UNITED STATES TARIFF COMMISSION

LACES AND LACE ARTICLES

A REPORT

UNDER THE GENERAL PROVISIONS OF SECTION 332 PART II, TITLE III, OF THE TARIFF ACT OF 1930, COVERING PARAGRAPH 920: NOTTINGHAM LACE-CURTAIN MACHINE PRODUCTS, AND PARAGRAPH 1529 (a): LACES, LACE FABRICS, LACE ARTICLES, AND OTHER RELATED ARTICLES

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CONTENTS

APPENDIXES

DIAGRAMS

ILLUSTRATIONS

TABLES

CHAPTER I

CHAPTER II

ACKNOWLEDGMENT

In the preparation of this report the Tariff Commission had the services of George Middleton, special expert of the textile division of the Commission's staff, and of others.

TARIFF ACT OF JUNE 17, 1930

Text of paragraphs 920 and 1529 (a) providing for laces and lace articles:

PAR. 920. Lace window curtains, nets, nettings, pillow shams, and bed sets, and all other fabrics and articles, by whatever name known, plain or Jacquard-figured, finished or unfinished, wholly or partly manufactured, for any use whatsoever, made on the Nottingham lace-curtain machine, wholly or in chief value of cotton or other vegetable fiber, 60 per centum ad valorem.

PAR. 1529 (a). Laces, lace fabrics, and lace articles, made by hand or on a lace, net, knitting, or braiding machine, and all fabrics and articles made on a lace or net machine, all the foregoing, plain or figured; lace window curtains, veils, veilings, flouncings, all-overs, neck rufflings, flutings, quillings, ruchings, tuckings, insertings, galloons, edgings, trimmings, fringes, gimps, and ornaments; braids, loom woven and ornamented in the process of weaving, or made by hand, or on a lace, knitting, or braiding machine; * * *; all the foregoing, and fabrics and articles wholly or in part thereof, finished or unfinished (except materials and articles provided for in paragraph 915, 920, 1006, 1111, 1504, 1505, 1513, 1518, 1523, or 1530 (e), or in Title II (free list), or in subparagraph (b) of this paragraph), by whatever name known, and to whatever use applied, and whether or not named, described, or provided for elsewhere in this Act, when composed wholly or in chief value of filaments, yarns, threads, tinsel wire, lame, bullions, metal threads, beads, bugles, spangles, or rayon or other synthetic textile, 90 per centum ad valorem. * * *.

697—34——2

PREFACE

This report deals with laces and lace articles, and related articles, covered by paragraphs 920 and 1529 (a) of the Tariff Act of 1930. Certain types of laces are luxury goods, some of them veritable works of art, but others belong in the class of necessities and are sold, largely in chain stores, at prices which place them within the reach of every purse.

The various laces and articles treated differ radically in mode of construction and in material composition, also in shape and size and in use. The dissimilarity is such that they cannot be logically combined into one group and are therefore given separate treatment in the several chapters as follows:

Chapter

I. Nottingham lace-curtain machine products.
II. Fancy laces made on the Levers lace machine.
III. Nets and nettings made on the bobbinet machine.
IV. Barmen laces made on the circular lace-braiding machine.
V. Lyons Alençon lace.
VI. Hand-made laces.
VII. Sundries.
VIII. The evolution of lace.
IX. Historical data concerning lace machinery.

Lists of domestic mills and machines and of domestic and foreign wage schedules appear in the appendix.

The information on cost of production is mainly derived from the data assembled by the United States Tariff Commission in its investigations made in 1924 covering the year 1923 and the information on importers' mark-up for expenses and profit, from data obtained in 1931 and 1932 in the valuation study under section 340 of the Tariff Act of 1930.

The account of the evolution of lace was written in response to numerous requests from the trade for such information. The decline in the making of European hand-made lace, largely through the rise of Chinese production of cheaper articles, is so serious that it has been deemed worth while to publish the laws promulgated in Belgium and Malta for its protection.

There has been included at the end of each chapter a section on technical details of machine construction and operation. The mechanical operations of the various machines are so complicated and so little known that considerable space has been given to the descriptions of their various motions. There are excellent descriptions of the operation of the Nottingham lace-curtain, the bobbinet, and the Barmen lace machines in German, and of the Levers and go-through lace machines in French, but with the exception of descriptions of the Levers lace machine in a magazine, the publication of which has ceased, and of consular and Commerce Department reports published in 1905 and 1908 and now out of print, there does not appear to be anything available in English. This paucity of

information is the same in 1934 as it was in 1905 when a consular report from Nottingham, England, stated:

> No complete technical description of these machines can be obtained. The only textbook on the subject is 30 or 40 years old, and needs to be supplemented by the unwritten record of development manifested in the machinery since built and now being built. The machine builders profess their inability to furnish any written description and to have no descriptive catalogs for distribution. The purchasers of their machines understand the business thoroughly and order machines to be built according to their particular specifications and requirements.

