser the yarn, but the larger the count figure the finer the yarn.

Spun yarns such as cotton worsted and linen as distinguished from filament yarns like silk and rayon, are first spun

[7] News Note. The Silk Association of America. Journal of Home Economics. February 1929. p. 147.

[8] Shover, John. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. 1928. p. 169.

[9] Ibid.

and twisted into single strands. These strands are then combined to form plied yarns. The term 10/2 means the count of each strand is 10 and that the yarn is 2 ply.[10]

There are standard statements telling the twists per inch and the direction of the twist and standard tests for strength and elasticity. Regularity is as yet expressed by comparison although there are standard methods of examination and the descriptions are becoming more and more exact. "Custom closely approaching standard trade practice is developing to regulate the amount of moisture in the various kinds of yarn... moisture content is the ratio of the weight of the moisture to total weight; moisture regain is the ratio of the weight of moisture to the bone-dry weight of yarn."[11]

It requires 2 miles of yarn to make 1 square yard of fine cotton cloth.[12] There are so many hundred miles of yarn used daily in the textile mills that the method of winding the yarn becomes a very important process and demands standardization. Some uniformity of practice in the wound package has been brought about in spite of the variety such as skeins, rolled warp, spools bobbins, caps and cones. Skeined yarn comes in hanks one loop of which is 1-1/2 yards long, the total length of the skein being 840 yards. Cones for knitting weigh 1-1/2 pounds each and are 5 inches in diameter at the bottom and 3 inches at the top.[13]

[10] Shover, John. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. 1928. p. 169.
[11] Ibid. p. 170.
[12] Ibid.
[13] Ibid.

Southern yarn spinners are working with the United States Department of Commerce on the standardization of yarn numbers, plies and put ups for the purpose of eliminating the risk of accumulating unsalable stock. There are further standard terms which give the details regarding the forms in which yarn is wound for handling, shipping or processing.

The Associated Knit Underwear Manufacturers of America are cooperating with the National Bureau of Standards to establish a commercial standard for cotton yarn sizes and a code to indicate the size by the color of the cones upon which the yarn is wound. This bit of standardization will prevent the mixing up of different yarn sizes on the same cone in the knitting plant as well as the mixing of the cones of different yarn sizes on the same knitting machine.

Because existing methods for determining the strength of yarn for rayon were inadequate, the Bureau of Standards has worked out a new method called the equitension-lea method, which has been applied to all yarns with consistent results. This new method "consists essentially of winding yarn under uniform tension on a specimen holder. This holder is inserted between the jaws of the machine, and the specimen is broken."[14]

The Knit Underwear Manufacturers of America have adopted a standard method of testing breaking strength of knitted fabrics and standard sizes for various kinds of underwear. The Association has adopted a standard mark protected by law, which

[14] Some Activities and Accomplishments. Standards Yearbook - United States Department of Commerce. 1929. p. 245.

is to be used by manufacturers on garments made to measurements certified to conform to tables compiled by the Bureau of Standards under license from the Association. A committee from the Association has the right to revoke the license upon due proof that the standard mark has been willfully and knowingly abused. The Association is making an investigation of the effect of twist in cotton yarn upon the shrinkage of knitted fabrics made of this yarn and is trying to eliminate unnecessary sizes of boxes used in packing underwear. Through a fellowship established by this Association at the Bureau of Standards, standard methods of folding hose in standardized boxes has been developed. Standard lengths for women's, men's, children's, infant's, 3/4 and 7/8 children's hosiery have been adopted, also standard percentages of oil in rayon yarns for knitting, tentative standards of moisture regain for mercerized cotton and for combed and carded cotton yarns for hosiery and underwear.

It is interesting to note that standardization and simplification usually begin with the product and work their way back through the industry to the raw material. Demands for standardized fabrics have resulted in the standardization of machinery and yarn which in turn has meant a standardization of the raw fiber and still other mechanical processes.

An example of how standardization is brought about in materials and machinery in one general change is well illustrated in the developments made in sizing. Sizing is the application of some starchy substance upon yarn so that it can be more easily handled in subsequent operations and to give more body to the

finished fabric. Sizing keeps the yarn from roughing and forming lint and also strengthens the yarn and protects it from the wear of later operations. Mr. Shover again gives us a good picture of the early sizing methods: "Once upon a time the sizing department would start out in the morning with a fresh batch of size mixture, made up of a certain number of buckets full of starch and tallow - and any bucket was a bucket. The boss guessed at how hot the mixture was and if there was a large amount of work ahead, the mixture was made up a little stronger than usual. First white yarn was run through the sizing machine and it was sized heavily. Later the light colored yarns were run through and finally the dark colored ones, thus avoiding the shading of yarn by any color deposits that might have been squeezed out into the size mixture. The darker colored yarns probably required the heavier sizing, but by the time they reached the sizing machine, the mixture was thinned out, although the boss did his best to replenish or strengthen it occasionally during the day as he found opportunity."[15] Today the squeeze rolls are dressed at regular intervals so that a uniform squeeze effect is made on the yarn. The ingredients are carefully weighed and each batch is cooked a definite time in properly constructed tanks. The temperature is known and recorded at all times during the sizing process. An instrument to record the viscosity of the size mixture is being perfected so that it may be maintained at certain points during the day. When materials, machinery,

[15] Shover, John. Standardization in the Textile Industry. Annals of the American Academy of Political and Social Science. May 1928. p. 173.

equipment, and processes are thus standardized, it is only a simple step to standardize the procedure for every man on the sizing job and thus the whole operation becomes standardized. This illustration will also bring out the fact that textile plants may standardize and simplify within themselves and yet not result in a uniform practice for the industry. This is one of the standardization problems which is being slowly worked out by the cooperating agencies discussed in Chapter III.

In addition to the progress made in the standardization of machinery, mechanical controls and testing devices, a certain amount of standardization of jobs and procedures is to be found in some of the textile plants. Cheney Brothers, silk manufacturers of South Manchester, Connecticut, have made much headway in the study of jobs, training methods and learning periods. The Duchess Manufacturing Company of Poughkeepsie, New York, is also doing some noteworthy work along this line. Textile companies in South Carolina are developing standard job practices in weaving and loom fixing. The Aberfoyle Manufacturing Company of Chester, Pennsylvania, has been developing standard job specifications for operators and has started the standardization of procedure for foremen.

Factors concerned with selling textiles have been seeking newer and better fabrics to increase sales. This trend has been opposed to standardization since it has increased the variety of fabrics, patterns, kinds of yarn and weight. Yet, in spite of the innumerable combinations possible with the large number and sizes of yarns, processes and finishes there are many

fabrics on the market today which are so well defined as to construction and nature that they are known to the trade by particular names such as serge, ratine, gingham, denim, sheeting, voile and crepe.

At a luncheon meeting on December 13, 1928, Carl Lang of Lang and Lewin, Inc., speaking before 75 broadsilk manufacturers said that whereas there is now a standard method of grading raw silk, each member of the trade has his own idea as to the method of grading piece goods. Because of this, discussions and controversies have arisen as to just what constitutes commercially perfect goods. He explained the principles underlying the system which is being worked out by the Piece Goods Standardization Committee of the Silk Association of America and urged all members of the division to cooperate in applying this standard in their business.[16] The Certified Silk Service, Inc., of New York City, under the leadership of Miss W. Kuhn, has just completed an interesting survey of the requirements of the garment indsutries. This survey has resulted in a new standard code on finished silk merchandise classification, which is to be made public soon.

At the meeting mentioned in the preceding paragraph, Mr. Robert Blum of the United Piece Dye Works discussed the value of the Design Registration Bureau of the Silk Association to individual consumers as being the education of the consuming trade to accustom itself to buy fabrics upon which there is placed the

[16] Fabric Standardization and Design Registration. American Silk Journal. January 1929. p. 74.

label of the Association indicating that the design has been registered as original. The registration of fabric designs prevents design duplication, intentional or otherwise, saves money for the manufacturer and makes the retail trade more willing to buy if the design is registered. Early in 1929 at the request of cotton and rayon manufacturers who have for some time felt the need for design registration in their particular industry, the Design Registration Bureau extended its registration services so that it now acts as a general clearing house for original designs for cotton and rayon as well as for silk.

In 1927 a standard form for government specifications was drawn up by a committee of the Silk Association of America and was accepted by the Government Specification Board. Before this bit of standardization was accomplished silk manufacturers when submitting bids for government supplies had found that the specifications were not always clear and satisfactory in meeting mill requirements.

The Broad Silk Division of the Silk Association of America went on record in 1927 as favoring standard terms and uniform contracts for every transaction in the sale of broadsilks. Other standardization activities of this Association during the past year are: (1) the revision of the finished goods rules, of thrown silk rules and of woven label rules; (2) compilation of raw goods rules; (3) publications of the cost-accounting manual for commission throwsters; (4) preparation of a cost manual for broadsilk manufacturers, and the adoption of a cost sheet for ribbon manufacturers.

TELEPHONE ASHLAND 7465-66

CERTIFIED SILK SERVICE, INC.

EXAMINING, GRADING, MEASURING, FABRICS ANALYZED
TESTING OF RAW AND THROWN SILK

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Re: ADVANTAGES of GRADING for CONVERTING

in connection with

NEW RULINGS of S.A.A.: DUTY OF INSPECTION and WEIGHTING-LIMIT

This is our first message to the trade this year. It has been inspired by a great many recent requests for copies of our STANDARD CLASSIFICATION CODE FOR BROAD SILK INSPECTION AND GRADING.

Since its first publication in the American Silk Journal of March, 1927, our code has elicited most favorable comments in other leading trade papers, however, most encouraging of all is its widening acceptance by the most progressive manufacturers, distributors and buyers as a reliable "yardstick" for measuring the commercial value of broad silks.

Evidently, to curb trade abuses and to encourage fair and square business dealings in our industry, the Silk Association adopted recently new rulings which place upon the buyer the duty of inspecting merchandise within a definite time after purchase. We welcome this action as a step in the right direction.

It should not be assumed by anyone that the reliability of established sources of supply is a blanket guarantee for the quality of merchandise. There is ever a possibility for errors and slips in manufacturing or accidents in processing.

This is only discoverable by tests and inspection which now even the smaller concern may do economically by using our facilities. Our yardage and grading certificates are a real profit insurance. You will be pleasantly surprised at the reasonable charges for our bonded, expert services.

Yours for improved quality-perfection,

CERTIFIED SILK SERVICE, INC.

W. H. Rubin

K:2-2/28

Executive.

Excerpt from Rules on Purchase and Sale of Raw Goods Adopted by Silk Association of America

5. Duty to Inspect—Claims and Allowances: *Buyer must examine and test piece goods in the raw* and promptly notify the seller of any claim within the time herein specified (any usage of the trade to the contrary notwithstanding), whether the goods are delivered at the contract place or sent to the dyer or to any other place or third person named by the buyer.

Goods shall not be returned nor allowance made nor claims made by the buyer for normal manufacturing defects or customary variations in manufacturing from specifications of width, length, weight, count or otherwise. A variation of not more than 5 per cent either way from the total specified yardage shall be deemed a compliance with the contract.

Goods shall not be returned nor allowance made nor claims made by the buyer for defects ascertainable upon inspection in the raw after 15 days, or for any defects, latent or otherwise, or for any reason whatsoever, after 60 days from delivery of the goods to the buyer either at the contract place or to the dyer or to any other place or third person named by the buyer, or after 15 or 60 days, as the case may be, after title has passed by appropriation or otherwise, nor after goods have been cut or otherwise changed from the original condition except such goods as would have been reasonably required to discover the defect.

6. Rejections and Replacements: Goods rejected by the buyer may be replaced by the seller within 30 days after rejection has been agreed to by the seller. If any dispute arises, it shall be settled by arbitration in accordance with the rule on arbitration.

10. Deferred Assortments — Default — Appropriation:

Where a contract covers the sale of goods in which colorings, designs, patterns, assortments or complete specifications are not determined at the time of sale. seller will submit colorings, designs or patterns for acceptance, from which buyer agrees to make selection or furnish assortment and give complete specifications within a reasonable or specified time. In the event of the buyer's failure so to do. the seller at his option may make the selection or assortment and determine the specifications according to his judgment and manufacture and appropriate the same at the full contract price to the contract for the account of the buyer. Failure of buyer to assort or give complete specifications within a specified or reasonable time will not release the buyer from his contract.

Effective from Sept. 19,'28—*From Women's Wear, Oct.* 12,'28

Lot of 100 pieces should contain not fewer than 75 pieces Class A and not more than 5 Class C.

Standard Classification Code For Grege Broadsilks Inspection and Grading

Class I A. *May be used for weighting or pure dyes, for dress goods.*

5-10 imperfections are allowed per piece of 65/70 yards of the following character: Single or double ends out not longer than 2-3 inches. One or two broken or mispicks. One or 2 joinings, start up marks, gradually, neither heavy nor light.

Class II B. *May be used for weighting at the discretion of the converter, to be used in preference for pure dyes—dress goods.*

8-15 imperfections are allowed per piece of 65/70 yards, of the following character, but not more than a few of the same kind: Joinings either light or heavy; small floats; broken, double, tight, or mispicks. Start up marks, light rebounding filling, dirty filling, finger marks, tight knots, small stickers.

Class III C. *May be used for pure dye at the discretion of the converter, in this case useable for linings or cheap underwear, or else for printing purposes.*

May have the following imperfections: joinings, either light or heavy, floats, broken, double, loose, tight, or mispicks. Start up marks, barre, finger, or rod marks. Shires, rebounding filling, stop motion loops cut off by picker, regulation (pick wheel) marks, boxes out of order, snarls, tight knots, single twist, single ends out.

The above three classes are sub-graded for light, medium and dark shades.

Class IV 0 *May be used for printing only or to be sold "as are."*

These are very imperfect. Faults may be of similar character as in Class III goods, but these imperfections would show up in a much more accentuated degree. In addition they would show: rebounding filling, warp section marks, badly strained reeds, wrong drafts, crammed dents, a number of ends out, smashes, finger marks, stars, sandroller marks, etc., etc.

Third reprint from American Silk Journal, March, 1927

NEW WEIGHTING STANDARDS

Satins	**50%**	**Georgettes**	**30%**
Crepe de Chines	**45%**	**Chiffons**	**10%**
Canton Crepes	**45%**	**Fabrics for Printing**	**30%**

Our plan has been to proceed step by step and let comparatively small accomplishments pave the way for greater achievements.

We have not given the industry something in which only one particular branch is favored—our service is a profit-insurance for all.

The reports here below represent an actual experience of how our standard inspecting *service* improved the quality-perfection position in a 130-loom plant within six weeks.

What a boon for the selling agent! The Good Will of the clientele that had frittered away was restored. The practical elimination of seconds and an increased outlet for the fabrics of this mill resulted in real profits for manufacturer and distributor.

DECEMBER 21, 1927

Piece No.	*Quality*	*Width*	*Yards Invoiced*	*Measured*	*Weight*	*Class*	*Shade*	*Remarks*
3771	5000	42.7	67–0	66–7	9–05	2	Lt.	Ends out, heavy joinings, cockled places, slack and tight picks.
3772	5000	42.7	67–4	67–5	8–10	4		Heavy joinings, small floats, broken ends, barre.
3773	5000	42.7	65–4	65–4	8–10	2	Lt.	Joinings, barre, loose and tight picks, fingermarks.
3774	5000	42.4	66–5	67–0	8–14	2	Med.	Joinings, tight picks, soiled barre, rebounding filling, ends out.
3775	5000	42.7	66–3	66–4	9–00	3		Joinings, broken ends.
3776	5000	42.7	66–4	66–4	9–01	3	Med.	Barre, broken ends, oil spots, oily filling, joinings.
3777	5000	42.7	67–4	67–7	8–10	2	Lt.	Heavy and light joinings, broken ends, impression marks.
3778	5000	42.7	66–6	66–5	9–02	3	Med.	Rebounding filling, broken ends barre, center loops, tight picks.
3779	5000	42.7	66–4	66–6	9–03	1	Dk.	Few heavy joinings, dirty filling, oil spots.
3780	5000	43.–	67–0	67–5	8–13	3	Dk.	Heavy joinings, barre, broken ends, soiled.
3793	5000	43.6	65–4	65–4	9–08	3	Dk.	Ends out, loose picks, barre, broken ends, cockled.
3794	5000	42.6	65–4	65–4	9–08	3	Dk.	Ends out, tight and loose picks, barre, cockled, broken ends.

FEBRUARY 9, 1928

Piece No.	*Quality*	*Width*	*Yards Invoiced*	*Measured*	*Weight*	*Class*	*Shade*	*Remarks*
4275	5000	43.–	65–5	65–0	9–04	1	Lt.	Tight picks, joinings.
4276	5000	43.–	66–1	66–3	9–12	1	Lt.	Few joinings.
4277	5000	43.–	66–1	66–3	9–04	2	Lt.	Joinings, shuttle jam.
4278	5000	42.2	66–4	66–4	9–04	1	Lt.	Few joinings.
4279	5000	43.–	66–0	66–1	9–12	1	Lt.	Heavy joining, heavy tinting.
4280	5000	42.–	66–0	66–6	9–04	1	Dk.	Joinings, heavy tinting.
4281	5000	43.–	66–4	66–6	9–04	1	Med.	Soiled, few joinings.
4282	5000	43.–	66–0	66–1	9–08	1	Lt.	
4283	5000	43.–	66–6	66–6	9–08	2	Lt.	Lt. barre, reedmarks, joinings.
4284	5000	43.–	66–0	66–3	9–04	1	Lt.	Few joinings.
4285	5000	43.–	67–4	67–5	9–08	1	Lt.	Broken ends, joinings.
4286	5000	43.–	67–4	67–5	9–08	1	Lt.	Few joinings.

We hereby certify yardage, width, weight and classification for workmanship of discernible weaving imperfections in above merchandise.

Tests made on sample of client apply only to the sample—Tests made on sample lot apply only to sample pieces tested.

We will not recognize any fabrics as having been measured or tested by us unless they bear our identification.

Not responsible for any damage on merchandise or loss of same while in transit.

There will be a storage charge of 5c per piece per day for merchandise which has not been called for by owner 3 days after completion of our inspection.

Merchandise is received by us in consignment for client only and is protected by customary insurance while in our possession in our premises. Transportation insurance is covered only if agreed to by us in writing.

We are registered in the Directory of Commercial Testing-Research Laboratories of the United States Bureau of Standards.