This report is written primarily for the information of Congress and the trade but it is hoped that, in the absence of other literature, the descriptions of the machines employed in lace making may prove useful to American textile students.

The data used in this report have been gathered from a variety of sources; domestic and foreign manufacturers, trade associations, jobbers, importers, department and chain stores, and others have each contributed their quota.

LACES AND LACE ARTICLES

INTRODUCTION AND SUMMARIES

INTRODUCTION

Lace is ornamental or decorative openwork, in the making of which the ornamentation and fabric are produced concurrently by the intertwisting of threads. Primarily laces may be divided into two classes—real or hand-made lace and the imitations thereof made on the various types of machines. These machines are of 8 basic types, and the mutations reach the number of 16. The industry in the United States is mainly concerned with the products of the Nottingham lace-curtain machine, the Levers lace machine, the bobbinet machine, and the Barmen lace machine. Laces made on the embroidery machine, though produced by the domestic industry in considerable quantity and value, will be treated in a separate survey covering embroideries and embroidered articles, as will the lace fabrics embroidered by the Bonnaz and other fancy sewing machines; the production of imitation laces made on the knitting machine is negligible in the domestic industry, there are no Alençon lace machines (bobbinet-jacquard) in the United States, neither is hand-made lace commercially produced here.

In addition to the types of lace already mentioned, paragraph 1529 (a) provides for embroideries and also for many woven or braided articles not partaking of the character of either lace or embroidery. Of these articles flouncings, all-overs, insertings, galloons, and edgings are among the characteristic shapes in which laces are produced and taken from the machine; and lace window curtains, veils, veilings, and quillings are in whole or in part the products of the various lace and net machines, whereas neck rufflings, flutings, ruchings, and tuckings are mostly of woven cloth. The specific mention of flouncings, all-overs, insertings, galloons, edgings, neck rufflings, flutings, ruchings, and tuckings causes these articles, if of other and cheaper modes of production, to be dutiable at the same rate as the most elaborate laces. It would appear that woven articles would be more appropriately classified under the schedules of the various materials of which they are composed; if the words describing the characteristic shapes in which laces are made be eliminated, there remain trimmings, fringes, gimps, ornaments, also braids which might be distributed to other paragraphs by reason of similitude of material or construction. Under the present arrangement common braided shoe laces pay the same ad valorem rate of duty as the most elaborate laces. The lace items in the paragraph are the products of several different machines, they differ radically in construction and vary widely in constituent materials, they are not the same in size or shape, do not serve the same purposes, and the skilled labor used in each branch is

too highly specialized to be interchangeable. In addition, the nature and extent of the competition between domestic and foreign products show wide differences, not only in relation to the type of machine used but also in relation to the grade of the products. These laces and other items are dutiable under paragraph 1529 (a) at a uniform rate that recognizes no differences in type or quality.

In 1909 Congress by a special provision allowed the free entry, for a period of about a year and a half, of Levers or go-through lace machines and advanced the duty upon the products of such machines from 60 percent to 70 percent ad valorem. This increase in duty extended throughout the act of 1909 but was not renewed under the act of 1913. Under various tariff acts the duty on lace has varied according to the constituent material, in some cases being a compound duty, comprising a specific rate per pound in addition to an ad valorem duty, but under the acts of 1913, 1922, and 1930 laces of all materials have been assessed at a uniform ad valorem rate of duty. Apart from the products of the Nottingham lace-curtain machine, laces have not been assessed at specific rates, dependent upon length, width, or any other mechanical factor. The rate of duty levied upon the items mentioned in paragraph 1529 (a) is 90 per centum ad valorem.

Under the act of 1913 Jacquard-figured nets and nettings made on the Nottingham lace-curtain machine were held to be dutiable elsewhere as "Jacquard-figured upholstery goods" at a rate lower than that applicable to plain nets made on the same machine; to prevent this and to make clear the intent of Congress there were added to paragraph 920 in the act of 1922 the words "plain or Jacquard-figured." However, the wording of the upholstery paragraph has since been changed to read "Jacquard-figured upholstery cloths" and as cloth is not made on a lace machine there is no longer any necessity for the words "plain or Jacquard-figured" in paragraph 920.

It will be seen later that domestic laces made on different machines, or different styles made on the same machine, as already stated, meet different degrees of competition from imports. In some cases the domestic demand is filled by domestic production, and in others by imports.

There are three points for consideration concerning the requirements for the operation of the Nottingham lace-curtain industry, the Levers lace industry, and the bobbinet industry. They are the necessity for the importation of machinery, of a percentage of raw material, and of expert labor.

The demand for these types of machinery has not been such as to warrant the investment in expensive plants for their production and upon the only occasion when the demand was considerable, the limited period of free entry of Levers or go-through lace machines under the Tariff Act of 1909, the time was of such short duration that opportunity was not afforded for domestic engineering plants to become equipped with models and personnel of skilled workers to enable them to produce what was required. In addition the limited demand since that period would have rendered the investment for the specific purpose largely unproductive. All Nottingham lace-curtain, Levers or go-through, and bobbinet machines used in the United States are, therefore, imported and are dutiable under paragraph 372 of the Tariff Act of 1930 at 30 percent ad valorem. In

February 1928 the invoice price of an imported 6-point Nottingham lace-curtain machine, 432 inches wide, was $9,237, the duty was $2,771, and the total landed cost, duty paid, was approximately $12,500, or about $3,250 more than the price paid by British manufacturers for a similar machine. In December 1932 the landed cost of Levers and plain net machines was between $7,000 and $7,500 each.

Nottingham lace-curtain machines, Levers lace machines, and bobbinet machines, all require a special kind of yarn for use in the brass bobbins. This yarn is "prepared" (flattened), by a process which has never been successfully used by domestic spinners; all this essential yarn, therefore, without which no Nottingham lace-curtain, Levers lace, or bobbinet can be made, is imported from England, and the Nottingham lace-curtain industry is the largest user of imported yarns in the United States. Most yarns finer than 80/2 used in all three types of machines are also imported; 90/2 and finer yarns are dutiable at 37 percent ad valorem under the Tariff Act of 1930. Metal threads are also imported, mainly from France, and are dutiable under paragraph 385 at 6 cents per pound and 35 per centum ad valorem.

All three branches of the industry suffer some labor disadvantage. The labor employed to operate the machines is mostly British or French. A period of training of about 3 years is necessary for skilled workers and there is no reserve of labor in the United States for a sudden demand for increased output. In the Levers lace branch the available supply is so limited that in times of great demand there is always an acute shortage of labor and during periods of depression, in order to keep their staff of expert workers together, domestic manufacturers operate their machines at little or no profit or utilize the men on nonproductive work.

Other branches of labor in which the domestic Nottingham lace-curtain and Levers lace industries are dependent upon foreigners are those which embrace the preliminary artistic side of the work—designing and drafting. These are so difficult and complicated that an extended period of apprenticeship, 7 years, is considered necessary abroad, an apprenticeship that is practically impossible of enforcement in the United States. In addition, the principal lace-making centers of Europe have municipal schools of art and design in which instruction and practical experience concerning lace and its production are obtainable. In no textile school of the United States is instruction given in any branch of the lace industry.

Basic differences in organization between the domestic and foreign industries.—The lace industry abroad has been largely built upon the efforts of workingmen who by thrift and ambition acquired a few machines (in some instances 1 or 2) and eventually became important manufacturers. This small-scale development led to the establishment of public bleacheries and dressing rooms where the machine-holders or the warehousemen who purchased their goods could have the lace bleached or dyed, and dressed; thus each small manufacturer was not subjected to the expense of having an individual establishment for the purposes of bleaching, dressing, and finishing. In England this system has led to the distribution of the lace trade among four classes of operators, the machine-holder, the bleacher or dyer, the dresser, and the warehouseman who disposes of the finished goods to wholesalers or jobbers who, in turn, distribute them to retail establishments. In France one of these intermediaries is elim-

inated as it is the custom for all important machine holders to market their own finished goods. In England this distribution of processes entails several, in some cases 4 or 5, profits.

The practice in the United States has been different. Most domestic mills contain a greater number of lace machines than the foreign mills, and it is the custom for each mill to be self-contained, carrying out all processes on the premises. This greater integration of organization requires a larger outlay of capital for plant and a perpetual outlay for wages and salaries of experts, but confines the profit to the producing company. One great advantage which accrues from this consolidated method is that the everchanging color schemes can be very successfully handled, as a sudden demand for a specific shade can be promptly met, while the importer is compelled to wait until the goods can be sent from Europe, and with the fluctuation of taste, the demand for the tint may be past before the arrival of the goods. One lace mill, at least, utilizes its bleaching, dyeing, and dressing facilities for processing nets and laces imported in the raw state. The economy here is apparent, as sufficient lace or net may be cut from the unfinished piece to fill out an order without leaving an undue surplus which may become unusable through the passing of the demand for the particular shade. In addition, domestic manufacturers have the advantage of proximity to the world's largest lace consuming market which makes quick delivery possible in times of special demand.

The location of the lace industry in the United States is mainly in the New England States and on the Atlantic seaboard—Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. The only plants not in this region are one in Ohio and one in Illinois.

The absence of public facilities for the subsequent operations of finishing, after the lace is taken from the machine, compels domestic manufacturers to provide such facilities for their own plants with the result in the Nottingham lace-curtain and Levers lace branches that the average domestic plant of these machines is larger than the average-sized plants in England and France. On the other hand, bobbinet plants are small and are run as complementary to other branches of lace manufacturing; only in one instance is bobbinet the sole item of production. The average size of the aggregations of Barmen lace machines is about the same as in Germany.

A condensation of the salient facts concerning the domestic and the foreign production of Nottingham lace-curtain machine products, Levers laces, bobbinet, Barmen lace, Lyons Alençon, and hand-made laces is given in the summaries following.