LABOR SERVICE CHARGES

(Subject to change without notification)

TEST:

A **Measuring, Certification and Identification of Grege Broad Silk:**

For lots less than 20 pieces ..... (Minimum $2.00) pr. yd. ½¢

For lots over 20 pieces ..... pr. yd. ¼¢

B **Measuring Yards and Width, Inspecting-Grading and Marking of Grege Broad Silks:**

Single shipments from 6-50 cuts ..... (Minimum $3.00) pr. yd. ¾¢

Single shipments over 50 cuts ..... pr. yd. ¾¢ less 10%

Weekly shipments on contract over 5000 yards ..... pr. yd. ¾¢ less 20%

For satins ¼¢ per yard additional

C **Counting Picks in Piece Goods, 5 Counts** $1.50

D **Ply of Filling in Piece Goods, 5 Counts** $1.00

CONSTRUCTION INFORMATION ON FABRIC SAMPLES

To consist of particulars as found in sample (not as it might be in the loom), namely: Width, reed, ply of warp, shafts. Picks ply and twist of filling.

CIR **All Silk Plain, Grege:** Georgettes, crepes, satins, etc. $5.00

CIF **All Silk Plain, Dyed:** Georgettes, crepes, satins, etc. $10.00

ANALYSIS OF FABRICS SAMPLES FOR MANUFACTURING

To consist of *complete construction details for the loom*: Width of warp, reed, ply of warp, shafts, size and quality of warp stock. Picks, ply, twist, size and quality of filling material. Dye, weighting percentage, etc.

AMR **All Silk Plain, Grege:** Georgettes, crepes, taffetas, satins, etc. $12.50

AMF **All Silk Plain, Dyed:** Georgettes, crepes, taffetas, satins, etc. $17.50

Cost calculation information about selvage and warp layout $5.00

Charges for analysis of rayons, mixed silk or fancy fabrics; design work; surveys; reports; representation in arbitration, court or private settlements depend upon the time involved and the nature of the case.

Fabric samples should be ½ yard if full width, or 1 yard length if only 24 inches wide.

BENEFITS FROM CERTIFIED MEASURING, INSPECTING AND GRADING

An itemized imperfection report is rendered on each piece classified 3 or 4. Upon request, the manufacturer's indestructible identification number is marked on heading of each cut, so as to minimize the possibility of error. Specification as to suitability for dyeing, in light medium or dark shade for each piece is indicated on report.

All shipments are received by us in consignment only. Merchandise is covered against customary risks while on our premises. Our employees are bonded.

We are registered in the directory of commercial testing-research laboratories of the United States Bureau of Standards.

There has been some confusion in the hosiery retail trade because retailers have advertised hosiery gauges which few consumers understand. Hosiery of silk or rayon may be manufactured as high as 100 to 200 gauges fine, but one would have to understand the German, American and French gauge standards to comprehend their application as an indication of fineness of hosiery. The gauge has as its basis the number of needles in a certain space in the needle bed of the knitting machine. In the American gauge this unit is about 1-1/2 inches. The Better Business Bureau of New York believes that the fewer technicalities a retailer can put into advertising, the more intelligent will be the public's buying and advocates the discontinuance of this technical term in defining quality in advertising.

One piece of standardization work that is being carried on this year, and which affects the textile industry by increasing the demand for yard goods through more home sewing, is the standardization of commercial patterns. For some time there have been just complaints on the part of home-makers regarding the variations in the sizes of commercial patterns. In October 1928, the Journal of Home Economics reported "A Comparative Study of the Sizes of Commercial Patterns" by Caroline B. Little and Ethel L. Phelps of the University of Minnesota, whose aim was "to ascertain the differences in size of several makes of commercial patterns and to compare these sizes with the actual physical measurements of girls, misses, and women."[17] The general con-

[17] Little and Phelps. A Comparative Study of the Sizes of Commercial Patterns. Journal of Home Economics. October 1928. p. 763.

clusion to this study was that patterns would more nearly meet the needs of a larger number of people if the measurements were based uniformly on medium physical measurements. On February 7, 1929, the United States Bureau of Standards called a conference of pattern makers and users of patterns in New York to consider the question of (1) standard classification, i.e., the division of patterns into classes as patterns for ladies, misses, girls, and infants, (2) standard body measurements, i.e., the working out of a standard scale of measurements of the average figure for each of the classifications mentioned, (these are the actual body measurements not the measurement of the pattern or finished garment), (3) terminology. The conference recommended that the word "age" be changed to "size" as "size 12" instead of "age 12 years." It recommended also that a truly scientific study be made of body measurements by some competent organization, preferably the Bureau of Home Economics of the United States Department of Agriculture. The recommendations included a provision for the regular yearly revision of the agreement and set January 1930 as the date at which it shall become effective.

This conference while called by the United States Bureau of Standards was not an attempt at governmental regulation. The demand for a conference had come from the makers and users of patterns and is another example of self-government within industry.

The wear of a textile material is very complicated and includes such factors as abrasion, repeated stress, continued stress, soil effect, atmospheric effects, light, heat and washing effects. The Bureau of Standards has designed and built an

apparatus for testing the wear on carpets similar to their leather wear machine. The wearing quality of a carpet is greatly influenced by the tightness with which the pile is bound in the base fabric. A method for measuring this tightness was worked out last year in the Bureau laboratories, and 30 different makes of velvet carpet were tested by this method for the Navy Department and other types will be tested this year.

In cooperation with the Cotton Textile Institute, a cleavage fabric for use in the construction of cement or macadam roads was developed in the experimental cotton mill at the Bureau of Standards. "The fabric is spread on the roadbed before the cement surface is laid, thus forming a line of cleavage which facilitates repairs and resurfacing. The requirements for this fabric are (1) cheapness; (2) sufficient body to form a cleavage line; (3) open construction, so that a binding action between the surfacing and the roadbed can take place; (4) sufficient strength to permit the manipulations required in laying it. Four different weaves were tried. The final fabric is as follows: Yarn count, warp and filling, 2.75s; weight ounce per square yard 1.6; threads per inch available, warp 2, available filling 3.5. The fabric is a plain weave. The warp ends are drawn at the rate of 2.6 to the inch, omitting one end of every four."[18] This Bureau has also worked out a method of expressing in numerical terms the fading which occurs when dyed fabrics are exposed to light, washing and perspiration. This method is experimentally definite and reproducable, but is more suited to research than to routine analysis.

[18] Some Activities and Accomplishments. Standards Yearbook. United States Department of Commerce. 1929. p. 243.

Some size standardizations in textiles worked out by the Bureau which have been adopted are as follows:

1. Men's ribbed (1 x 1) cotton union suits, bleached fabrics from carded yarns.

2. Men's flat knit cotton union suits.

3. Men's ribbed (1 x 1) worsted, worsted merino, wool, wool and cotton union suits (made from fabrics that have been washed in the roll and then cut and seamed).

4. Boy's ribbed (1 x 1) cotton union suits.

5. Boy's flat knit cotton union suits.

6. Children's flat knit cotton union suits.

7. Children's ribbed (1 x 1) cotton union suits.

8. Men's ribbed (1 x 1) cotton 2 piece underwear.

9. Men's flat knit cotton 2 piece underwear.

10. Men's flat knit wool, wool and cotton, 2 piece underwear (for garments that were washed and fulled after seaming).

11. Boys' ribbed (1 x 1) cotton 2 piece underwear.

12. Boys' flat knit wool, wool and cotton 2 piece underwear.

13. Boys' flat knit cotton 2 piece underwear.

14. Infants' bands and shirts.

15. Children's sleeping garments.

16. Men's ribbed and flat knit athletic shirts (pull-over shirts).

The Bureau has worked out endurance tests for fiber rope and is carrying on investigations of dyes. In the Directory of the

Bureau of Standards and the Bureau of Foreign and Domestic Commerce of the Department of Commerce, 27,000 specifications are listed, of these 1900 specifications apply to 275 textile commodities.[19] Specifications for the following textile commodities are included in this list for the use of government purchasing agents:

Abrasive cloth

Absorbent cotton

Airplane cloth, cotton mercerized Grade A

Aprons - surgeon's rubber

Bags Politzers

Bandage - gauze, compressed

Bandage plain, gauze, roller, assorted

Canvas cot folding

Cheese cloth, bleached or semibleached

Cheese cloth, remnants for wiping purposes

Cheese cloth unbleached

Cheese cloth for wiping purposes

Cloths - wiping

Cotton duck numbered

Cotton fabric for waterproofing, asphalt saturated woven

Cotton pillow cases bleached

Cotton rags colored for wiping machinery (sterilized)

Cotton rags white for wiping machinery (sterilized)

19 Alphabetical Index and Numerical Index of the United States Government Master Specifications. Promulgated by the Federal Specification Board - Circular of the Bureau of Standards No. 319. United States Department of Commerce

Cotton rope

Cotton sheeting bleached wide

Cotton sheeting brown

Cotton sheeting brown wide

Cotton sheets, bleached (medium and high count sheets)

Cotton waste colored

Denim blue indigo (shrunk)

Denim blue indigo (unshrunk)

Denim brown

Denim brown (shrunk)

Duck light weight (army duck, grey)

Duck, tent (special construction for bleaching or dyeing grey)

Felt asphalt saturated rag for roofing and waterproofing

Felt, coal tar saturated rag for roofing and waterproofing

Felt, hair

Felt, rag for flashings, asphalt saturated

Flax packing

Hose, fire-cotton rubber lined

Hosiery sizes and measuring

Packing, fabric condenser tube

Packing, rubber, cloth insertion

Pads - surgical operating

Ribbons - computing and recording machines

Ribbons - hectograph

Ribbons - typewriter

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BUREAU OF STANDARDS
George K. Burgess, Director

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STANDARD HOSIERY LENGTHS

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STANDARD HOSIERY LENGTHS

METHOD OF MEASURING AND STANDARDS PROPOSED FOR LADIES', MEN'S, CHILDREN'S RIBBED, CHILDREN'S SPORT, INFANTS' RIBBED, AND INFANTS' AND CHILDREN'S SOCKS

By E. M. Schenke and Charles W. Schoffstall

ABSTRACT

A study of existing practices relating to lengths of hosiery was made. A method of measuring the length was selected, and hosiery representing the product of 30 different manufacturers was measured. From the data obtained standards are set up for the lengths of ladies', men's, children's ribbed, children's sport, infants' ribbed and infants' and children's socks. Reasonable tolerances are also recommended.

CONTENTS

I. INTRODUCTION

The reduction in the variations of hosiery lengths is of economic importance to both the user and the manufacturer. The interest of the user is evident when consideration is given to the discomfort resulting from wearing hosiery, the leg of which is too long or too short. Although not relatively as important as the length of foot,[1] for the variation in length of an inch may not cause any decided discomfort, yet the purchaser wishes to have some reasonable assurance that the hosiery is the same length at each purchase.

The chief interest of the manufacturer is in the establishment of a fair standard as a matter of trade procedure. This must bring about fairer methods of competition. It will also decrease the number of disputes and cancellations. The saving in materials will be a factor in those instances where the manufacturer is now exceeding the proposed standards by several inches. In addition, the adoption of a regular procedure will probably increase the efficiency of the mill.

The hosiery industry has readily recognized the advantages to be gained by the adoption of a standard method of measuring the length

[1] See B. S. Circular No. 149, A Standardized Method of Measuring the Size of Hosiery; Feb. 1, 1924.

of hosiery and the fixing of standard lengths. Its interest has been repeatedly expressed. This work was undertaken in cooperation with the National Association of Hosiery and Underwear Manufacturers as one of the problems of research and standardization in the hosiery industry.

II. ACKNOWLEDGMENTS

The bureau acknowledges the cooperation and efficient assistance of John Nash McCullaugh, national secretary and industrial manager of the National Association of Hosiery and Underwear Manufacturers. Mr. McCullaugh was helpful in the formulation of the plan of this study and secured through his association valuable assistance in its development. Acknowledgment is also made to the various manufacturers who submitted the hosiery used in obtaining data for the solution of this problem.

III. PURPOSE

The purposes of this study were (*a*) to select a method for measuring the length of hosiery, and (*b*) to formulate proposed standard lengths and tolerances for men's, ladies', and children's hosiery.

IV. METHOD OF MEASURING THE LENGTH OF HOSIERY

The selected method for measuring the length of hosiery is shown diagrammatically in Figure 1. It is as follows:

1. Method of Measuring Length of Ladies' Hosiery.—Lay the hosiery on a flat surface. Place a ruler so that it touches the lower end of the heel gore and the curve formed at the ankle. The length is the distance from the bottom of the heel to the top of the hosiery as located by this line. (For full-fashioned hosiery this line of length shall be determined by laying the ruler so that it touches the curve at the ankle and is parallel to the front line of the hosiery.)

2. Method of Measuring Men's, Children's, Children's Three-quarter Length Hosiery, Infants' Hosiery, and Infants' Socks.—Lay the hosiery (or sock) on a flat surface. Place a ruler so that it passes through the heel gore and is parallel to the ribs on the ribbed portion of the hosiery. If the hosiery has been boarded properly, the ruler will be parallel to the front line of the hosiery. If this is not so, adjust the ruler so that it is parallel to the front line of the hosiery. The length is the distance from the bottom of the heel to the top of the hosiery.

V. DISCUSSION OF RESULTS OBTAINED

Samples of hosiery of their various kinds and styles were submitted by 30 manufacturers. These included men's, ladies,' children's ribbed, children's three-quarter length (sport), infants' ribbed, and

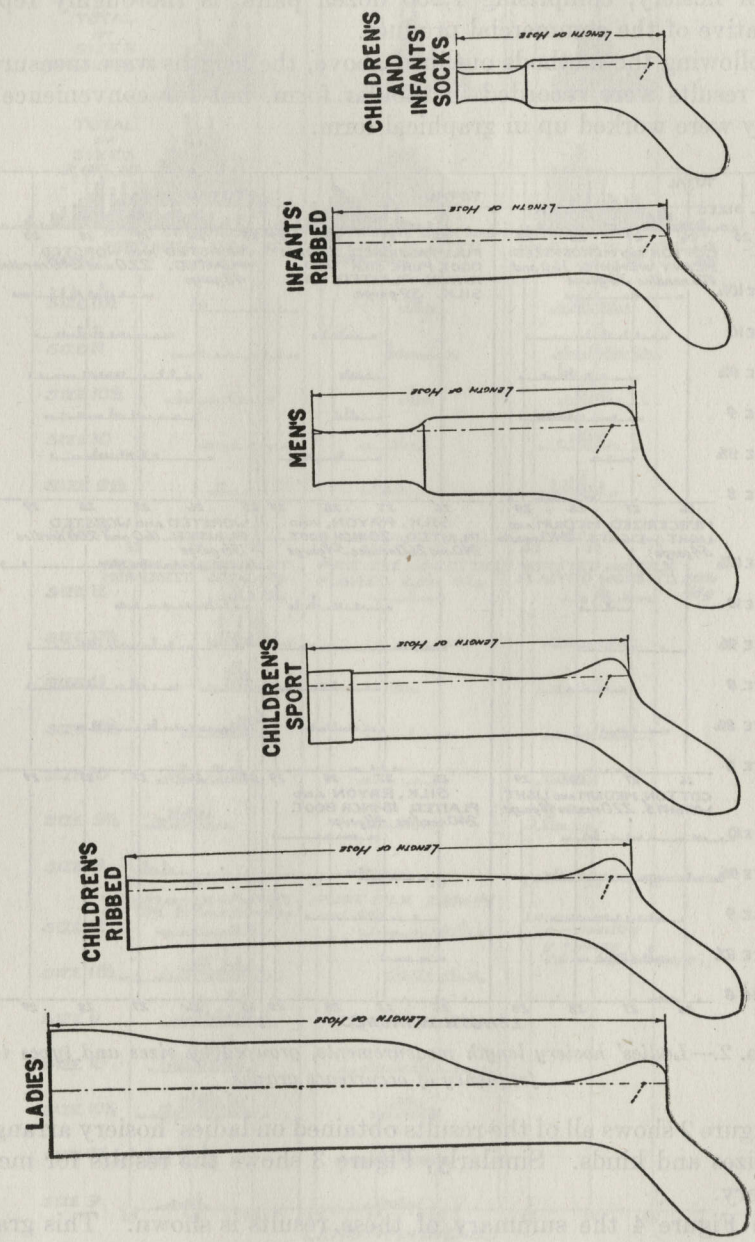

FIG. 1.—*Method of measuring length of hosiery*

children's and infants' socks. The kinds included cotton, silk, rayon, worsted, and various plaited combinations. It is thought that this lot of hosiery, comprising 1,200 dozen pairs, is thoroughly representative of the commercial product.

Following the methods outlined above, the lengths were measured. The results were recorded in tabular form, but for convenience of study were worked up in graphical form.

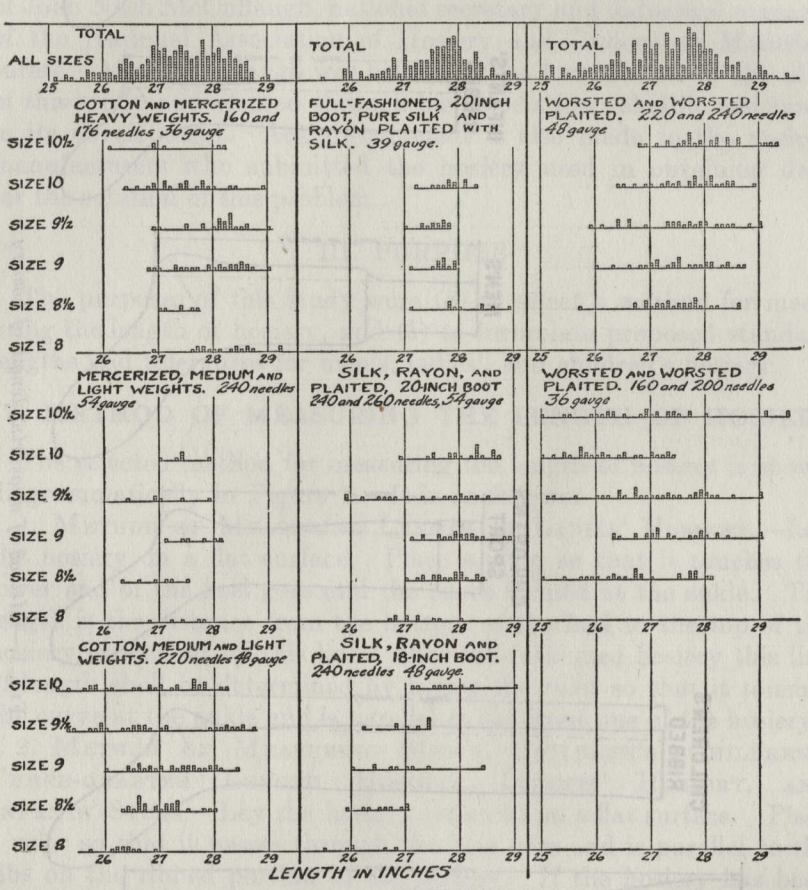

FIG. 2.—*Ladies' hosiery length measurements, grouped by sizes and types in frequency of occurrence graphs*

Figure 2 shows all of the results obtained on ladies' hosiery arranged by sizes and kinds. Similarly, Figure 3 shows the results for men's hosiery.