NOTTINGHAM LACE-CURTAIN MACHINE PRODUCTS—SUMMARY

Description and uses.—Paragraph 920 covers all Nottingham lace-curtain machine products wholly or in chief value of cotton or other vegetable fiber.

The Nottingham is the largest of all lace machines. Although some of these machines have a width of 480 inches [1] and a weight of 12 tons, the usual widths are 216 to 360 inches. Each machine produces simultaneously a number of curtains or breadths of curtain net, side by side. The groundwork of the fabric is made by intertwisting brass-bobbin yarns with warp yarns or with warp yarns and extra beam yarns, and the pattern is made with one or more sets of spool yarns. The brass-bobbin yarns, wound on round flat brass bobbins, are carried in steel chariots which operate in parallel grooves in the comb bars of the machine. The warp and beam yarns are carried on beams beneath the machine with the spools banked on a board at the back. The warp and beam yarns are shifted by cams, and the spool yarns by one or more jacquards, to the right or left of the brass-bobbin yarns, and are drawn up vertically through the well of the machine. Thousands of the brass bobbins suspended from the finished material, which is being wound up on a roller at the top of the machine, swing back and forth, pendulum-like, in an unbroken line. To form the pattern, the intertwistings made by the shifting of the vertical warp and beam threads and of the spool threads to the right and left of the swinging bobbin threads are pushed up into place by the needles of the point bars.

[1] The original width was 70 inches.

The gage of the machine, that is, the number of bobbins and points to the inch, is a measure of the fineness of the machine and consequently of the fineness of the article the machine produces. Nottingham lace-curtain machines range in gage from 5 to 20 points, producing goods with 5 to 20 spaces or meshes to the inch. In the American industry the range is from 5½ to 16. About 54 percent of the domestic machines are coarse gage, not exceeding 8 points; about 37 percent are medium gage, from 9 to 12 points; and about 9 percent are fine gage, exceeding 12 points to the inch.

The domestic industry uses cotton yarns as coarse as 20/2 to as fine as 120/2; the principal counts are 58/2, 68/2, 70/2, and 78/2. The spool yarns are of domestic spinning, as are also most of the warp and beam yarns. Fine counts over 80/2 are mainly imported (80/2 is dutiable at 34 percent, and 90/2 and finer yarns are dutiable at 37 percent ad valorem under the act of 1930). The prepared (flattened) yarns required for use in the thin circular brass-bobbins are not obtainable in this country. Because of the necessity for importing this essential element of manufacture the lace-curtain industry ranks as the leading importer of cotton yarns. Of the total cotton yarns used in the domestic lace-curtain industry, about one-fourth is imported and about three-fourths are produced in the United States.

Products of the Nottingham lace-curtain machine are used principally for interior furnishings, such as window curtains, bedspreads, pillow shams, and table covers. Table covers are now made in solid work, imitating linen cloths with patterns. More than half of the domestic output consists of lace curtains, and the remainder is largely curtain nets. The curtains are made in widths of 36 to 45 inches and in lengths of 2½ to 3 yards. The lace-curtain nets are made in the same widths as curtains but in continuous pieces, which are afterward cut to the desired lengths.

Production.—The domestic production of Nottingham lace curtains and lace-curtain nets is recorded by the Bureau of the Census as follows:

Nottingham lace-curtain machine products: Domestic production

Census year	Lace curtains		Lace-curtain nets		Total value
	Quantity	Value	Quantity	Value	
	Pairs		*Linear yards*		
1914	5,591,154	$4,678,847	7,604,809	$1,258,307	$5,937,154
1919	3,933,493	8,165,447	19,464,962	7,616,339	15,781,786
1921	3,915,412	8,435,424	17,235,736	6,785,333	15,220,757
1923	6,038,378	12,944,108	30,277,712	10,311,870	23,255,978
1925	4,559,617	10,276,737	28,612,343	8,823,034	19,099,771
1927	5,661,119	10,797,895	19,197,410	5,518,338	16,316,233
1929	6,112,561	11,249,575	14,312,593	4,674,795	15,924,370
1931	4,517,850	6,867,575	6,282,392	1,830,770	8,698,345

Domestic production reached its peak in 1923 and has since tended downward. In total value, production in 1931 was only 37 percent of that in 1923. In quantity, the pairs of lace curtains produced in 1931 were 75 percent, and the linear yards of lace-curtain nets were only 21 percent, respectively, of the peak production in 1923.

Data are not available as to the total linear yards or total square yards produced by the industry, but on the basis of an estimate of the linear yards per pair of curtains averaging 6 in 1914, 5 in 1923, and 4½ in 1931, the total production of curtains and curtain nets combined, increased from about 41,052,000 linear yards in 1914 to 60,470,000 linear yards in 1923, and then decreased to 26,613,000 linear yards in 1931. Both curtains and curtain nets range in width from 36 to 54 inches, the most usual widths being 36 and 45 inches.

Of the 500 Nottingham lace-curtain machines in the United States, about 400 are in Pennsylvania and about 100 in New York and Illinois. These machines are contained in 11 mills, of which 8 are in Pennsylvania, 2 in New York, and 1 in Illinois.

Data are not available as to foreign production, but it is estimated that there are about 800 machines in Great Britain, over 500 in Germany, and about 200 altogether in other European countries.

Imports.—Average annual imports of Nottingham lace-curtain machine products under each of the last four tariff acts were as follows:

Nottingham lace-curtain machine products: Average annual imports for consumption under various tariff acts

Tariff act of—	Quantity	Value	Duty	Value per yard	Average ad valorem rate	Equivalent specific rate
	Square yards				*Percent*	*Per square yard*
1897 [1]	----------	$157,313	$86,869	----------	55.2	----------
1909	----------	241,907	126,380	----------	52.2	----------
1913 [1]	392,467	77,212	33,015	$0.197	42.8	$0.084
1922	208,556	68,346	41,498	.328	60.7	.199

[1] Imports shown for the Acts of 1897 and 1913, do not include Nottingham nets and nettings which were listed, without separate record, with other nets and nettings imported under pars. 339 and 358 of those acts, respectively.

Imports by years, from the beginning of the act of 1922, were as follows:

Nottingham lace-curtain machine products: Imports for consumption, by years, under tariff acts of 1922 and 1930

Calendar year	Quantity	Value	Duty collected	Value per square yard	Average ad valorem rate	Equivalent specific rate
	Square yards				*Percent*	*Per square yard*
1922 (Sept. 22 to Dec. 31)	77,925	$25,634	$15,793	$0.329	61.61	$0.203
1923	282,622	91,920	56,154	.325	61.09	.199
1924	316,965	113,313	68,006	.357	60.02	.215
1925	262,777	96,631	58,778	.368	60.83	.224
1926	253,809	72,487	44,507	.286	61.40	.175
1927	205,914	56,822	34,619	.276	60.93	.168
1928	90,073	30,602	18,372	.340	60.03	.204
1929	87,393	29,638	17,795	.339	60.04	.204
1930 (Jan. 1 to June 17)	37,259	12,122	7,273	.325	60.00	.195
1930 (June 18 to Dec. 31)	44,693	11,422	6,853	.256	60.00	.153
1931	96,443	16,539	9,923	.171	60.00	.103
1932	274,483	30,784	18,470	.112	60.00	.067
1933	1,512,108	190,339	114,203	.126	60.00	.076

Imports now constitute a negligible part of the domestic consumption. The United Kingdom is the main source, supplying over 90 percent of the total.

Curtains in pairs are mostly imported by the department stores, and curtain nets and netting are imported by wholesalers who sell to interior decorators.

Exports.—Domestic exports of cotton lace window curtains were not separately recorded prior to 1922 nor subsequent to 1925. They were valued at $115,395 in 1922, $97,329 in 1923, $79,344 in 1924, and $65,085 in 1925. Canada was the largest purchaser in the years shown.

Relation of production and imports to consumption.—Production is recorded in pairs of curtains and linear yards of curtain net, and imports are recorded in square yards so data are not available for a quantitative comparison. The relation of production and imports (landed value) to consumption is shown in terms of value in the following table for 1931, the latest year for which census data are available.

Nottingham lace-curtain machine products: Relation of value of domestic production and of landed value of imports to consumption, 1931

Type of goods	Domestic production	Landed value of imports [1]	Apparent consumption [2]	Percentage of consumption	
				Domestic production	Imports
Nottingham lace-curtain machine products	$8,698,345	$27,702	$8,726,047	99.68	0.32

[1] Foreign value plus 60 percent duty and 7½ percent landing charges.
[2] Value of consumption is taken as value of domestic production plus landed value of imports. Value of exports is not avaliable but is known to be small.

Similar comparisons for other years tend to show that in no year since 1914 have imports constituted as much as 1 percent in value of the domestic consumption.

Competitive conditions.—The domestic industry supplies over 99 percent of the domestic consumption of Nottingham lace-curtain machine products and has little competition from abroad. The decrease in domestic production during the last decade has been due mainly to the competition of other domestic articles, particularly woven cloth curtains, with or without lace trimming.

Imports attained a record of about 2,650,000 square yards in 1900 when the unrecorded domestic output was small; by 1923 imports had declined to 282,622 square yards, and production had increased to about 60,480,000 linear yards (averaging over a yard in width); subsequently both imports and production tended downward, with imports constituting a negligible part of the total.

Imports are confined mainly to novelties and include some curtains made on machines of finer gage than those used in the domestic industry.