In Figure 4 the summary of these results is shown. This graph shows that ladies' hosiery are made in various lengths varying from 25 to 29½ inches, a range of 4½ inches. The results shown in Figure 2 indicate that there is very little tendency to vary the length to correspond with the size. It must be concluded then that the

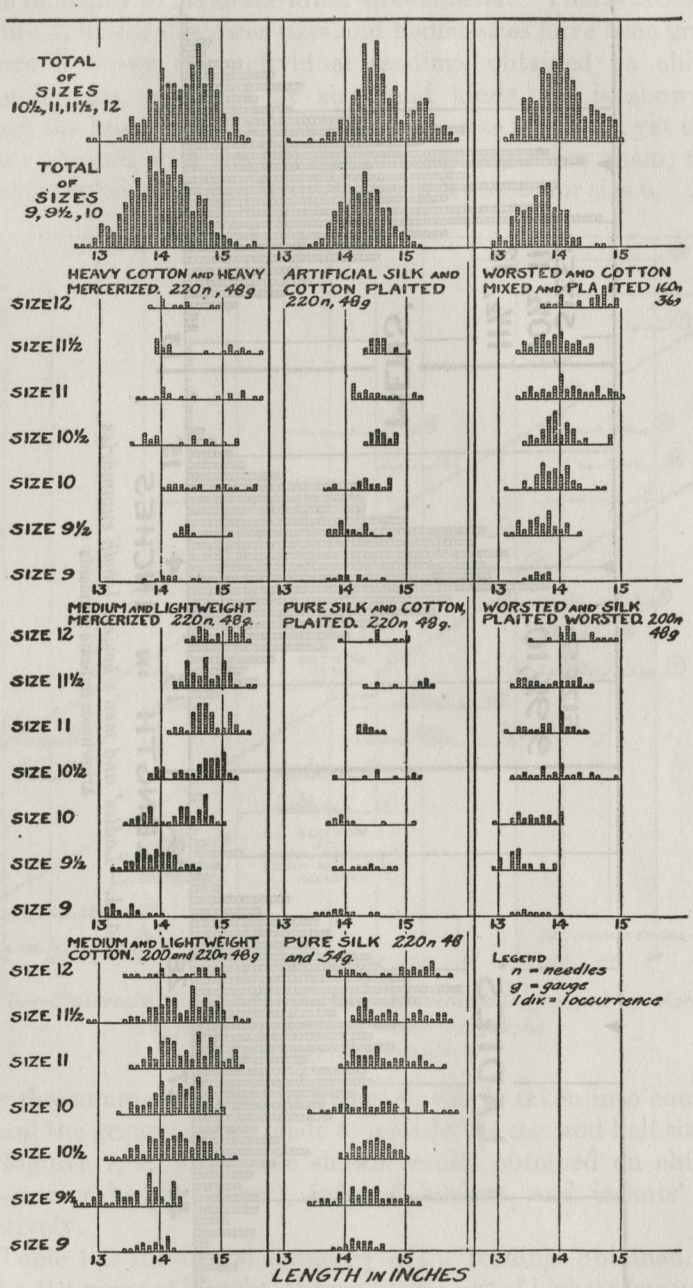

FIG. 3.—*Men's hosiery length measurements, grouped by sizes and types in frequency of occurrence graphs*

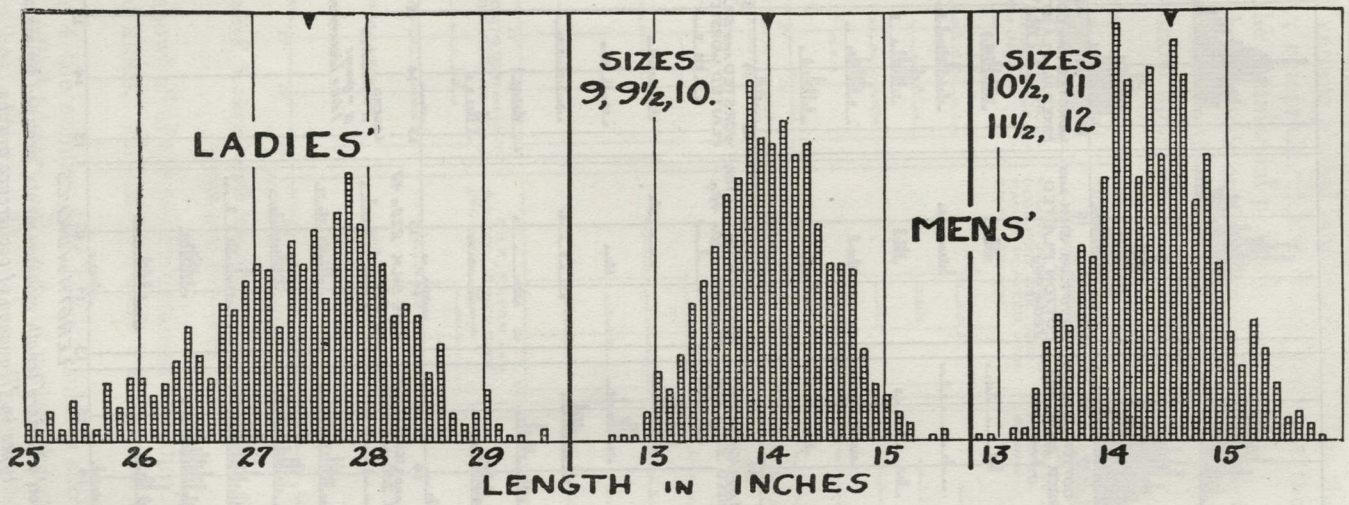

FIG. 4.—*Ladies' and men's hosiery length summaries*
Arrowheads indicate standards

manufacturers' practice varies considerably. In men's hosiery there is some tendency to make the lower sizes shorter. This is brought out in Figure 4, where the lower sizes and higher sizes have been grouped.

Figure 5 shows the individual readings obtained on children's hosiery lengths, arranged by sizes and kinds. It is shown that although the hosiery length increases as the size increases, yet the half sizes are grouped with the full size immediately below them; that is, the lengths for size 6½ are about the same as those for size 6. In pre-

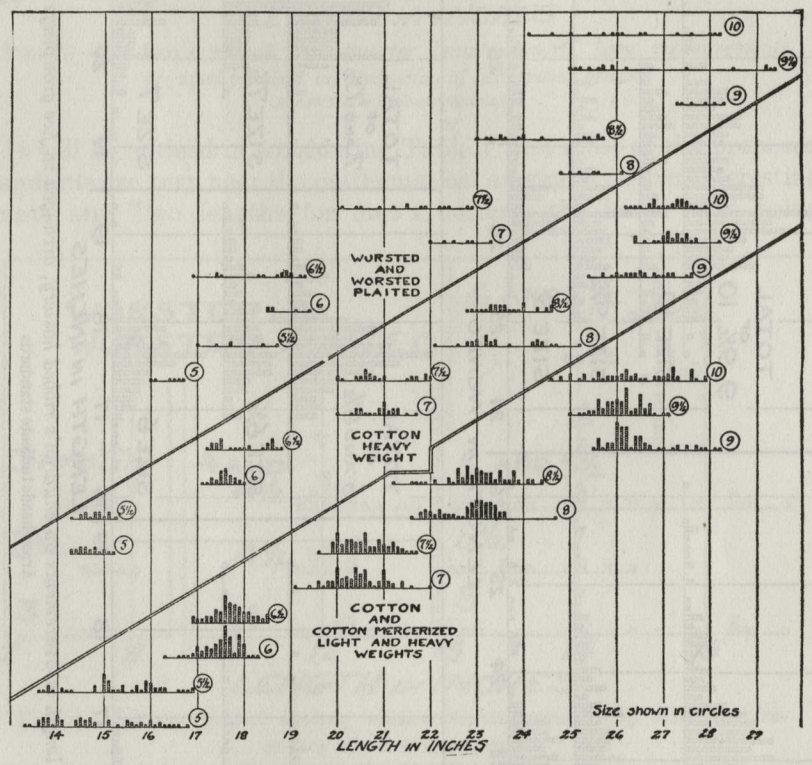

FIG. 5.—*Children's ribbed hosiery length measurements, grouped by sizes and types in frequency of occurrence graphs*
Arrowheads indicate standards

paring the summary shown in Figure 6, this is taken into consideration, and the groupings are made to include the size and half size.

In Figures 7, 8, and 9 are shown results obtained on children's three-quarter length (sport), infants' hosiery, and infants' socks, respectively.

In Table 1 is shown the summary of the readings obtained. This includes the range of lengths, the mode or point of highest frequency of occurrence, and the mathematical average of the results. The proposed standards which were formulated from a consideration of these

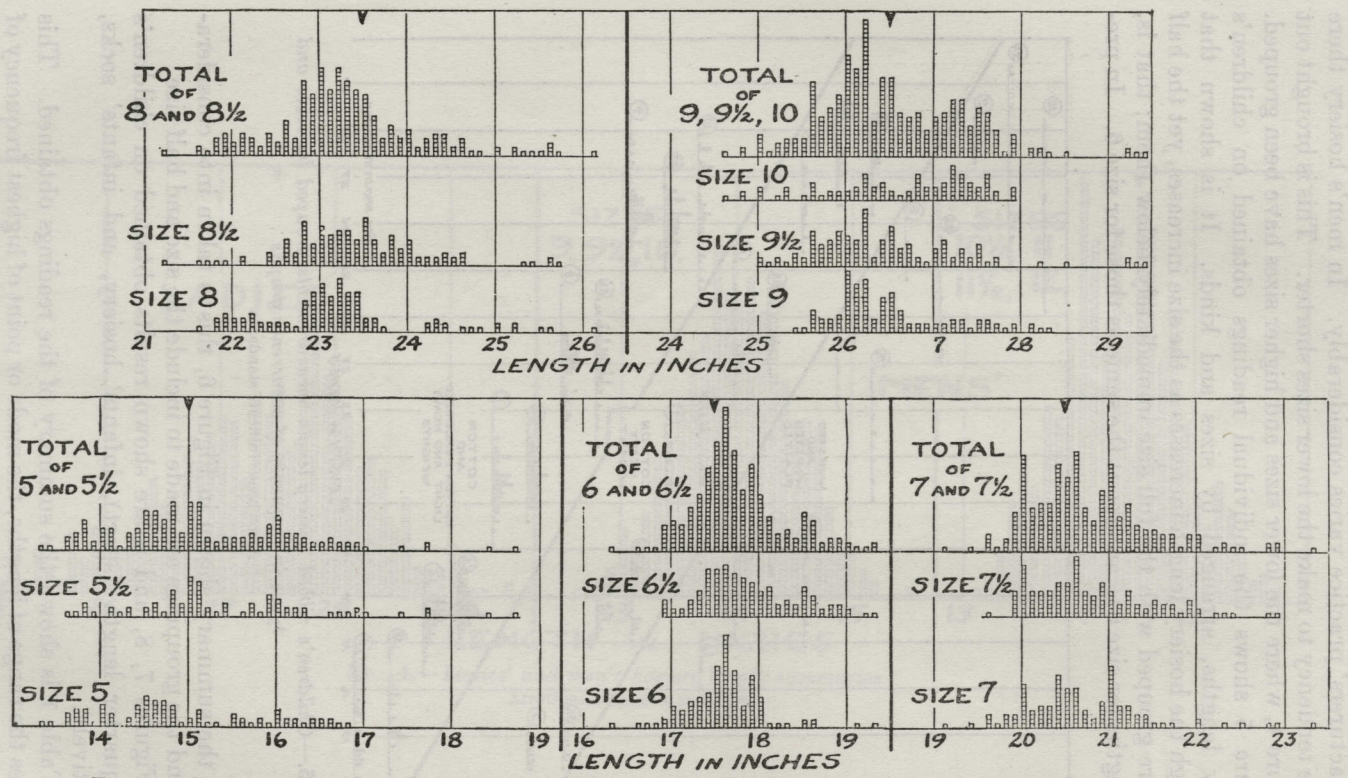

FIG. 6.—*Summary of length measurements on children's ribbed hosiery, arranged in five groupings of sizes*
Arrowheads indicate standards

results are given, together with the difference between the mathematical average and the proposed standards. There is also given the increment of difference between the sizes.

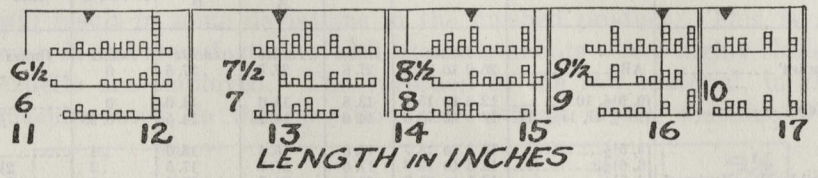

FIG. 7.—*Children's ribbed three-quarter length (sport) hose measurements, grouped by sizes on frequency of occurrence graphs*
Arrowheads indicate standards

It will be noticed in considering Table 1 that most of the proposed standards are very near the mathematical average. Other interesting points are: Two lengths for men's hosiery, the lower sizes being

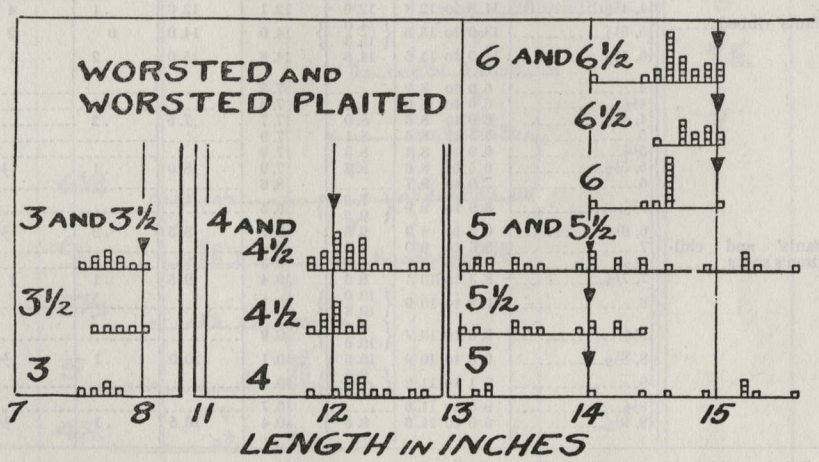

FIG. 8.—*Infants' ribbed hosiery measurements, grouped by sizes on frequency of occurrence graphs*
Arrowheads indicate standards

one-half inch shorter than the higher sizes; one length for ladies'; half sizes included with the preceding full size for all children's and infants' hosiery.

TABLE 1.—*Summary of results obtained on length measurements of hosiery*

Kind and style	Size	Range	Mode[1]	Mathematical average A	Proposed standards B	Difference between A and B	Increment of difference
		Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Ladies'	All	25.0 to 29.6	27.8	27.5	27.5	0	
Men's	9, 9½, 10	12.6 to 15.5	13.8	14.0	14.0	0	
	10½, 11, 11½, 12	12.8 to 15.8	14.0	14.25	14.5	0.25	½
Children's and misses' ribbed	5, 5½	13.3 to 18.7	15.0	15.4	15.0	.4	
	6, 6½	16.3 to 19.3	17.6	17.7	17.5	.2	2½
	7, 7½	19.1 to 23.3	20.6	20.7	20.5	.2	3
	8, 8½	21.2 to 26.1	23.0, 23.2	23.7	23.5	.2	3
	9, 9½, 10	24.6 to 29.4	26.2	26.6	26.5	.1	3
Children's sport ¾ length	6, 6½	11.2 to 12.1	12.0	11.75	11.5	.25	
	7, 7½	12.8 to 13.7	13.2	12.6	13.0	.4	1½
	8, 8½	13.9 to 15.1	15.0, 14.6	13.6	14.5	.9	1½
	9, 9½	15.4 to 16.2		15.9	16.0	.1	1½
	10	16.4 to 17.0	16.8	16.7	16.5	.2	½
Infants' ribbed	3, 3½	7.5 to 8.0	7.75	7.73	8.0	.27	
	4, 4½	11.8 to 12.8	12.0	12.1	12.0	.1	4
	5, 5½	13.0 to 15.6	14.0, 15.3	14.0	14.0	0	2
	6, 6½	14.0 to 15.0	14.6	14.8	15.0	.2	1
Infants' and children's socks	4	6.0 to 8.2		7.3			
	4½	6.6 to 8.6	8.0	7.9			
	4, 4½	6.0 to 8.6	8.0	7.7	7.5	.2	
	5	6.5 to 8.6	8.1	7.9			
	5½	6.9 to 8.4	8.3	7.9			
	5, 5½	6.5 to 8.6	8.3	7.9	8.0	.1	½
	6	7.0 to 9.7		8.6			
	6½	6.9 to 9.9	7.2, 9.5	8.5			
	6, 6½	6.9 to 9.9	9.5	8.7	8.5	.2	½
	7	8.3 to 9.9	9.5	9.4			
	7½	8.5 to 10.1	9.6	9.3			
	7, 7½	8.3 to 10.1	9.6	9.4	9.5	.1	1
	8	9.2 to 10.9	10.0, 10.3	10.1			
	8½	9.0 to 10.7	9.2, 10.6	9.9			
	8, 8½	9.0 to 10.9	10.6	10.1	10.0	.1	½
	9	9.1 to 11.2	9.5, 11.2	10.2			
	9½	9.0 to 11.6		10.7			
	9, 9½	9.0 to 11.6	9.5	10.4	10.5	.1	½

[1] Point at which the greatest number of results fall.