Domestic mills are self-contained, carrying out all processes on their own premises, whereas foreign mills have bleaching, dressing, and finishing done on a commission basis in outside establishments. Although the American organization entails a larger initial outlay for buildings and plant equipment and a continuous outlay for a larger staff of experts and other employees, it eliminates the various profits required abroad by the companies carrying out special processes. Both here and abroad the lace-curtain mills work on purchased yarns; most of the yarn used here is of domestic spinning except prepared brass-bobbin yarn, which is imported from England. Domestic manufacturers have the advantage of proximity to their market and have shown initiative and ingenuity in originating styles. Competition is such that foreign manufacturers no longer attempt to produce designs or styles for this market.

FANCY LACES MADE ON THE LEVERS LACE MACHINE—SUMMARY

Description and uses.—Some Levers machines are built as wide as 224 inches, but the usual width is 184 inches. Levers lace machines weigh about 12 tons each and being so heavy can only be installed in specially constructed factories; from this and other causes the capital investment required is large in ratio to the value of the product, the turnover in a year representing less than the investment. Each machine produces a large number of narrow breadths of lace, side by side, or all-over net the width of the machine, or wide breadths made across the machine. The basic principle of movement in the machine is the same as in the Nottingham lace-curtain machine already noticed, the mode of working the brass-bobbin threads and the warp thread being identical, but the gimps and outlining threads in the Levers machine are worked from independent beams instead of from spools.

The "gage" of the machine is an indication of the number of bobbins or points in half an inch. Levers or go-through machines, therefore, have twice as many bobbins or points to the inch as the Nottingham lace-curtain machines of the same gage. They range in gage from 5 to 18 points, with 10 to 36 meshes to the inch. In the American industry the range is from 7 to 14 points, with 14 to 28 meshes to the inch. About 36 percent of the domestic machines are 9½ point or medium gage; only about 13 percent are of 12-point gage or finer, and are available for making the finer laces.

The counts of cotton yarn used in the domestic industry range from 20/2 to 260/2.[2] Yarns finer than 80/2 are imported, as are all brass-bobbin yarns, some laces being made entirely of fine imported yarns. The most important count of yarn is 140/2; 120/2, 98/2, and 78/2 are also largely used in the order named. Some laces require as many as 5 kinds of yarns in the same pattern, brass-bobbin yarns, two warp yarns, gimps, and outlining threads. Brass-bobbin yarns range from 80/2 to 260/2. A small amount of singles yarn is used in substitution for the 2-ply in brass bobbins. These singles are 60/1, 70/1, and 90/1, having the same yardage as 120/2, 140/2, and 180/2. Warp yarns form the foundation of most laces, are always gassed, and vary from 80/2 to 200/2, certain styles being made with a single warp and others with two warps. Gimp yarns form the substance of the objects of the pattern in some styles of lace, the counts used ranging from 60/2 to 100/2. Lace outline yarns (French "brodeurs") are mainly 20/2, 30/3, 40/3, and 60/3.

In addition to cotton yarns, the materials used include raw silk, thrown silk, spun silk, rayon yarns, worsted yarns, and metal threads, either singly or in combination. Raw silk is imported, free of duty, from France, Italy, and Japan. The counts mainly used are 30/32 deniers raw silk and 2- and 3-thread organzine, the 2 latter being of domestic throwing. Spun silk, rayon, and worsted yarns are obtained from domestic sources, and the small amount of lame and tinsel thread used is imported from France.

Paragraph 1529 (a) covers all products made on the Levers lace machine. Levers laces are made on four essential principles—fil passé, independent beams, bobbin fining, and Ensor net. Valenciennes laces, Cluny laces, torchon, and similar styles are made from independent beams, and the mesh, gimps, and outline threads are usually of the same count of yarn. Bobbin-fining laces are made with two warps, either with or without outlining threads. Chantilly and some other silk laces are made on the Ensor net set-out. But these basic principles have numerous developments. Levers laces are produced in a variety of forms—edgings, insertings, galloons, flouncings, all-over nets,[3] scarfs, veilings, shawls, and handkerchiefs. Edging is narrow lace with a straight back and an indented or scaloped front; it is used for trimming dresses and underwear. Inserting or insertion is narrow lace with both edges straight; it is specially made for inserting in a plain fabric, and there is a certain amount of plain work on both edges for use in sewing to the fabric. Galloon is narrow lace made with both edges scaloped, or the whole article may be of serpentine form. Edgings, insertings, and galloons range from half an inch to about 12 inches in width, and are usually sold in sets of varying widths. Flouncings are wide laces, generally made cross band (across the machine) with a straight back and scaloped front, the widths ranging from 12 to 54 inches. They are used for making deep ruffles or flounces, gathered or pleated at the edge which is sewn to the garment. All-over nets, made the full width of the machine, and without scalops, have a pattern which is repeated throughout

[2] In England and France cotton yarn as fine as 400/2 is occasionally used.

[3] Edgings, insertings, galloons, flouncings, and all-overs, are terms which refer not only to lace but also to similar forms of embroidered or otherwise ornamented fabrics.

the length and breadth of the piece. Scarfs or streamers are galloons from 6 to 8 inches in width, with a repeated object which can be scaloped to form a perfect end.

Edgings, insertions, and galloons are used for trimming dresses, underwear, hats, and other articles of women's apparel; the same garment may carry different widths of the same pattern. Similar laces made of coarser yarns are used for upholstery purposes. All-over nets are cut into required widths and lengths for making dresses, yokes, and sleeves, and are also used for making window curtains, bedspreads, and other household articles.

The styles of cotton laces in general use are Alençon, Valenciennes, Binche, filet, Cluny, torchon, and Normandie; cotton laces are also made in patterns in which styles merge. Levers Alençon laces are not made in imitation of hand-made laces, but of Lyons Alençon laces; they are usually designed so that shapes or motifs can be cut from them and appliquéd on to women's garments. Valenciennes laces are made with various kinds of mesh, particularly the diamond, the round, and the style known as "fil passé"; Binche laces have fancy meshes and include Point de Paris net; filet laces have a square mesh; Cluny laces have bold patterns made of coarse yarns; torchon laces are similar to Cluny, but narrower and of finer yarns; and Normandie laces are wide, generally with large flowers on a clear ground. Imports of cotton laces consist largely of Alençon and Valenciennes styles, and domestic production consists mainly of Cluny and bobbin-fining laces.

Silk and rayon laces are of two predominant styles, Chantilly and Spanish. Chantilly laces are made with a silk ground, and cotton or silk gimps and outlining threads. They are made as narrow laces and as wide flouncings by four methods of construction—bobbin-fining, bottom bars, double stump bars, and Ensor net set-outs; the quality and consequent price of the laces are partly determined by the method of construction. Elaborate and expensive styles form the bulk of the recorded imports of silk Levers laces, other than veils and veilings. Spanish laces are made with a silk or cotton ground, and the objects are of rayon. These laces are mostly all-overs; the demand is mainly filled by domestic production, imports being small.

Wool laces are made with a cotton or silk ground and worsted objects. The demand is spasmodic and is mainly supplied by the domestic industry.

Metal thread laces are similar in type of design to Spanish laces and consist of narrow laces, wide flouncings, and all-overs. They are made with a silk or cotton ground, and the objects and outlining threads are of lame or tinsel thread. The demand is mainly supplied by the domestic industry, imports being small.

The making of any of these laces requires many antecedent processes of preparation and many subsequent processes of finishing; they are sold principally to the cutting up (manufacturing) trade. The finest qualities, however, are mainly imported by department stores and specialty shops.

The only lace articles of any importance produced by the Levers lace machine, apart from the upholstery laces made as all-overs and cut out, are veils and veilings. Veiling is a general commercial term covering a wide variety of fabrics, such as chiffon, grenadine, fancy netting (having fancy veiling meshes, or ornamented with a bar or

border, or figuring) used chiefly or exclusively for the making of veils. A veil is a particular length of veiling; veils are of two types, bridal and communion veils, and face veils.

Production.—The domestic production of cotton Levers laces is recorded by the Bureau of the Census as follows:

Domestic production of cotton Levers laces, 1914–25

Census year	Quantity	Value	Unit value
	Square yards		
1914	7,236,934	$3,681,042	$0.509
1919	11,629,123	6,607,546	.568
1921	4,452,625	3,988,120	.896
1923	10,523,517	8,029,404	.763
1925	8,981,824	6,547,830	.729

The production of Levers laces was so overwhelmingly of cotton in years previous to 1927, that the record of production of laces made of other materials than cotton was included under that heading. For 1927 and subsequent years, however, the different materials were segregated and are shown as follows:

Levers laces: Domestic production as recorded by Bureau of Census, 1927–31

Levers laces	1927			1929			1931		
	Quantity	Value	Unit value	Quantity	Value	Unit value	Quantity	Value	Unit value
All-overs:	*Square yards*			*Square yards*			*Square yards*		
Cotton	789,583	$555,484	$0.7035	1,855,572	$1,460,686	$0.7872	2,091,587	$1,131,565	$0.5410
Silk	96,004	116,600	1.2145	----------	----------	----------	278,496	233,003	.8366
Rayon	262,937	220,222	.8375	382,302	420,588	1.1001	394,640	283,039	.7172
Mixed fibers	1,871,143	1,577,293	.8430	2,720,365	2,486,115	.9139	4,316,695	3,136,988	.7267
Total	3,019,667	2,469,599	----------	4,958,239	4,367,389	----------	7,081,418	4,784,595	----------
Edgings, insertings, galloons, and flouncings:	*Pounds*			*Pounds*			*Pounds*		
Cotton	931,004	2,173,503	2.3346	(1)	2,018,980	(1)	(1)	1,469,260	(1)
Silk	3,603	51,487	14.2900	(1)	89,593	(1)	(1)	210,215	(1)
Rayon	51,378	279,912	5.4481	(1)	780,655	(1)	(1)	85,640	(1)
Mixed fibers	237,274	1,288,430	5.4301	(1)	1,499,355	(1)	(1)	755,379	(1)
Total	1,222,659	3,793,332	----------	----------	4,388,583	----------	----------	2,520,494	----------
Grand total	----------	6,262,931	----------	----------	8,755,972	----------	----------	7,305,089	----------

[1] Not available.