VI. PROPOSED STANDARDS AND TOLERANCES FOR HOSIERY LENGTHS

Although a manufacturer may adopt a given set of hosiery lengths as standard, experience has shown that manufacturing variations will result in some deviations in the finished product. This is so even in the manufacture of delicate instruments where highly skilled experts are employed. The variation in the raw material, in the machine used, in the operation and settings of the machine will

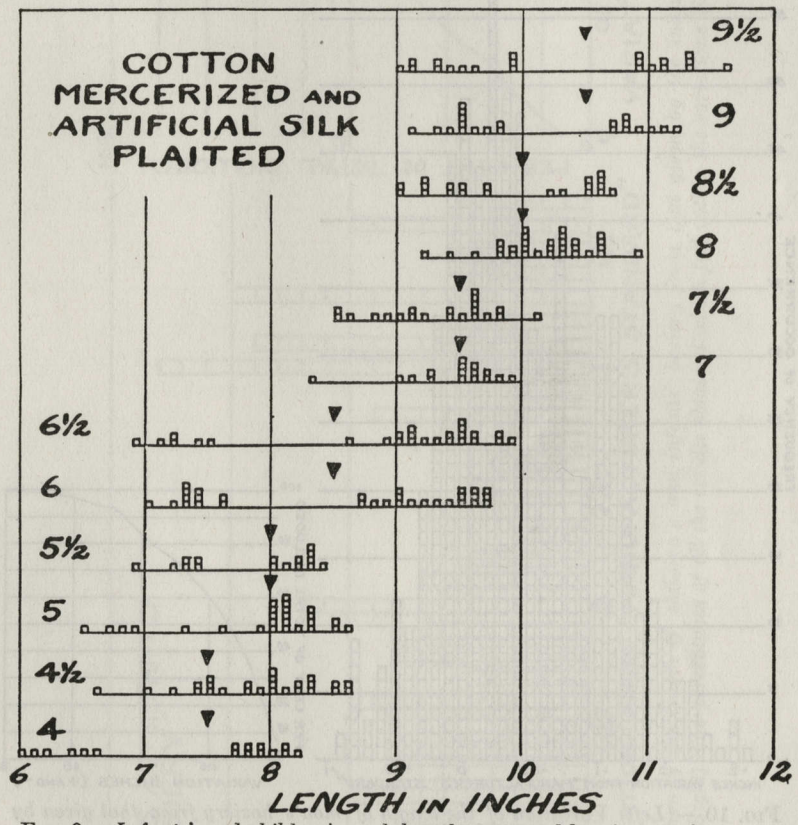

FIG. 9.—*Infants' and children's sock lengths, grouped by sizes on frequency of occurrence graphs*
Arrowheads indicate standards

result, in any given mill, in variations in the finished product. The usual procedure in the establishment of a standard such as those under consideration is to study the variations as they exist and fix an allowable variation or tolerance to take care of this condition.

Each manufacturer was asked to state the intended lengths of the samples of hosiery he submitted. The differences between the intended lengths and the actual lengths may be taken as indication of the variation which would ordinarily occur in the manufacturing process. The data are shown in Figures 10, 11, and 12.

These figures show that in every instance less than 10 per cent of the hosiery are the exact length the manufacturers planned, and also that to include all of the hosiery measured a tolerance of 2.6 inches for ladies', 2.1 inches for men's and 1.7 inches for children's and infants' hosiery would be necessary. Obviously, such large tolerances would be undesirable. On the assumption that probably no very strict system had been used in maintaining any fixed length

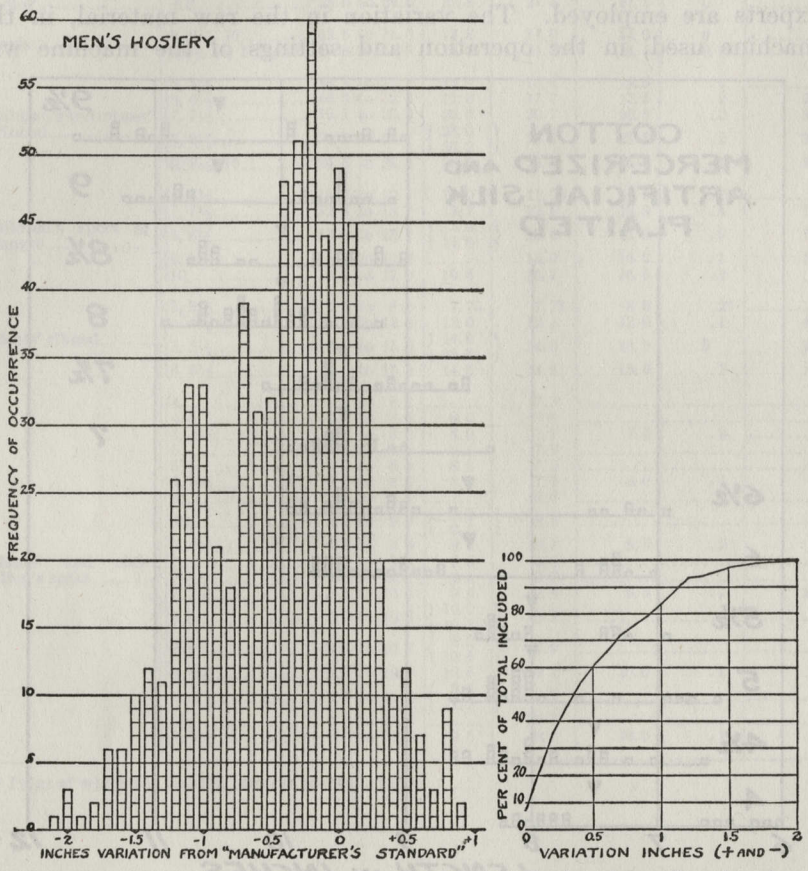

FIG. 10.—*(Left) Variation of the length of men's hosiery from that given by the individual manufacturer as his standard. (Right) The percentage of all the results obtained which fall within the variations (in inches) shown*

in a particular mill, it was decided to recommend a tolerance that would include roughly 60 per cent of the total.

The recommended standards and tolerances are indicated in Table 2.

These findings were recommended to the standardization committee of the National Association of Hosiery and Underwear Manufacturers. This committee, at a meeting held during January, 1926, has recommended their adoption by the association as a standard for the hosiery industry.

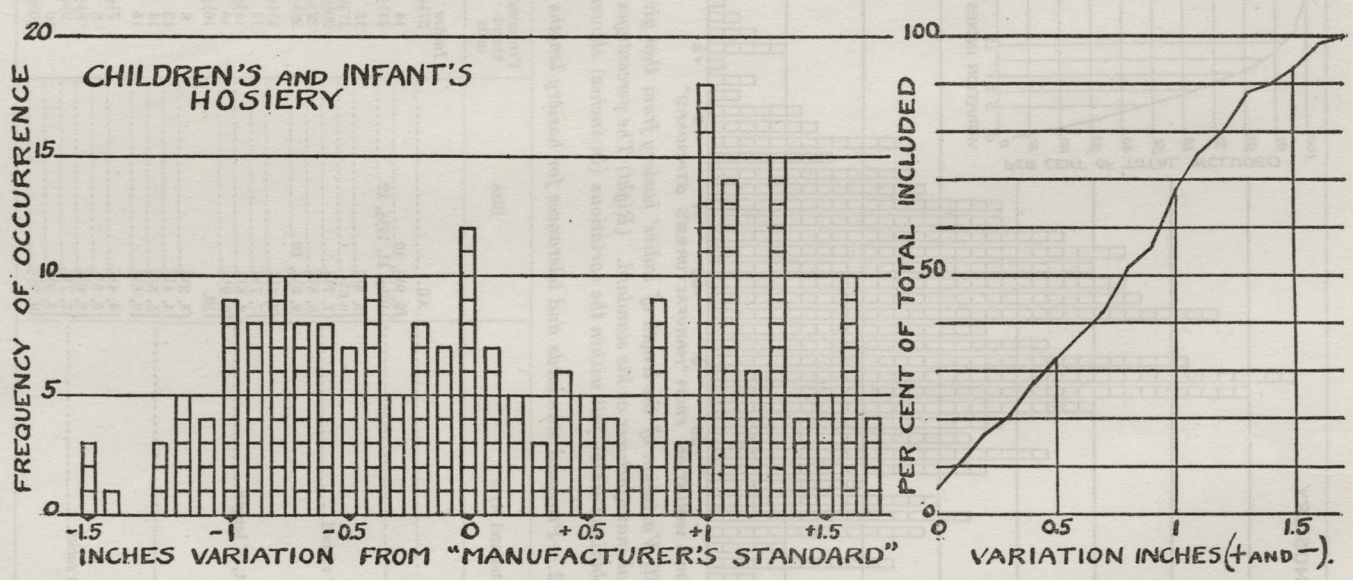

FIG. 11.—*(Left) Variation of the length of children's and infants' hosiery from that given by the individual manufacturer as his standard. (Right) The percentages of all the results obtained which fall within the variations (in inches) shown*

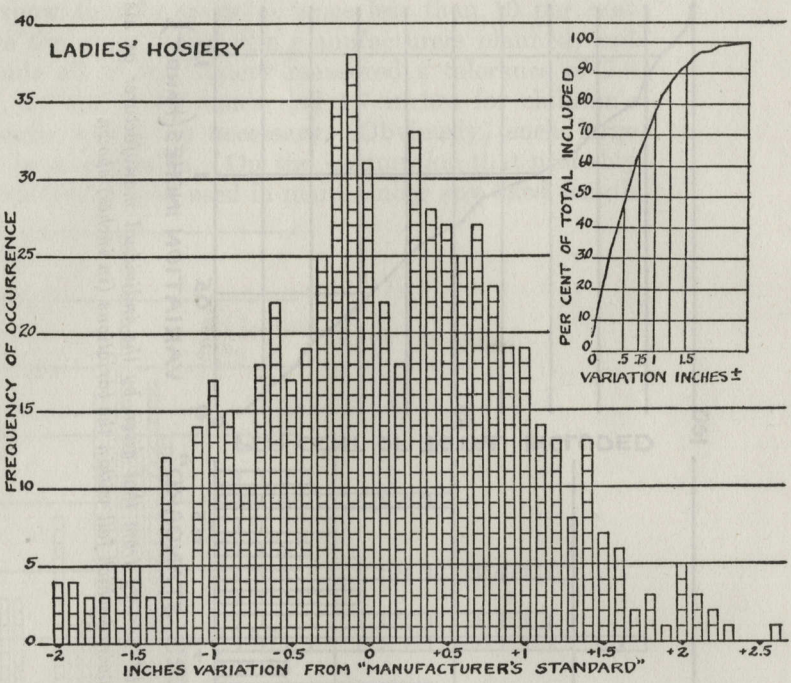

FIG. 12.—*(Left) Variation of the length of ladies' hosiery from that given by the individual manufacturer as his standard. (Right) The percentages of all the results obtained which fall within the variations (in inches) shown*

TABLE 2.—*Proposed standards and tolerances for hosiery lengths*

Kind and style	Size	Proposed standards	Tolerance (plus or minus)
		Inches	*Inches*
Ladies'	All	27½	1
Men's	9, 9½, 10	14	½
	10½, 11, 11½, 12	14½	
Children's and misses' ribbed	5, 5½	15	¾
	6 6½	17½	
	7, 7½	20½	
	8, 8½	23½	
	9, 9½, 10	26½	
Children's ribbed sport, ¾ length	6, 6½	11½	¾
	7, 7½	13	
	8, 8½	14½	
	9, 9½	16	
	10.	16½	
Infants' ribbed	3, 3½	8	¾
	4, 4½	12	
	5, 5½	14	
	6, 6½	15	
Infants' and children's socks	4, 4½	7½	¾
	5, 5½	8	
	6, 6½	8½	
	7, 7½	9½	
	8, 8½	10	
	9, 9½	10½	

WASHINGTON, January 27, 1926

Ring cushions - cloth inserted

Rope manilla

Shades, window - shade cloth, rollers slats and cords

Stitches, seams and stitching

Syringe - cloth inserted fountain

Textile materials - general specifications for tests

Towels - huck (with woven name)

Wool waste colored

The Division of Simplified Practice since its establishment as a part of the United States Bureau of Standards in 1922 has promulgated recommendations developed by respective industries which have effected the following reductions in textile stock items:

Items	Formerly	Now	Per cent reduction
Bed mattresses and springs[20]	78	4	95
Bed Blankets[20]	78	12	85
Face and hand towels[21]	129	3	
Ply and Yarn Goods of hard fiber cordage[22]	1,304	391	70
Sheets[21]	50	4	
Spreads[21]	54	2	
Surgical gauze (construction)[22]	15	7	53

Projects are under way at the present time for the reduction in stock items of book cloths, gauze standards and household textiles. This short list shows that little has been done in the simplification of stock items of textile products, but that a

[20] Hudson, Ray M. Organized Efforts in Simplification. Annals of the American Academy of Political and Social Science May 1928. p. 4.

[21] Sheet Standardization and Home Economics. Journal of Home Economics. August 1927. p. 452.

[22] Simplified Practice. Standards Yearbook. Department of Commerce. 1929. p. 233.

beginning has been made and that further progress will surely follow.

The American Society for Testing Materials published the following list of specifications and methods of tests for textile materials:

(1) Standard methods of testing woven textile fabrics

(2) Standard specifications for -

Textile testing machines

Tolerances and test methods for cotton yarns

Tolerances and test methods for electrical cotton yarn

Tolerances and test methods for cotton sewing threads

Tolerances for numbered cotton duck

Tolerances and test methods for tire fabrics other than cord fabrics

Tolerances and test methods for cord tire fabrics

Tolerances for hose duck and belt duck

Tolerances and test methods for electrical silk and cotton tapes

Specifications and tests for Osnaburg Cement sacks

(3) Standard definitions of terms relating to textile materials

(4) Tentative specifications for

Tolerances and test methods for rayon

Tolerances and test methods for certain light

AMERICAN SOCIETY

FOR

TESTING MATERIALS

ORGANIZED IN 1898
INCORPORATED IN 1902

Some of the

A.S.T.M. Specifications and Methods of Test for Textile Materials

1927

PREPARED BY

COMMITTEE D-13 ON TEXTILE MATERIALS

Price: 75 cents

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PUBLICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS
PHILADELPHIA, PENNA.

FOREWORD

This pamphlet contains the methods of testing, definitions of terms, and specifications for textile materials developed by the American Society for Testing Materials, and material relating thereto. It is published for the purpose of presenting in a single cover data that the Society believes to be of much importance to all who deal with textile materials.

The activities of the Society in the study of tests and specifications for textile materials are in the hands of its Committee D-13 on Textile Materials, which is one of forty-five Standing Committees of the Society engaged in the "promotion of knowledge of the materials of engineering and the standardization of specifications and the methods of testing." This committee was organized in 1915 and took up as its first problem the development of methods of testing cotton fabrics. The committee was the means of bringing together representatives of the producers and users of the mechanical fabrics and of greatly stimulating the development of methods of testing these products. The committee prepared Tentative Methods of Testing Cotton Fabrics, which, in 1920, after five years' trial, were adopted in modified form as the Society's first standard on Textile Materials.

The activities of the committee were broadened to cover fabrics other than cotton, the personnel of the committee being correspondingly enlarged. The broadened activities are reflected in the standards and tentative standards formulated by the committee. These now number twelve standards and seven tentative standards. These various specifications and methods cover, besides mechanical fabrics, the testing of electrical cotton yarns, sewing thread, cotton fibers and wool. The latest activities of the committee include rayon and asbestos textiles.

The activities of Committee D-13 are conducted under the general rules and regulations of the Society, which are based upon an experience of upwards of twenty-five years in the study of materials of engineering and the development of methods of testing and specifications. On the committee are represented both producers and consumers of the materials under discussion, this being a fundamental requirement in relation to all committees of the Society dealing with subjects having a commercial bearing. The personnel of the committee now numbers 184 members. The work of the committee has been assigned to twenty-one sub-committees, which are listed on pages 104 and 105 of this booklet. The committee reports annually to the Society, which acts upon its recommendations for specifications and methods of test.

Further information regarding the activities of the Society and Committee D-13 may be obtained by addressing the Society at its headquarters, 1315 Spruce St., Philadelphia, Pa.

September, 1927.

STANDARD GENERAL METHODS

OF

TESTING WOVEN TEXTILE FABRICS[1]

Serial Designation: D 39 – 27

These methods are issued under the fixed designation D 39; the final number indicates the year of original adoption as standard or, in the case of revision, the year of last revision.

ISSUED AS TENTATIVE, 1915; ADOPTED IN AMENDED FORM, 1920; REVISED, 1924, 1927.

GENERAL TEST METHODS

Scope.

1. These General Methods of Testing are intended to be applicable for testing woven textile fabrics. Where a material requires special treatment, specific methods of test will be described applicable for that material and such special methods shall take precedence over the general methods. The cord fabric used in manufacturing tires is not considered to be a "woven" fabric within the meaning of these methods.

CONDITION

Dry Condition.

2. The dry condition of woven textile fabrics shall be understood to be absolute dryness obtained by placing the material in a ventilated drying oven maintained at a temperature of from 100 to 110° C. (212 to 230° F.) and drying to constant weight as determined by two consecutive weighings without removal from the oven, to be taken not less than ten minutes apart, and showing a further loss of not more than 0.1 per cent from the previous weighing.

Standard Condition.

3. The standard condition of woven textile fabric shall be understood to be the condition which it assumes on exposure for at least four hours, to an atmosphere having a relative humidity of 65 per cent at 70° F. (21.1° C.).

Test Condition.

4. All fabrics shall be tested under standard condition as described in Section 3, unless the bone-dry condition, described in Section 2, is specified in the purchase specifications covering a particular contract.

[1] Under the standardization procedure of the Society, these methods are under the jurisdiction of the A.S.T.M. Committee D-13 on Textile Materials.

TEST METHODS

(*A*) *Length*

Length.

5. (*a*) If the fabric weighs more than 6 oz. per sq. yd., the length of a roll or piece shall be determined by running the cloth over a measuring drum of known circumference, from which the yardage is registered by a dial or counter driven by a chain, or other positive or non-slip mechanism. Just enough uniform tension[1] shall be used on the cloth to keep it running flat and true.

(*b*) If the fabric weighs 6 oz. per sq. yd. or less, its length shall be determined by running it through a folding device which will fold a known length of the fabric at each stroke. The yardage shall be registered by a dial or counter which shall be accurately calibrated against the length of the fabric per stroke.

(*B*) *Width*

Width.

6. (*a*) The width of a roll or piece shall be determined at five different places uniformly distributed along the full length of the roll or piece, and may be determined at the same time as the total length.

(*b*) Measurements shall be made to the nearest $\frac{1}{16}$ in.

(*c*) The average of the five measurements shall be the width.

(*C*) *Weight*

Weight.

7. A sample (or samples) for the weight test, containing in the aggregate not less than 20 sq. in., shall be stamped or cut from the fabric in such a way as to be fairly representative of the material. The sample (or samples) shall be conditioned as specified in Sections 2 or 3, and weighed on a balance sensitive to 0.1 per cent of the total weight.

Moisture Content and Regain.

8. The difference between the normal weight of the fabric and the dry weight is the amount of moisture present.

(*a*) When computed as percentage of the normal weight, this is the "Moisture Content" of the material.

(*b*) When computed as percentage of the dry weight, this is the "Moisture Regain" of the material.

(*D*) *Number of Threads per Inch*

Number of Threads per Inch.

9. (*a*) Where there are more than 25 threads per inch, the number of threads per inch or count of the fabric shall be determined by counting a space of not less than 1 in., in at least five different places

[1] It has been suggested that a uniform tension of two and one-half times the weight of five running yards of the fabric will be sufficient to keep the fabric flat and preserve a proper relation for comparison of different fabrics. Invitation is extended to report the results of such tests upon different fabrics.

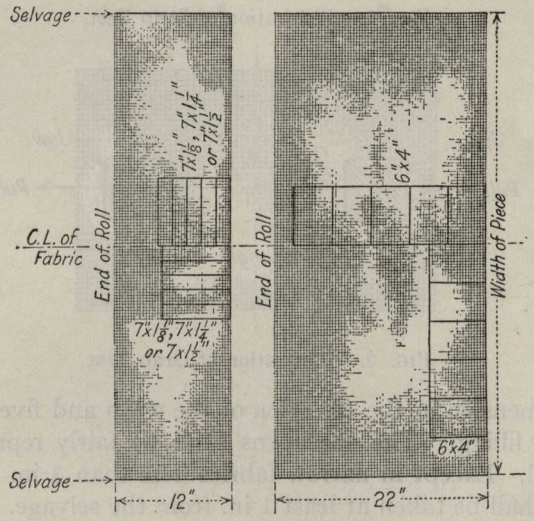
in the roll or piece. Where there are 25 or fewer threads per inch, a 3-in. gage length shall be used.

(*b*) For fabrics 3 in. in width or less, the entire width shall be used in counting the warp threads; for wider fabrics, the gage length for counting the warp threads shall be at least 1 in. from the selvage.

(*c*) The average of five determinations shall be the count. **Count.**

TABLE I.—TENSILE STRENGTH TEST METHODS.

Method No.	1 Strip Method	2 Grab Method
Length of specimens, in.	7	6
Width of specimens, in.:		
If thread count is 80 or over	$1\frac{1}{8}$	4
If thread count is 50 to 80	$1\frac{1}{4}$	
If thread count is less than 50	$1\frac{1}{2}$	
Ravelled to standard or specified threads per — in.	1	..
Minimum width of bottom or back jaws, in.	$1\frac{1}{2}$	2
Width of top or front jaws, in.	$1\frac{1}{2}$ (min.)	1
Distance between jaws, in.	3	3
Speed of pulling jaw, in. per minute	12	12
Number of specimens each, warp and filling	5	5



No. 1 No. 2

(*E*) *Thickness*

10. (*a*) The thickness shall be measured by an automatic micrometer which presses upon a circle $\frac{3}{8}$ in. in diameter of the fabric **Thickness.**

with a pressure of 6 oz., and which is so mounted as to make possible measurements 6 in. from the selvage. All thickness measurements shall be exclusive of the selvage.

(*b*) At least five measurements at different portions of the roll or piece shall be made, and the average shall be the thickness of the fabric.

(*F*) *Tensile Strength*

Tensile Strength.

11. Tensile strength tests shall be made by one of the two methods as described in detail in Section 12. In each case the results shall be recorded separately for warp and filling.

Test Specimens.

12. For the determination of tensile strength a swatch of sufficient length as specified in Table I shall be cut the entire width of the cloth, and ten test specimens shall be cut from this swatch, five with

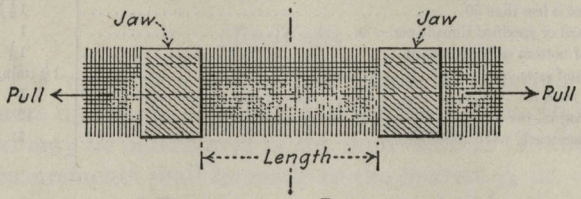


FIG. 1.—Illustration of Strip Test.

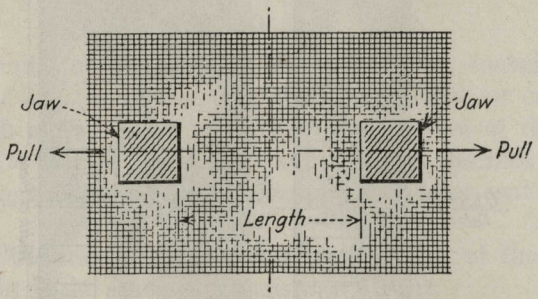


FIG. 2.—Illustration of Grab Test.

the long dimension in the direction of the warp and five in the direction of the filling. The specimens shall be fairly representative of the material. Except in narrow fabrics (less than 3 in. in width), all specimens shall be taken at least 1 in. from the selvage.

Strip Test.

(*a*) *Strip Test* (*Fig. 1*).—Under this method a long narrow strip of the fabric shall be clamped at each end by the jaws of the testing machine and strained to the point of rupture.

Grab Test.

(*b*) *Grab Test* (*Fig. 2*).—Under this method the testing machine jaws, each of definite width, shall be made to reach into the body of a rectangular piece of fabric and shall be clamped a definite distance

apart. Care shall be taken that the same set of threads are embraced by both pairs of jaws. The specimen shall then be strained to the point of rupture.

(*c*) All fabrics shall be tested by the grab method, Paragraph (*b*), unless the strip method, Paragraph (*a*) is specified in the purchase specifications covering a particular contract.

(*d*) The average of the five individual tests on the warp shall be the strength of the warp and the average of the five individual tests on the filling shall be the strength of the filling.

(*G*) *Crimp*

13. Two parallel lines shall be marked on the fabric at least 6 in. apart. Four threads shall be ravelled out, long enough to extend about 2 in. beyond each mark. These threads shall be straightened by a machine which applies a load to each thread. The load (in grams) to be used is 156 divided by the equivalent singles size of the thread. The crimp shall be the ratio between the final length of the thread and its original length in the cloth. **Crimp.**

STANDARD SPECIFICATIONS

FOR

TEXTILE TESTING MACHINES[1]

Serial Designation: D 76 - 27

These specifications are issued under the fixed designation D 76; the final number indicates the year of original adoption as standard or, in the case of revision, the year of last revision.

ISSUED AS TENTATIVE, 1920; ADOPTED IN AMENDED FORM, 1927.

Tensile Testing Machines

Type of Machine.

1. Textile testing machines shall be of the inclination balance or pendulum type.

Angle of Pendulum.

2. The maximum angle of swing of the pendulum in textile testing machines shall be 45 deg. from the vertical.

Pendulum Drum.

3. The minimum diameter of drum for transferring the pull on the specimen to the swinging pendulum shall be 2 in.

Testing Machine Capacity.

4. In selecting the proper capacity of a textile testing machine for a given sample of fabric or yarn, the maximum capacity of the machine shall not exceed that at which the pendulum reaches a swing of 45 deg. from the vertical. The minimum capacity of the machine when used for a given sample of fabric or yarn shall not be less than 20 per cent of the above maximum capacity.

Type of Jaw.

5. (*a*) *Fabric Jaws.*—The clamps of textile testing machines for use upon fabrics shall consist of flat metallic jaws pressing directly against the specimen. One gripping surface shall be hinged or swiveled and the other shall be rigidly connected to the frame of the jaw. The pressure between the jaws shall be secured by any suitable mechanical device so constructed as to grip the fabric firmly before the testing load is applied and to prevent visible slippage during the progress of the test.

(*b*) *Skein Jaws.*—The drums of testing machines for yarn skeins shall consist of cylindrical spools not less than 1 in. in diameter and not less than 1 in. in width, so supported that at least one shall turn freely upon its axis.

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[1] Under the standardization procedure of the Society, these specifications are under the jurisdiction of the A.S.T.M. Committee D-13 on Textile Materials.

(*c*) *Individual Strand Jaws.*—The jaws or clamps for tests upon individual strands of yarn shall be of the cylindrical or drum type, so arranged that the strands of yarn shall pass around not less than 180 deg. circumference before being clamped or fixed in the jaw. The length of the specimen shall be considered from center to center of drums. The minimum diameter of the cylinder or drum shall be $\frac{1}{2}$ in.

Jaw Dimensions.

6. The width of jaw in a direction perpendicular to the specimen shall in no case be less than 1 in. The depth of jaw in a direction length-wise of the specimen shall in no case be less than 1 in.

Backlash.

7. The dial pointer of textile testing machines shall be so arranged as to be easily adjustable to a zero reading for any weight of jaw or other fixture in the testing machine. The dial pointer shall be so counter-weighted as to prevent undue fluctuations in its position due to backlash, whatever the dial reading may be.

Machine Speed.

8. Textile testing machines shall be power driven or operated in such a manner as to produce a uniform and accurate movement of 12 in. per minute for the pulling jaw.

Calibration.

9. In calibrating textile testing machines, dead weights of accurate amounts shall be used, but these weights shall be applied at a speed of 12 in. per minute, corresponding to the standard jaw speed. The machine shall otherwise be arranged in an entirely similar manner to that used in testing fabric.

STANDARD SPECIFICATIONS

FOR

TOLERANCES AND TEST METHODS FOR COTTON YARNS, SINGLE AND PLIED[1]

Serial Designation: D 180 – 27

These specifications are issued under the fixed designation D 180; the final number indicates the year of original adoption as standard or, in the case of revision, the year of last revision.

ISSUED AS TENTATIVE, 1923; ADOPTED IN AMENDED FORM, 1927.

Scope.

1. These specifications cover the tolerances and methods of testing for cotton yarn, both single and plied.

TOLERANCES

STRENGTH

Strength of Yarn.

2. The average tensile strength of each case, bale, chain ball or beam warp of yarn, either single or plied, as found by test shall be not less than the specified strength.

SIZE OR YARN NUMBER

Size of Yarn, Carded and Combed.

3. The average size of each case, bale, chain ball or beam warp of yarn, in the singles, either carded or combed, as found by test shall not vary more than 3 per cent above or below the specified size.

Example.—No. 36 carded yarn specified; tolerance would allow 34.92 to 37.08.

TWIST

Direction of Twist.

4. *Direction of Twist.*—The direction of twist shall be as defined in the Standard Definitions of Terms Relating to Textile Materials (Serial Designation: D 123) of the American Society for Testing Materials, as follows:

Twist, Direction of.—In the case of yarn or cord, the yarn or cord has right-hand or regular twist if when it is held vertically the spirals or twists are seen to incline upward in a right-hand direction

[1] Under the standardization procedure of the Society, these specifications are under the jurisdiction of the A.S.T.M. Committee D-13 on Textile Materials.

STANDARD DEFINITIONS OF TERMS RELATING TO TEXTILE MATERIALS[1]

Serial Designation: D 123 - 27

These definitions are issued under the fixed designation D 123; the final number indicates the year of original adoption as standard or, in the case of revision, the year of last revision.

ISSUED AS TENTATIVE, 1921; ADOPTED IN AMENDED FORM, 1927.

(*A*) *Imperfections*

Thick and Thin Places (Major Defects).—In the case of major defects, places in the fabric where for one inch or more the count varies a specified per cent or over from the specified count.

Thick and Thin Places (Minor Defects).—In the case of minor defects, places in the fabric where for less than one inch the count varies a specified per cent or over from the specified count.

Missing Warp (Yarn or Cord).—A place in the fabric where a portion of the warp yarn or cord is missing.

Pucker (Puff or Blister).—A series in the fabric of six or more tight or slack warp yarns.

Bad Start-up.—Requires no definition.

Knot.—A joining by tying of portions of a full-ply yarn in the fabric.

Slack and Tight Warp or Filling Yarns or Cords.—Yarns or cords having too little or too much tension, respectively.

Slug.—A bunch of lint entangled in the yarn, cord or fabric.

Sewed Yarn.—A yarn in the fabric interwoven by hand.

Corkscrew Twist.—A place in the yarn or cord where an uneven twist gives a corkscrew-like appearance.

Mispick or Broken Pick.—A streak across the width of the fabric caused by a missing or partly missing pick.

Float.—A place in the fabric where warp and filling threads are incorrectly interlaced.

Kink.—A place in the fabric where a slack strand twists on itself, forming a loop on the yarn or cord.

[1] Under the standardization procedure of the Society, these definitions are under the jurisdiction of the A.S.T.M. Committee D-13 on Textile Materials.

Reed Mark.—Marks or lines up the warp way of the cloth, usually caused by too many warp yarns being drawn into a dent, a faulty setting of the loom or imperfections in the reed.

Split or Chafed Yarn or Cord.—One or more ends of ply yarn or cord broken in the fabric and chafed into a bunch.

Dirty Yarn.—Requires no definition.

Wrong Ply Warp (Yarn or Cord).—Requires no definition.

Wrong Draw.—A streak lengthwise of the fabric where the filling floats over more than one yarn due to a warp yarn having been drawn through the wrong harness.

Oil Spot.—Requires no definition.

Mixed Yarn of Inferior Grade.—Requires no definition.

Irregular Pick.—A place in the fabric where the picks are irregularly spaced.

Smash.—A place in the fabric where the warp, yarns, or cords have been broken due to the shuttle getting caught in the shed during weaving.

Imperfect Selvage.—Tight, slack, broken, weak, nicked, or open selvage.

Baggy Fabric.—A loose place in the fabric which gives the appearance of a bag or pocket.

Wrong Ply Filling Yarn.—Requires no definition.

Mixed Yarn or Cord.—Requires no definition.

Defective Splice.—A splice having irregular final twist, untrimmed ends or excessive thickness.

(*B*) *Mechanical Cotton Fabric*

The term "Mechanical Fabric" shall be understood to mean fabric manufactured for use as an intermediate product in the making of some mechanically constructed article.

NOTE.—Mechanical fabrics shall be referred to by the following descriptive nomenclature:

A word or phrase generally descriptive of the appearance of the material, or the use to which it is put.

Weight in ounces per square yard. The words "oz. sq. yd." are to be written after the weight. To avoid confusion in regard to weight of material, it is suggested that immediately succeeding the square yard weight, the weight of the material on whatever basis may have been used previous to the adoption of these standards be inserted in brackets. Table I gives the conversion values of linear yard weight to square yard weight.

Width in inches.

Count, giving first the ends, and second the picks per inch.

Example: Hose Duck, 9 oz. sq. yd. [40 in. 10 oz.], 48 in., 28 by 18.

Table I.—Conversion Table of Linear Yard Weight to Square Yard Weight of Fabric.

Weight, oz.	Width, in.																													
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
8.....	9.60	9.29	9.00	8.73	8.47	8.23	8.00	7.78	7.58	7.38	7.20	7.02	6.86	6.70	6.55	6.40	6.26	6.13	6.00	5.88	5.76	5.65	5.54	5.43	5.33	5.24	5.14	5.05	4.97	4.88	4.80
9.....	10.80	10.45	10.13	9.82	9.53	9.26	9.00	8.76	8.53	8.31	8.10	7·90	7.71	7.53	7.36	7.20	7.04	6.89	6.75	6.61	6.48	6.35	6.23	6.11	6 00	5.89	5.79	5.68	5.59	5.49	5.40
10.....	12.00	11.61	11.25	10.91	10.59	10.29	10.00	9.73	9.47	9.23	9.00	8.78	8.57	8.37	8.18	8.00	7.83	7.66	7.50	7.35	7.20	7.06	6.92	6.79	6.67	6.55	6.43	6 32	6.21	6.10	6.00
11.....	13.20	12.77	12.38	12.00	11.65	11.31	11.00	10.70	10.42	10.15	9.90	9.66	9.43	9.21	9 00	8.80	8.61	8.43	8.25	8.08	7.92	7.76	7.62	7.47	7.33	7.20	7.07	6.95	6.83	6.71	6.60
12.....	14.40	13.94	13.50	13.09	12.71	12.34	12.00	11.68	11.37	11.08	10.80	10.54	10.29	10.05	9.82	9.60	9.39	9.19	9.00	8.82	8.64	8.47	8.31	8.15	8.00	7.85	7.71	7.58	7.45	7.32	7.20
13.....	15.60	15.10	14.63	14.18	13.76	13.37	13.00	12.65	12.32	12.00	11.70	11.41	11.14	10.88	10.64	10.40	10.17	9.96	9.75	9.55	9.36	9.18	9.00	8.83	8.67	8.51	8.36	8.21	8.07	7.93	7.80
14.....	16.80	16.26	15.75	15.27	14.82	14.40	14.00	13.62	13.26	12.92	12.60	12.29	12.00	11.72	11.45	11.20	10.96	10.72	10.50	10.29	10.08	9.88	9.69	9.51	9.33	9.16	9.00	8.84	8.69	8.54	8.40
15.....	18.00	17.42	16.88	16.36	15.88	15.43	15.00	14.60	14.21	13.85	13.50	13.17	12.86	12.56	12.27	12.00	11.74	11.49	11.25	11.02	10.80	10.59	10.38	10.19	10.00	9.82	9.64	9.47	9.31	9.15	9.00
16.....	19.20	18.58	18.00	17.45	16.94	16.46	16.00	15.57	15.16	14.77	14.40	14.05	13.71	13.40	13.09	12.80	12.52	12.26	12.00	11.76	11.52	11.29	11.08	10.87	10.67	10.47	10.29	10.11	9.93	9.76	9.60
17.....	20.40	19.74	19.13	18.56	18.00	17.49	17.00	16.54	16.11	15.69	15.30	14.93	14.57	14.23	13.91	13.60	13.30	13.02	12.75	12.49	12.24	12.00	11.77	11 55	11.33	11.13	10.93	10.74	10.55	10.37	10.20
18.....	21.60	20.90	20.25	19.64	19.06	18.51	18.00	17.51	17.05	16.62	16.20	15.80	15.43	15.07	14.73	14.40	14.09	13.79	13.50	13.22	12.96	12.71	12.46	12.23	12.00	11.78	11.57	11 37	11 17	10.98	10.80
19.....	22.80	22.06	21.38	20.73	20.12	19.54	19.00	18.49	18.10	17.54	17.10	16.68	16.29	15.91	15.55	15.20	14.87	14.55	14.25	13.96	13.68	13.41	13.15	12.91	12.67	12.44	12.21	12.00	11.79	11.59	11.40
20.....	24.00	23.23	22.50	21.82	21.18	20.57	20.00	19.46	18.95	18.46	18.00	17.56	17.14	16.74	16.36	16.00	15.65	15.32	15.00	14.69	14.40	14.12	13.85	13.58	13.33	13.09	12.86	12.63	12.41	12.20	12.00
21.....	25.20	24.39	23.63	22.91	22.24	21.60	21.00	20.43	19.89	19.38	18.90	18.44	18.00	17.58	17.18	16.80	16.43	16.09	15.75	15.43	15.12	14.82	14.54	14.26	14.00	13.75	13.50	13.26	13.03	12.81	12.60
22.....	26.40	25.55	24 75	24.00	23.29	22.63	22.00	21.41	20.84	20.31	19.80	19.32	18.86	18.42	18.00	17.60	17.22	16.85	16.50	16.16	15.84	15.53	15.23	14.94	14.67	14.40	14.14	13.89	13.66	13.42	13.20
23.....	27.60	26.71	25.88	25.09	24.35	23.66	23.00	22.38	21.79	22.23	20.70	20.20	19.71	19.26	18.82	18.40	18.00	17.62	17.25	16.89	16.56	16.24	15 92	15.62	15.33	15.05	14.79	14.53	14.28	14.03	13.80
24.....	28.80	27.87	27.00	26.18	25.41	24.69	24.00	23.35	22.74	22.15	21.60	21.07	20.57	20.09	19.64	19.20	18.78	18.38	18.00	17.63	17.28	16.94	16.62	16 30	16.00	15.71	15.43	15 16	14.90	14.64	14.40
25.....	30.00	29.03	28.13	27.27	26.47	25.71	25.00	24.33	23.68	23.08	22.50	21.95	21.43	20.93	20.45	20.00	19.57	19.15	18.75	18.37	18.00	17.65	17.31	16.98	16.67	16.36	16.07	15.79	15.52	15.25	15.00
26.....	31.20	30.19	29.25	28.36	27.53	26.74	26.00	25.30	24.63	24.00	23.40	22.83	22.29	21.77	21.27	20.80	20.35	19.91	19.50	19.10	18.72	18 35	18.00	17.66	17.33	17.02	16.71	16 42	16.14	15.86	15.60
27.....	32.40	31.35	30.38	29.45	28.59	27.77	27.00	26.27	25.58	24.92	24.30	23.71	23.14	22.60	22.09	21.60	21.13	20.68	20.25	19.84	19.44	19.06	18.69	18 34	18.00	17.67	17.36	17.05	16.76	16.47	16.20
28.....	33.60	32.52	31.50	30.55	29.65	28.80	28.00	27.25	26.53	25.85	25.20	24.59	24.00	23.44	22.91	22.40	21.91	21.45	21.00	20.57	20.16	19.76	19.38	19.02	18.67	18.33	18.00	17.68	17.38	17.08	16.80
29.....	34.80	33.68	32.63	31.64	30.71	29.83	29.00	28.22	27.47	26.77	26.10	25.46	24.86	24.28	23.73	23.20	22.70	22.21	21.75	21.31	20.88	20.47	20.08	19.70	19.33	18.98	18.64	18.32	18.00	17.69	17.40
30.....	36.00	34.84	33.75	32.73	31.76	30.85	30.00	29.19	28.42	27.69	27.00	26 34	25.71	25.12	24.55	24.00	23.48	22.98	22.50	22.04	21 60	21.18	20.77	20.37	20.00	19.64	19.29	18.95	18.62	18.31	18.00
31.....	37.20	36.00	34.88	33.82	32.82	31.89	31.00	30.16	29.37	28.62	27.90	27.22	26.57	25.95	25.36	24.80	24.26	23.74	23.25	22.78	22.32	21.88	21.46	21.06	20.67	20.29	19.93	19.58	19.24	18 92	18.60
32.....	38.40	37.16	36.00	34.91	33.88	32.91	32.00	31.14	30.32	29.54	28.80	28.10	27 43	26.79	26.18	25.60	25 04	24.51	24.00	23.51	23.04	22 59	22.15	21.74	21.33	20.95	20.57	20.21	19.86	19.53	19.20
33.....	39.60	38.32	37.13	36.00	34.94	33.94	33.00	32.11	31.26	30.46	29.70	28.98	28.29	27.63	27.00	26.40	25.83	25.28	24.75	24.24	23.76	23 29	22.85	22.42	22.00	21.60	21.21	20.84	20.48	20.14	19.80
34.....	40.80	39.48	38 25	37.09	36.00	34.97	34.00	33.08	32.21	31.38	30.60	29.85	29.14	28.47	27.82	27.20	26.61	26.04	25 50	24.98	24.48	24.00	23,54	23.09	22.67	22.25	21.86	21.47	21.10	20.75	20.40
35.....	42.00	40.65	39.38	38.18	37.06	36.00	35.00	34.06	33.16	32.31	31.50	30.73	30.00	29.30	28.64	28.00	27.39	26.81	26.25	25.71	25 20	24.71	24.23	23,77	23 33	22.91	22.50	22.11	21.72	21.35	21.00
36.....	43.20	41.81	40.50	39.27	38.12	37.03	36.00	35.03	34.11	33.23	32.40	31.61	30 86	30.14	29.45	28.80	28.17	27.57	27.00	26.45	25.92	25.41	24 92	24.45	24.00	23.56	23.14	22.74	22.34	21.97	21.60

The following is a partial list of mechanical fabrics in general use:

Tire Builder Fabric.—A square woven fabric having usually 11-ply yarn in both warp and filling.

Tire Cord Fabric.—A fabric consisting of hawser cord yarn in the warp, with single yarn filling at intervals to keep warp threads together.

Hose Duck.—A soft, plain-weave fabric of plied yarns not finer than No. 8, made in weights from 10 to 24 oz. to the 40-in. width. When made of finer yarn than No. 8, it is classed as Special Hose Duck.

Rubber Belt Duck.—A soft, plain-weave fabric of plied yarns not finer than No. 8, weight ranging from 22 to 36 oz. to 42-in. width. When made of finer yarn than No. 8, it is classed as Special Belt Duck.

Balata Belt Duck.—A closely woven fabric made of hard twisted plied yarn usually made in wide widths, the weight being based on the square yard.

Oil Belt Duck.—A closely woven fabric of plied yarns not over No. 8, made in a variety of widths, usually a 32-oz. fabric, the weight being based on the square yard.

Numbered Duck.—A plain woven fabric of plied yarns ranging from coarse to fine numbers, the weight being based on 22-in. width.

Army Duck.—A closely woven fabric of plied yarns, usually ranging between 7 to 12 oz., the weight being based on 28½-in. width.

Single Filled or Flat Duck.—A fabric made of single yarn, plain weave, the weight being based on 29-in. width.

Enameling Duck.—A plain woven fabric with laid warp and plied yarn filling, weight being based on 46½-in. width.

(C) *Cotton Fabrics Other than Mechanical Fabrics*

Twill.—A weave which produces pronounced lines running diagonally across the fabric, some of which are known as follows:

Drills.—A commercial term for a fabric with warp face twill usually made with three harnesses and single yarns.

Alberts.—A commercial term for a fabric of twill weave with filling face usually made with four or five harnesses.

Jeans.—A commercial term for a fabric with warp face twill like a drill but with higher count and finer yarns.

Serge.—A commercial term for a fabric of twill weave made with four harnesses 2 by 2.

Clay.—A commercial term for a fabric of twill weave similar to a serge, but made with six harnesses 3 by 3.

(D) General Definitions

Standard Atmosphere.—In the case of textiles, an air condition in which the relative humidity is 65 per cent at a temperature of 21° C. (70° F.).

Standard Condition.—In the case of textiles, the moisture condition of a material when it is in moisture equilibrium with a standard atmosphere.

Standard Regain.—In the case of any specific textile material, an agreed or officially adopted percentage allowance of moisture added to the absolute dry weight of a material to determine its standard weight.

Standard Weight.—In the case of textiles, the absolute dry weight of a material plus its standard regain.

Moisture Content (Moisture, Percentage of Moisture).—In the case of textiles, moisture present in a material shown as a percentage of the net weight.

Yarn.—An assemblage of fibers or filaments of animal, mineral, or vegetable origin, either natural or manufactured, twisted or laid together to form a strand or group of strands for use in weaving, knitting, or forming in any manner into textile fabrics.

Cord.—A string or small rope of fibrous material made by twisting together, generally with hard twist, several yarns for use in tying, binding, lacing, etc., and in weaving or laying very heavy fabrics.

Thread.—A fine cord composed of two or more yarns twisted together, for use in sewing.

Lea.—The division of a hank (840 yd.) of cotton yarn, 120 yd. made up of 80 turns on a standard cotton reel. Also a hank of linen yarn, 300 yd., used as the basis of the linen yarn count.

Count.—In the case of cotton yarn, the number of 840-yd. hanks contained in one pound (avoirdupois 7000 grains) of the yarn at standard condition.

Ends.—The individual warp yarns running lengthwise of a fabric.

Picks.—The individual filling yarns running across a fabric.

Plain Weave.—A fabric pattern in which each yarn of the filling passes alternately over and under a yarn of warp.

Twist, Direction of.—In the case of yarn or cord, the yarn or cord has right-hand or regular twist if when it is held vertically the spirals or twists are seen to incline upward in a right-hand direction and has left-hand or reverse twist when the spirals or twists are seen to incline upward in a left-hand direction.

NOTE.—Attention is called to the fact that this definition of twist is opposite to that used in sewing thread manufacture.

Crimp.—In the case of fabric, the difference in distance between any two points of the yarn as it lies in the fabric, and the same two points after the yarn has been removed from the fabric and straightened, expressed as a percentage of the distance between the two points as the yarn lies in the fabric.

NOTE.—"Crimp" is not to be confused with "take-up" which is the difference in distance between any two points on the yarn as it lies in the fabric and the same two points after the yarn has been removed from the fabric and straightened, expressed as a percentage of the distance between the two points after the yarn has been straightened. The threads for the "take-up" test shall be straightened with the same machine that is used for the "crimp" test, but for this test the machine shall be equipped with an extra scale on the dial, in which case the scale shall be plainly marked "crimp" and "take-up."

Off-Square.—In the case of fabric, the percentage of warp crimp minus the percentage of filling crimp.

EDITORIAL NOTE

In addition to the standard definitions contained herein, the following definitions have been accepted for publication as tentative but are still under consideration in the committee:

Regain (*Moisture Regain*).—The percentage of moisture present in a textile material calculated on its absolute dry weight.

Gage.—In the case of knit goods, the closeness of the wales, that is, the longitudinal row of loops per inch, a measure of the fineness of the fabric. It is expressed by the number of needles in ½ in.

Loop Knot.—Snarl or curl produced by a weft yarn receding upon itself.

TENTATIVE METHODS OF TESTING GREASE WOOL AND ALLIED FIBERS FOR SCOURED CONTENT[1]

Serial Designation: D 232 – 25 T

This is a **Tentative Standard,** published for the purpose of eliciting criticism and suggestions, and as such is subject to annual revision.

ISSUED, 1925

Scope.

1. These methods of test are intended to be applicable for testing grease wool and allied fibers (such as mohair, alpaca, camel hair, cashmere, vicuna) which contain grease, sand, dirt and vegetable matter, for the scoured content.

Form of Material.

2. The scoured content may be determined on the following forms of loose fiber in the grease:

(*a*) Wool (etc.) in the fleece;
(*b*) Necks, pieces, bellies;
(*c*) Pulled wool;
(*d*) Colonial scoured.

I. WOOL (ETC.) IN THE FLEECE

3. The tests to determine the scoured content of grease wool in the fleece shall be made on not less than 500 lb. but need not be on more than 1000 lb.

Weight.

4. (*a*) The wool shall be weighed in the original bags or bales at the time and place of making the test. This shall be considered the gross weight.

(*b*) The weight of the coverings and bindings and the string used for tying the fleeces, known as the tare, shall be determined.

(*c*) The difference between the gross weight and the tare shall be the "normal net weight" of the grease wool.

Sorting.

5. To retain the full commercial value of the wool after scouring it shall be sorted previous to scouring into an agreed number of main and off sorts.

Tags, Fribs, Clips.

6. The tags, fribs, clips and paint clips shall not be scoured, but shall be weighed in the grease and reported separately as a percentage of the normal net weight of the grease wool.

[1] Criticisms of these Tentative Methods are solicited and should be directed to Mr. K. B. Cook, Secretary of Committee D-13 on Textile Materials, Winnsboro Mills, Winnsboro, S. C.

Scouring or Washing.

7. The main sorts and off sorts excepting tags, fribs, clips and paint clips, shall be scoured separately in a train of at least 4 bowls, or in 3 bowls and a rinse box. The first 3 bowls shall contain the detergents and the last bowl or the rinse box shall contain clean running water.

Drying.

8. The sorts shall be thoroughly dried in a heated mechanical dryer or on a heated table dryer and shall be bagged and weighed at once.

Hot Weight.

9. The total net weight of all the lots from the dryer, known as the "hot weight" of the scoured wool shall be determined.

Hot Shrink.

10. The difference between the normal net weight of the grease wool and the hot net weight of the scoured wool shall be determined as the "hot shrink" of the grease wool, when expressed as a percentage of the normal net weight of the grease wool by the following formula:

$$\text{Percentage Hot Shrink} = \frac{(\text{Normal Net Weight of Grease Wool} - \text{Hot Net Weight of Scoured Wool}) \times 100}{\text{Normal Net Weight of Grease Wool}}$$

Moisture in Hot Net Weight.

11. To determine the moisture in the hot net weight, three samples of not less than 1 lb. each shall be taken from the bags or bag representing about the beginning, the middle and the end of the run, immediately after the hot weight has been determined, and immediately placed in dry air-tight containers, the weights of which have been previously determined, and carefully weighed therein (check weight being made on containers); the net weight calculated, and the samples dried to constant weight in a ventilated drying oven maintained at a temperature of 230 to 240° F. (110 to 116° C.) as shown by two consecutive weighings not less than ten minutes apart without removing from the oven.

Bone Dry Weight.

When two such weighings do not show a further loss of more than 0.1 per cent of the previous weighing the material is considered to be bone dry.

Actual Regain in Hot Weight.

12. The difference between the average of the original (initial) weights of the samples, and the average of the bone dry weights of the same, shall be considered to be the moisture loss.

(*a*) When computed as a percentage of the initial weight it is the moisture content percentage.

(*b*) When computed as a percentage of bone dry weight it is the moisture regain percentage.

Standard Condition or Conditioned Weight.

13. The standard condition of scoured wool shall be understood to be the condition in which it contains 12 per cent of its dry weight of moisture.

14. This 12 per cent shall be the standard regain of scoured wool. **Standard Regain.**

15. The conditioned weight of the scoured wool shall be calculated from the following formula: **Formula for Conditioned Weight.**

$$\text{Conditioned Weight} = \frac{\text{Hot Net Weight} \times 112}{100 + \text{Actual Regain}}$$

16. The true yield of the test lot shall be calculated from the following formula and shall be the actual yield of the entire lot. **Conditioned Yield.**

$$\text{Yield, per cent} = \frac{\text{Conditioned Weight of Scoured Wool} \times 100}{\text{Normal Net Weight of Grease Wool}}$$

17. If the loss in scouring is to be expressed as shrinkage, it shall be calculated from the following formula and shall be the actual shrinkage of the entire lot. **Conditioned Shrinkage.**

$$\text{Shrinkage, per cent} = \frac{(\text{Normal Net Weight of Grease Wool} - \text{Conditioned Weight of Scoured Wool}) \times 100}{\text{Normal Net Weight of Grease Wool}}$$

18. Wool shall be considered thoroughly scoured when tests by the Soxhlet Extraction Apparatus do not show a loss of more than one per cent of the weight of the conditioned scoured wool before testing. **Thoroughly Scoured Wool.**

19. Grease and solubles not to exceed a fixed percentage may be left in scoured wool by agreement, and tests to determine this percentage shall be made by the Soxhlet Extraction Apparatus. **Scoured Wool Containing Grease.**

II. NECKS, PIECES AND BELLIES

20. The tests to determine the scoured content of necks, pieces and bellies shall be made on not less than 500 lb. but need not be on more than 1000 lb. wool in the grease.

21. (*a*) The wool shall be weighed in the original bags or bales at the time and place of making the tests. This shall be considered the gross weight. **Weight.**

(*b*) The weight of the coverings and bindings of the bales, known as the tare, shall be determined.

(*c*) The difference between the gross weight and the tare shall be the "normal net weight" of the grease wool. **Normal Net Weight.**

22. The test for scoured content shall be made as described for wool in the fleece in accordance with Sections 5 to 19, inclusive. **Scoured Content.**

III. PULLED WOOL

23. The tests to determine the scoured content of pulled wool shall be made on not less than 500 lb. but need not be on more than 1000 lb. of wool in the grease.

Weight. 24. (*a*) The wool shall be weighed in the original bags or bales at the time and place of making the tests. This shall be considered the gross weight.

(*b*) The weight of the coverings and bindings, known as the tare, shall be determined.

(*c*) The difference between the gross weight and the tare shall be the "normal net weight" of the grease wool.

Scouring or Washing. 25. The wool shall be scoured in a train of at least 4 bowls or in 3 bowls and a rinse box. The first 3 bowls shall contain the detergents and the last bowl or rinse box shall contain clean running water.

Drying. 26. The wool shall be thoroughly dried in a heated mechanical dryer or on a heated table dryer and shall be bagged and weighed at once.

Hot Weight. 27. The net weight of the wool from the dryer, known as the "hot weight" of the scoured wool shall be determined.

Scoured Content. 28. The remainder of the test for determining the scoured content shall be made as described for wool in the fleece in accordance with Sections 10 to 19, inclusive.

IV. COLONIAL SCOURED

29. The test to determine the scoured content of colonial scoured wool shall be made as described for pulled wool in accordance with Sections 23 to 28, inclusive.

REGULATIONS GOVERNING COMMITTEE D-13
ON
TEXTILE MATERIALS

Article I. Regulations

Section 1. These Regulations are supplementary to the "Regulations Governing Standing Committees."

Article II. Membership

Section 1. The membership of Committee D-13 shall consist of those originally appointed and subsequently approved by the Executive Committee of the Society.

Sec. 2. Additional appointments to membership in this Committee shall be approved by its Chairman and subsequently approved by the Executive Committee of the Society.

Note.—Any member of Committee D-13 may recommend additional appointments for membership to the Chairman.

Sec. 3. If a member or his authorized representative, without valid excuse, is absent from all regular meetings of the Committee for a year or more, or fails to mark and return to the Secretary of the Committee two consecutive Letter Ballots, the Secretary shall report it to the Advisory Sub-Committee who may remove his name from the roll of membership by a two-thirds vote by Letter Ballot.

Article III. Officers and Their Election

Section 1. The officers of this Committee shall be a Chairman, a First Vice-Chairman, a Second Vice-Chairman, and a Secretary.

Sec. 2. The terms of office shall be for two years and officers shall be eligible for re-election.

Sec. 3. The election of officers shall be held at the regular meeting of this Committee during the annual meeting of the Society in the even-numbered years. Any vacancies may be filled for an unexpired term by election at any meeting.

Article IV. Duties of Officers

Section 1. The executive direction of the Committee shall be vested in an Advisory Sub-Committee, which shall consist of the officers of the Committee and the Chairmen of its various Sub-Committees. The Chairman and Secretary of the Committee shall be Chairman and Secretary of this Sub-Committee. The Chairman and four members shall constitute a quorum for the transaction of business.

Sec. 2. Sub-Committees authorized by the Committee shall be appointed by the Advisory Sub-Committee for two or three years, unless otherwise specified, so that the appointments shall expire in the even years. At the end of the period the Advisory Sub-Committee shall elect to continue the Sub-Committee indefinitely or to discontinue it.

Sec. 3. The Chairman shall preside at all meetings of the Committee and be an *ex-officio* member of all Sub-Committees.

Sec. 4. The Secretary shall attend all the meetings of the Committee and keep the minutes thereof. He shall issue notices of all meetings and promptly

inform Sub-Committees of their appointment and duties, at the request of the Chairman. He shall have custody of the rules, books, records, and all other documents, belonging to the Committee and copies of all the minutes of its Sub-Committees. He shall keep a complete list of the members of the Committee with their addresses and a memorandum of the expenses of the Committee, and shall perform such other duties as may be delegated to him by the Chairman.

ARTICLE V. MEETINGS

SECTION 1. Regular meetings of the Committee shall be held three times a year, the third Thursday and Friday in October, the second Thursday and Friday in March, and during the annual meeting of the Society prior to the presentation of the Annual Report of the Committee. The time and place of special meetings shall be fixed by the Chairman.

SEC. 2. Special meetings may be called at the option of the Chairman or at the written request of five members stating the reasons therefor.

SEC. 3. Notice of meetings shall be sent to members at least two weeks in advance of the meeting, stating the time and place at which the meeting will be held, and in the case of special meetings, the business to be transacted.

SEC. 4. Seven members, or their representatives authorized to vote for them, shall constitute a quorum for the transaction of business.

ARTICLE VI. SUB-COMMITTEES

SECTION 1. Sub-Committees shall perform the duties assigned to them and shall present a written report, with definite recommendations, at each regular meeting of the Committee.

SEC. 2. The Chairman of each Sub-Committee shall keep proper files of all correspondence and papers relating to the work of his Sub-Committee, which shall ultimately be transmitted to the Secretary of the Committee.

SEC. 3. No expense shall be incurred by any Sub-Committee except for postage, unless previously authorized by the Advisory Sub-Committee.

ARTICLE VII. LETTER BALLOTS

SECTION 1. Any action taken by the Committee at any regular meeting resulting in Standards or Tentative Standards or in Amendments to existing Standards or Tentative Standards shall be subsequently confirmed or rejected by a majority vote of those voting by Letter Ballot.

SEC. 2. The Letter Ballot shall be sent out by the Secretary within two weeks and the vote counted within four weeks after the Regular Meeting at which the action was taken.

SEC. 3. The Letter Ballot shall state clearly what is to be voted on and shall be provided with three columns headed respectively "Affirmative," "Negative," and "Not Voting."

SEC. 4. The results of such Letter Ballot shall be included in the Annual Report of the Committee.

SEC. 5. Each member (person, corporation, firm, etc.) shall be entitled to one vote in a Letter Ballot except that members of the Committee who do not pay dues to the Society and receive its publications shall not be entitled to vote in Letter Ballots of the Committee.

ARTICLE VIII. AMENDMENTS

SECTION 1. Amendments to these Regulations may be adopted by two-thirds vote of those voting by Letter Ballot.

and medium cotton fabrics

Specifications and tests for Cuban (Jute) raw sugar bags

(5) Tentative Methods of

Testing cotton fibers

Testing grease wool and allied fibers for scoured content

Identification of textile fibers and their quantitative determination in mixed goods.

The Textile Color Card Association of the United States has developed a standard color card whereby each color is given a standard name and standard number consisting of 4 figures, which express as nearly as can be done the character of the color. The Association also issues a color card for standard hosiery colors to be used by the hosiery industry in America.

The Converters Association is endeavoring to eliminate the practice of misbranding merchandise by selling cotton goods as of fast color when they are not fast and to compile standard definitions of the term "fast color" in its application to different degrees of fastness and fastness for different purposes. The Association is attempting to more accurately define "seconds" as applied to cotton goods.

The Cordge Institute has formulated and adopted standards for footage, nomenclature and tensile strength of sisal manila and Java ply and yarn goods. These standards are now being reviewed and expanded. The Institute worked with the Division of Simplified Practice in the simplification of sizes and put-ups of hard fiber twines which resulted in the formulation

of Simplified Practice Recommendation No. 92, which relates to the ply and yarn goods of hard fibers.

The American Association of Textile Chemists and Colorists is working on methods of producing fastness to perspiration, to light, to dry and wet heat, to acids and alkalies, carbonizing and sea water. Its research committee is now formulating standard methods of dye testing. In cooperation with the British Society of Dyers and Colourists an attempt is being made to establish international standard methods of dye testing.

The Cotton Textile Institute (Inc.) working with the Department of Commerce and t e National Tent and Awning Manufacturers' Association, has formulated preliminary plans for the development of standards of performance and utility of tents, awnings and tarpaulins. The Institute has also published a booklet advocating a standard length bed sheet for the standard lengths of mattresses and beds.

The Better Bedding Alliance of America, whose object is the encouragement of exact and truthful labeling of the filling contents of bedding, has been engaged in eliminating the use of second hand, unsanitary filling materials in bedding. It has promoted the passage of sanitary bedding laws which empower State Inspectors to inspect bedding factories to insure that each article of bedding is correctly labeled as to kind of filling used and as to whether it is new or previously used. These sanitary bedding laws have already been passed in 31 states. The organization has a committee which is working on standard names for each material used to fill mattresses or groups of material.

The International Association of Garment Manufacturers in cooperation with other organizations is endeavoring to establish specifications for measurements for dress and work shirts and for work-clothing fabrics. It has also undertaken the work of standardizing cutting, sewing, pressing and packing operations; measurements for boys' blouses and shirts; cost methods; pocketing fabrics; and cotton thread for factory made pants. Its research associate at the National Bureau of Standards is working on standards relating to the shrinkage and fast colors of cotton fabrics for shirts and dresses.

The National Association of Finishers of Cotton Fabrics has adopted standard methods for testing cotton fabrics to determine their fastness to light and power laundry washing. "For the purpose of protecting the public against misleading statements, the association has made arrangements with the Pease Laboratories of New York, N. Y., for the testing of all goods as regards the fastness of colors to both light and washing, according to approved standards and requirements. Member finishers whose goods receive an "A" or "B" rating, both with respect to light and washing tests, are licensed to use the Association's label showing that such tests have been made."[23]

The National Bureau of Standards, in addition to their textile standardization already recorded, is making a study of aeronautical fabric weaves in order to produce a material with a greater tear resistant property. Fabrics in plain, twill, basket,

[23] Standardizing Activities of Technical Societies and Trade Associations. Standards Yearbook. Department of Commerce. 1929. pp. 349-350.

satin and mock leno weaves are being studied from which data may be compiled. The material used for parachutes must have springiness and slip so that they will open quickly when the draw string is pulled. A laboratory apparatus for measuring this quality is being developed. Methods for measuring air permeability are also being compared. The cotton fiber is being studied as a possible substitute for parachute silk so that the raw materials for a suitable fabric for parachute construction may be produced in this country.

The National Better Business Bureau has made some very much worthwhile progress in the standardization of textiles. Through its efforts better business standards in selling lingerie were adopted by a group of executives representing concerns which sell lingerie directly to the consumer. To it, also, is due the credit for the adoption of resolutions by the trade that all hosiery not of first quality be indeliably marked to that effect on the toe of each stocking. The Better Business Bureau of Baltimore, Maryland, was instrumental in securing the passage of the following law in that city: "It shall be unlawful to give publicity to the sale of or sell or offer for sale any merchandise which is second hand or used or which is defective in any manner or which consisted of units or parts known as seconds or blemished or which has been rejected by the manufacturer as not first class, unless there be conspicuously displayed directly in connection with the name and description of such merchandise a direct and unequivocal statement, phrase or word, which will clearly indicate that such merchandise is second-hand, used or

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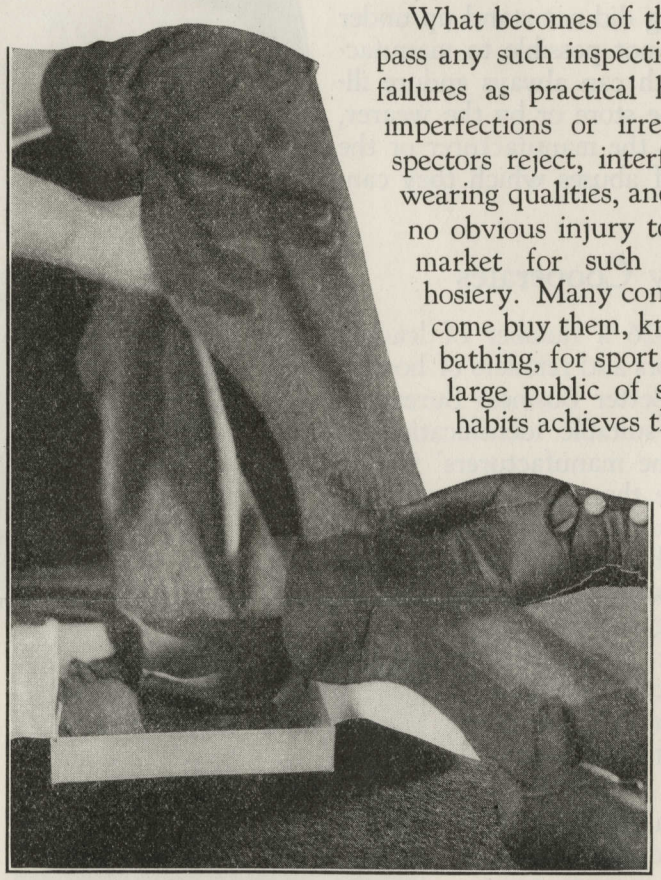
MERCHANDISE DEPARTMENT

Bulletin 0006 *June, 1927*

HOSIERY

How Leading Manufacturers Protect Consumers and the Trade

IN the whole field of apparel there are few articles with more feminine appeal, more fraught with beauty, than well-made silk hosiery. The cocoons from which raw silk is manufactured are one of the marvels of entomology. To this wonder of nature are brought the scientific knowledge and practical experience of industrial chemists and engineers and the manual dexterity of many workers. The silk fiber is cleaned, spun, knit, de-gummed, dyed and dressed for marketing with a pride and skill of workmanship which are reflected in the finished product. Is it any wonder the modern woman takes so much pleasure in buying and wearing such a product, or that she is interested in the material, the style and grade of hosiery which is offered her?



The Costume's Final Touch

The quality of fine silk hosiery is the result of minute and careful inspection. The standards of inspection employed vary with the conscience of the individual manufacturer. The majority are high. The very finest first quality hose, while made of an essentially irregular material, represent the standard of quality, skill and inspection maintained by the respective makers.

In the manufacture of service-weight silk hosiery, 15% of the output usually falls below the standard of inspection individually maintained by most manufacturers. In the sheer weights, 20% of the output may fail to pass inspection.

What becomes of the stockings which fail to pass any such inspection? These are not total failures as practical hosiery. Frequently the imperfections or irregularities for which inspectors reject, interfere little, if at all, with wearing qualities, and in many instances cause no obvious injury to style. There is a wide market for such imperfect and irregular hosiery. Many consumers of comfortable income buy them, knowing what they are, for bathing, for sport wear or for home use. A large public of small income and thrifty habits achieves the effect of silk hosiery at bargain prices by purchasing these stockings.

Up to a few months ago, there was no general method by which the consumer might identify stockings which had failed to pass the manufacturer's inspection. Mistakes happened; lots were jumbled; a few dealers intentionally deceived the public. Again and again Better Business Bureaus found hosiery which the manufacturer had graded as irregular or imperfect sold to the consumer at apparent bargain prices, but without notification of the variation in quality.

The result was one which caused the leaders in the industry grave concern. From the angle of

fair play, the consumer was not getting the facts to which she is rightfully entitled. From the angle of practical business, these undisclosed imperfect products were beginning to build a wholly unjustified suspicion regarding silk hosiery. The consumer had become her own hosiery inspector. The consequent handling of stockings, often carelessly, by many customers has played sad havoc with the hosiery stock of many a store. Moreover, much unjustified criticism has sprung up regarding hosiery which has passed factory inspection. Slight unevenness of fiber and dye—often inevitable in silk—has been charged to faulty or dishonest inspection. Some such consumers have cherished unreasonable expectations regarding silk stockings of first quality. They have handled them gingerly with rough, dry fingers, have worn too snug a size, or have turned down a garter hem in order to humor discrepancies of worn out garters—and then blamed the manufacturer or the retailer because a sheer silk stocking did not stand up under such punishment. It is not possible to manufacture a silk stocking which can always endure ill-treatment, whether in the store or by the wearer, and it is unfair to blame the manufacturer or the retailer for the results of abuses which they cannot control.

An Industry Cooperates

In the summer of 1926 a number of leading manufacturers, distributors and retailers of hosiery met with the National Better Business Bureau to discuss the problem of suitable identification of hosiery not passed by the manufacturers' inspection. Subsequently, more than sixty-five principal manufacturers, who make approximately 75% of the silk hosiery sold in this country, have pledged themselves to identify hosiery other than that of first quality by marking *each* stocking *indelibly* upon the toe of *each* foot with the word "Imperfect," "Irregular," "Second" or "Sub-Standard." The preference of the trade has been recorded in the order named.

The large illustration on page two shows more than two dozen stockings from as many different manufacturers, marked indelibly on the toe of each foot in order that by no chance may they be sold to the public as products of these makers' first quality.

Retailers throughout the United States have expressed a vigorous interest in this protection of the consumer and

How Leading Hosiery M
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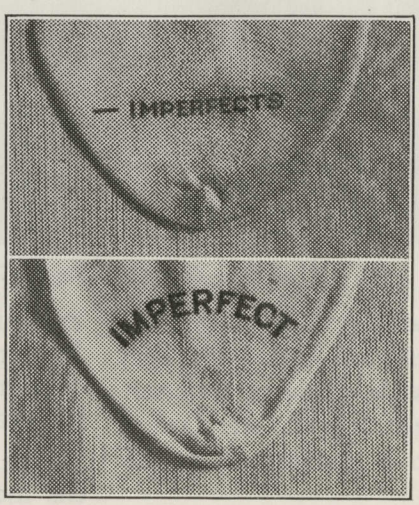
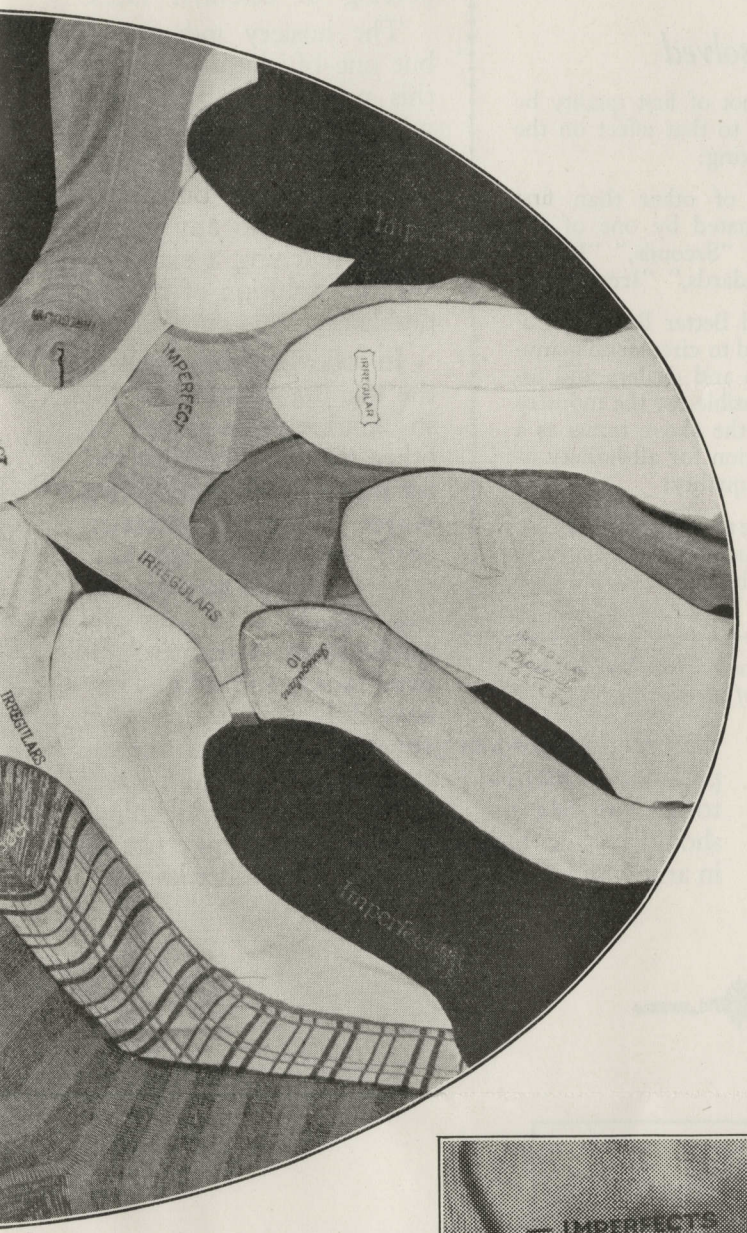


Each stocking is marked Indelibly on the Toe or Foot as in this picture. This prevents misunderstanding.

turers are Branding Hose Quality



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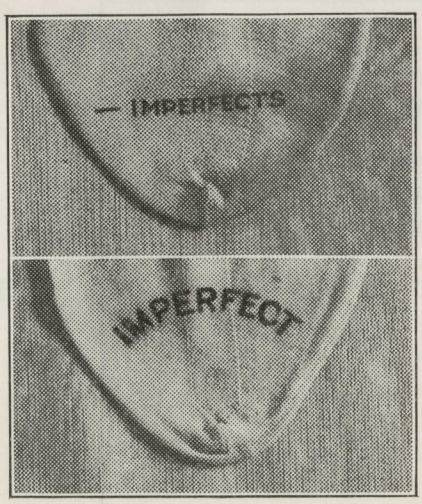

Hosiery branded in this fashion by makers inspires consumer confidence in manufacturer and retailer.

the conservation of public confidence in maker and seller which it involves. The Garment Retailers of America, 1500 strong, including in its membership a large part of the leading department stores and specialty shops serving American women, have officially approved this marking policy. On the other hand, a few retailers—a very few—have declined to purchase imperfect hose from manufacturers or jobbers unless the markings be left off. What are we to suppose regarding the fairness of such retailers toward their customers?

Public policy has been indicated by the passage of ordinances and State laws in several localities making it incumbent upon the seller of merchandise of other than first quality to declare the facts to the purchaser affirmatively. Better Business Bureaus are interested in the subject, however, not as a matter of law, but as one more step in the maintenance of mutual understanding and fair play between buyer and seller.

Who Are the Gainers?

How does this program of indelible identification for hosiery other than of first quality affect the interested parties from manufacturer to consumer? Let us trace the process and see what each has to gain by the program.

The *manufacturer* who stamps each stocking indelibly on the toe when the quality is below his inspection standard may be sure, first of all, that these stockings will not be sold as and for firsts in competition with his best merchandise. This is a valuable insurance for trade and public goodwill, in that whatever secrecy be attempted, the maker's name very frequently filters through the trade to the consumer. When the imperfections are stamped, the retailer does not suspect a device to accomplish special discounts for favored distributors and the public has an opportunity to note that this manufacturer maintains inspection standards and brands stockings which do not pass them.

A *jobber* who handles hosiery so marked is open to no accusation of deception or concealment on the part of any retailer to whom he sells them. If he utilizes a private label, he, like the manufacturer, profits from assured dealer and public confidence.

The *retailer* who sells hosiery of other than first quality only when it is indelibly marked on each stocking, insures the good-will of his store against carelessness or over-eagerness on the part of sales

persons. He insures against unwarranted returns and complaints about such merchandise. He builds the reputation of the store for disclosing in all instances the true quality of merchandise offered. On such good-will the fortunes of many of our leading merchandise establishments have grown to their present stature.

The gain to *the consumer* is clear. As the practice is adopted, the consumer learns to know that certain makes or brands of hosiery are indelibly marked when the product is of other than first quality, and therefore that when stockings of that brand are not so marked that they represent that maker's highest standard of manufacture and inspection.

Consumers are not slow to note this trend in business practice and to give to those industries by which it is evidenced the confidence deserved. Whether in the sale of merchandise or securities, such a policy represents sound business judgment, practical common sense. Common sense should rule in the application of such a policy. While the consumer should be furnished with facts vital to her, she should not be burdened with technicalities of no public interest to others than the trade. Better business follows accurate reporting of essential facts.

The hosiery industry is but one of many to which this principle is applicable with benefit to business and the public. The National Better Business Bureau is prepared to aid any industry in reaching a similarly effective solution of related problems.

In following this practice the manufacturers who are so marking stockings of other than first quality bid for public confidence in two ways: They have attuned their methods to the keynote of modern merchandising, which is to give the public facts about merchandise frankly and fully. They have followed, moreover, the practical wisdom proven so long ago in the experience of mankind that Cicero wrote in a letter to his son, Marcus, 2,000 years ago: "All things should be laid bare so that the buyer may not be in any way ignorant of anything the seller knows."

Resolved

1 that all hosiery not of first quality be indelibly marked to that effect on the toe of each stocking;

2 that all hosiery of other than first quality be designated by one of the following terms: "Seconds," "Imperfects," "Sub-standards," "Irregulars";

3 that the National Better Business Bureau be authorized to circularize manufacturers, jobbers and dealers and ascertain if it is possible for the industry to adopt one of the above terms as a standard designation for all hosiery of other than first quality;

4 that in all advertising, hosiery of other than first quality be affirmatively designated as such.

Resolutions by the trade which have become a code of practice.

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MERCHANDISE DEPARTMENT
KENNETH B. WILLSON, *Manager*

Bulletin 0007 *June, 1927*

INFANTS' WEAR INDUSTRY ACTS TO PROTECT PUBLIC

NO ITEM is purchased with more careful scrutiny than the one which belongs in any way to the baby of the family. Mother is continuously watching what baby eats, what baby wears, and what baby plays with. Every precaution is taken to buy the best obtainable, and woe to the manufacturer or distributor who loses the confidence of a mother in his stock of baby things.

Careful buying is particularly applied to the undergarments baby wears. Doctors often specifically prescribe silk, wool, rayon, cotton or combinations of these materials where these fabrics are believed to be particularly beneficial or healthful and mothers demand what doctors prescribe.

It is because of this careful scrutiny that the small number of manufacturers, jobbers and distributors who have incorrectly advertised baby's undergarments has attracted the attention that it has. The National Better Business Bureau and local Better Business Bureaus throughout the country have in the past received a large number of complaints from customers who found that their purchases did not measure up to their expectations drawn from the advertising of the product. Not that there was any greater percentage of misrepresentation in the Infants' Underwear field; quite the contrary is the case, for the majority want to be fair. But because of the personal and human interest expended upon baby's things, a careless application of terms on the part of some in the Infants' Underwear field has caused far more reaction on the part of the public than it would have, had the misrepresentation concerned purchases of even greater monetary value which were for adult members of the family.

At a meeting recently held with leaders in the Infants' Underwear industry, the National Better Business Bureau demonstrated to the executives present how a great harm was being done the entire industry by the misrepresentation of a few. The Bureau showed by means of tests of garments which several of the local Better Business Bureaus had purchased in their cities, that so called "silk and wool" was sometimes found to be cotton and rayon, and "all wool" largely cotton. To obviate the possibility of continued loss of public confidence which is a consequence of such inaccuracies, the National Bureau at the same time presented a code, the application of which would insure that statements such as "all wool" or "silk and wool" would actually mean made entirely of wool or made entirely of silk and wool. Leaders in the industry were quick to respond, for they saw that with this code to guide the entire industry, public confidence could be assured. They, therefore, sanctioned the proposal of the National Better Business Bureau to take this code to the industry at large for endorsement, and to present it to every company manufacturing and distributing Infants' Undergarments.

This has been done. The response of the industry was both spontaneous and whole-hearted. Manufacturers of over 85% of all Infants' Wear made in the United States have unqualifiedly approved and endorsed the code of fair play for the guidance of the industry. One reply states: "We are heartily in favor of this movement and will cooperate 100% in assisting and working with this committee as suggested. We believe this movement will bring about better merchandising methods." This letter is typical of the attitude of the whole industry toward the code which reads as follows:

1. ALL CLAIMS MADE FOR ANY MATERIAL SHOULD BE ACCURATE AND PROVABLE BY THE ADVERTISER.

2. THE TERM "WOOL" OR ANY DERIVATIVE THEREOF, WHEN APPLIED TO A MATERIAL, MEANS MADE ENTIRELY OF WOOL.

3. "SILK" OR ANY DERIVATIVE THEREOF, WHEN APPLIED TO A MATERIAL, MEANS THE PRODUCT OF THE SILK WORM.

4. "RAYON" IS THE GENERIC NAME FOR A TEXTILE MATERIAL, THE CHIEF INGREDIENT OF WHICH IS CELLULOSE.

5. THE TERM "SILK AND WOOL" INDICATES A FABRIC MADE ENTIRELY OF THESE MATERIALS WITH EACH PRESENT IN SUBSTANTIAL AMOUNTS.

6. THE TERM "WOOL AND COTTON" INDICATES A FABRIC MADE ENTIRELY OF THESE MATERIALS WITH EACH PRESENT IN SUBSTANTIAL AMOUNTS.

7. "PART WOOL", "WOOL MIXED", "MIXED WOOL", "WOOL FINISH", ARE AMBIGUOUS AND SHOULD BE DISCARDED IN FAVOR OF THE MORE CONFIDENCE-INSPIRING TERMS "WOOL AND COTTON", "WOOL, COTTON AND RAYON", ETC.

8. IN DESCRIBING THE MATERIAL CONTENT OF A GARMENT, THE BODY MATERIAL SHALL BE CONSIDERED AND NOT TRIMMINGS, EDGES AND OTHER ADORNMENTS. IF MENTION OF MATERIAL CONTENT OF TRIMMINGS, BINDINGS AND ADORNMENTS IS MADE, THEN IT SHALL BE ACCURATELY STATED.

9. THE ABOVE STANDARDS SHALL APPLY TO ALL ADVERTISING AND PRINTED MATTER, CATALOGS, LABELS AND BOXES, AS WELL AS VERBAL STATEMENTS OF SALESMEN.

Standards of business practice cease to be paper codes and become effective living customs in proportion to the number who participate in their application. This industry has taken the first step by pledging itself to follow definite fair play standards. The action speaks for the progressive attitude of modern business—an attitude far the opposite of the old doctrine of "Let the purchaser beware!" It illustrates how another industry is expressing, as so many have, a real desire for fair play within the industry and toward the consumer.

Fair play brings ready recognition from the consumer public. Those who buy appreciate the efforts of a concern and of an industry to give them good merchandise fairly represented.

Members of the public themselves can help in the promotion of fair play and better understanding between buyer and seller, not only by reading the code set forth above, but also by reporting to Better Business Bureaus, National or local, advertisements or labels which tend to mislead those, who, in this particular instance, are buying with extreme care and with a well justified expectation that they are to receive exactly what is ordered.

Better Business Bureaus Act to End Fraud and Deception in "Part Wool" Blanket Merchandising

Urge Label and Advertising Statement of Wool Content as Means of Correcting Confusion Resulting from Use of Term "Part Wool" as Misleading and Meaningless Designation

WHEN is a wool blanket not a wool blanket?

The answer obviously is, "When it is a part wool blanket." But . . .

How much wool must a blanket contain to be a part wool blanket? There is a question that is not so easy to answer.

Theoretically, if the blanket contained even so little as one-tenth of 1 per cent wool it might be classed as a "part wool" blanket. Such a product is, in truth, part wool. By the same logic it would be "part wool" if it contained one-tenth of one-tenth of 1 per cent. And so the logic might be continued until a blanket was produced which had in its make-up only one strand of wool. Obviously such a state of affairs would be ridiculous. But would it be more ridiculous than the "part wool" situation as it exists today?

Let us see.

In the beginning, wool blankets were all—100 per cent—wool. While all-wool blankets are still manufactured the blanket industry in this country had not advanced very far before the manufacturers learned that it was possible to combine wool and cotton in the production of a blanket of high utility which found a ready market under the name "part wool."

Manufacturers Learn Value of Term "Part Wool"

Competition was quick to recognize this development with the result that the wool content of "part wool" blankets became less and less. According to laboratory tests on blankets purchased throughout the country during the last year, blankets marked "part wool" may contain anywhere from 1 to 12 or 15 per cent of wool with the majority containing 4 or 5 per cent. The use of the term "wool" has therefore been retained on a blanket that contains an overwhelming percentage of cotton.

To procure accurate information as to just what the term "part wool" means to the average consumer, the Merchandise Section of the National Better Business Bureau, Inc., contacted with a substantial number of consumers by means of a questionnaire. Of the replies received, more than half or 68 per cent indicated that to them the term meant a content of more than 25 per cent of wool. Fourteen per cent replied that they believed the wool content to be less than 25 per cent while the replies of the remaining 18 per cent was so vague and indefinite that it was impossible to tabulate them. But since the understanding of the majority was far from the actual facts in the matter, the National Bureau believes that the continued use of the term is deceiving the public and that it actually amounts to fraud.

To the end that the consumer may be accurately informed as to the wool content of blankets and because salespersons usually have no very clear knowledge of the actual wool content of the blankets which they sell, the National Bureau has drawn up a resolution which is urged for adoption before November 1 of this year and which will, it is believed, eliminate deception in the sale of cotton and wool blankets and provide competition with a free and open market for blankets made of cotton and wool. This resolution reads as follows:

Wool Content Statement Asked

> The National Better Business Bureau, Inc., recommends to blanket manufacturers that when the term "wool" or "woolen" is used either in such expressions as "part wool" or "wool and cotton" or in any other way, on blanket labels or any other form of advertising, that the approximate percentage of wool content of such blankets be mentioned in the same size type as the word "wool" or "woolen."
>
> It is also recommended that this recommendation be put into effect as soon as possible, immediately if desired, but not later than November 1, 1928.

In the opinion of the Bureau, wool is put into "part wool" blankets for selling purposes rather than utility. Where, then, is the injustice in asking manufacturers to protect themselves and the public by identifying the approximate wool content on labels, tickets, and in all advertising?

There is none.

WHEN A PURCHASER buys a blanket made chiefly of cotton but labeled "part wool" he is entitled to know how much wool that blanket contains. The next time you, as a consumer, buy a blanket that is made of cotton and wool insist upon accurate and authoritative information from the salesperson as to the percentages of cotton and wool in the blanket. Manufacturers who want you to have reliable and authentic information will put the percentages on their labels, because this method eliminates guesswork and deliberate exaggeration.

defective, or consists of seconds or is blemished or has been rejected by the manufacturer thereof, as the fact shall be."[24] Other cities are making similar laws which, with the cooperation of industry and trade associations, has greatly improved business ethics in the last 5 years. The recommendation by the Better Business Bureau regarding the wool content code of wool blankets was adopted at a meeting of leading manufacturers of cotton and wool blankets on November 17, 1927. Another recommendation worked out by this organization and adopted by almost all manufacturers of infants wear is the accompanying code for fair play.

So far as the style element of the finished articles of clothing is concerned, one may safely predict that there will never be strict standardization and yet even here, there is perhaps more standardization than is at first realized. Men's clothing is already fairly well standardized as to the general shape, arrangement of pockets, number of buttons, and so on, but not as to material and the finer points of the cutter's art. There is much more variation in women's clothing, but even here there are certain standard specifications, such as the length of skirt, tightness of the dress, the outline of the silhouette, color and length of hose, and the size of hat which have been standardized to a degree, but after all, these are standards which make for more economic production without interfering with the variety and freedom of life.

[24] Better Business News. March 1927. p. 2.

CONCLUSION AND OUTLOOK

From the foregoing survey of standardization and simplification in the textile industry, one of the first and most important conclusions to be drawn is that standardization and simplification are coming. They are coming as inevitably as day follows night and this great movement can no more be stopped than the flow of a mighty river into the sea. Like the river, beginning in obscure brooks up in the mountains, gathers power through the union with other streams down in the valley and rushes into the sea with a force no power on earth can stop, so has this great movement of standardization and simplification, beginning in the far corners of the textile industry, gathered.momentum until now it will not be stopped, but moves along with increasing power to a mature and beneficial development in the years to come.

And while it is inevitable that standardization and simplification are coming, it is also inevitable that they must come slowly. The tests and investigations, the conferences and acceptances of each standard must of necessity cover a long period of time. The textile industry is a vast complicated and complex industrial organization which adopts reforms slowly and with a conservative attitude of mind, but it is arousing itself to the need of scientific controls, of research and simplification and the adoption of the modern method will eventually be complete.

It has been shown, too, that this movement will be established through self government within the textile industry and not through regulatory legislation. Economic pressure, competition and public opinion will be more powerful than laws when it comes to the production of materials whose quality is defined in terms which the buyer understands and whose variety is limited to a useful number of standard types.

Standardization and simplification are of benefit to the producer, consumer and the nation. Greater profits will result for the producer and lower prices with better quality values for the consumer. This means a general raising of the standards of living with greater opportunities to enjoy life and to make useful contributions to society. Because men will be economically free, individuality will develop and flourish so that instead of stifling life, this new program will liberate it. For the nation it means greater industrial prosperity. It provides a basis for better understanding and friendly relations between nations, but it may also develop hatred and jealousy between them because of the keener competition for foreign markets.

The new spirit of cooperation between industries which stimulates investigations and shares information is doing much to hasten and expand the movement.

In the preceding chapter the author has shown that many projects in textile standardization and simplification have already been completed, but in the light of what is yet to be accomplished in this industry and in comparison to the progress already made in other industries one has to admit that it is only a beginning. Nevertheless, interest has been aroused and ex-

perience shows that intelligent demands for standardization and simplification on the part of the consumer will be met as fast as they are voiced through organized channels.

The two outstanding needs for the future development of this movement in the textile industry is the need for textile research and the need for consumer education. Congressman Johnson of Indiana, speaking before congress in 1927, said that "we have invested less in the fundamental study of fabrics probably than is spent each year in holding and attending hearings on fabric legislation"[1] and that given an era of textile research we can progress without regulatory laws because definitions of standards can go into practice and fill the need for laws, while laws can never be a substitute for the lack of fundamental facts. We need a greater interest in textile research on the part of the government. An annual appropriation for the Bureau of Home Economics comparable to that received by other bureaus of the federal government, together with more active interest in textiles on the part of this Bureau should greatly increase textile research. Industries are pressing forward on sound research programs and educational institutions are increasing their facilities for research work in textiles, but there still remains an infinite amount of study and investigation to be made before much further progress can take place.

The second great need, that of educating the consumer, is claiming the attention of many organizations. The public is passing out of the age when they liked to be humbugged as in the

[1] American Silk Journal. May 1927. p. 34.

days of the "Fabulous Forties" and are becoming conscious of quality. It has been one of the accusations of tradespeople that women for the last two generations have not looked for quality in buying but rather for style and surface finish. Home Economics departments in schools, women's magazines, extension work, educational advertising and women's clubs are slowly training women and girls to appreciate and demand quality in yard goods and ready to wear garments. Home Economics teachers must now spread understanding of what standardization and simplification mean. The success of this movement is dependent upon the educative process of both the producer and the consumer for when the proper interest is aroused, tentative standards can be adopted and the resulting discussions will provide a basis for permanent standards.

The consumer needs organizations through which to voice his interests, organizations similar to the cooperative societies of Denmark, perhaps. Labor unions, farm and home bureaus and women's clubs should be able to do much. So far the Federal Trade Commission and other government agencies have favored business more than they have the individual because there was no organized consumer's voice. The fact that the consumer is now represented at the meetings of the American Standards Association is encouraging for a future outlook. The author believes that the results of investigations by the Bureau of Standards and by the Federal Trade Commission should be published and made available to the individual as well as to the trade. There is at present only one government service from which consumers can secure information

about commercial articles identified by name and brand. This is the equipment for use on vessels put out by the Steamboat Inspection Service. The progressive factory owner can buy by specifications but for the ultimate consumer this is almost impossible unless organized into groups. Protection of the consumer so far can come only from general standards such as the government lays down or those which are adopted voluntarily by the trade.

Rosamond Cook, of the University of Cincinnati, Ohio, has laid down the following ways by which the individual consumer can help in the standardization program:

(1) Find out the standardizing agencies now in operation. This can be done by reference to the Standards Year Book.

(2) Find out what products are now standardized.

(3) Study the standards which have been set up.

(4) Show interest by asking questions of merchants.

(5) Write to national and state trade associations for information about the standardization of products.

(6) Study advertisements and compare these with the labels. Buy through labels rather than salestalk.

(7) Ask for and give preference to standard products when buying.[2]

These are ways in which the consumer may help before he becomes organized, but it is only through organization that tangible results may be expected.

[2] Cook, Rosamond. Taking the Guesswork out of Buying. Journal of Home Economics. March 1928. p. 164.

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