The following shows the percentages that all-overs and edgings form of the value of production of each material and of total production, and also shows the percentage that the total value of each material forms of the total value of production.

Levers laces: Domestic production, by materials and forms in which produced, census years 1927–31

Lever laces	1927			1929			1931		
	Value	Per-cent	Per-cent	Value	Per-cent	Per-cent	Value	Per-cent	Per-cent
Cotton:									
All-overs	$555,484	20.35		$1,460,686	41.98		$1,131,565	43.51	
Edgings, insertings, etc.	2,173,503	79.65		2,018,980	58.02		1,469,260	56.49	
Total	2,728,987	100.00	43.57	3,479,666	100.00	39.74	2,600,825	100.00	35.60
Silk:									
All-overs	116,600	69.37					233,003	52.57	
Edgings, insertings, etc.	51,487	30.63		89,593	100.00		210,215	47.43	
Total	168,087	100.00	2.68	89,593	100.00	1.02	443,218	100.00	6.07
Rayon:									
All-overs	220,222	44.03		420,588	35.01		283,039	76.77	
Edgings, insertings, etc.	279,912	55.97		780,655	64.99		85,640	23.23	
Total	500,134	100.00	7.99	1,201,243	100.00	13.72	368,679	100.00	5.05
Mixed fibers:									
All-overs	1,577,293	55.04		2,486,115	62.38		3,136,988	80.59	
Edgings, insertings, etc.	1,288,430	44.96		1,499,355	37.62		755,379	19.41	
Total	2,865,723	100.00	45.76	3,985,470	100.00	45.52	3,892,367	100.00	53.28
Grand total:									
All-overs	2,469,599	39.43		4,367,389	49.88		4,784,595	65.50	
Edgings, insertings, etc.	3,793,332	60.57		4,388,583	50.12		2,520,494	34.50	
	6,262,931	100.00	100.00	8,755,972	100.00	100.00	7,305,089	100.00	100.00

The increase in production from 1914 to 1919, which was 61 percent by quantity and 80 percent by value, was due to the exigencies of the war, as both the French and British industries were crippled up to the time of the armistice. The disbanding of the army was not sufficiently speedy in either France or England to give full effect of man power to trade requirements of 1919, and this enabled the domestic industry to take advantage of a demand which was so insistent that price was not considered so much as the ability to make deliveries. The average value per square yard advanced from 51 cents in 1914 to 57 cents in 1919, an increase of about 12 percent, an indication of the gradual rise in prices, which was accentuated by a further advance of about 58 percent, to 90 cents per square yard in 1921. The whole of this difference, however, was not attributable to the rise in prices, as between 1919 and 1921 the industry turned, to a certain extent, to the use of more expensive materials, silk, rayon, and metal threads, although its output was still recorded by the Bureau of the Census as "cotton lace." The decrease in production for the same period was 62 percent of quantity, and 40 percent of value. The census for 1923 showed production of greater value, although the quantity was lower than in 1919, but the census of 1925 showed a recession in quantity, value, and unit value. Although the value of production in 1927 was lower than in 1925, no comparison can be instituted for quantity as the basis of the larger half was changed to the pound. Laces of mixed fibers constituted the largest percentage

of the total value, and silk laces were highest in unit value. About 60 percent consisted of edgings, insertings, etc., and about 40 percent of all-overs. Cotton predominated as the material in the value of edgings, etc., and mixed fibers in the value of all-overs. In 1929 and 1931 laces of mixed fibers designated as "other" constituted the largest percentage of total value. Edgings, etc., and all-overs were about 50 percent each of the total value in 1929 and 35 and 65 percent, respectively, in 1931. Cotton again predominated as the material in edgings, etc., as did mixed fibers in all-overs. The increase in value of products of the whole industry in 1929 was about 45 percent above the value in 1927, and the decrease was 16½ percent in 1931 from the value in 1929.

The production of silk laces, nets, veils, veilings, etc., by the domestic silk industry was furnished by the Bureau of the Census as follows:

1914	1919	1921 [1]	1923 [1]	1925 [1]
$1,328,933	$5,825,359	$2,844,902	$2,892,812	$1,325,617

[1] Includes embroideries.

The Levers lace industry was started in the United States in the early seventies of the nineteenth century but was not placed on a firm foundation until Congress incorporated a special provision in the Tariff Act of 1909 whereby Levers or go-through lace machines were given free entry from August 6, 1909, to December 31, 1910, during which period more than 400 machines were imported. The number of Levers lace machines in the domestic industry was tabulated in 1927 as 574 and in 1933 as 590. The industry is established mainly in the eastern textile States—Rhode Island, Pennsylvania, Connecticut, New York, and New Jersey, mentioned in the order of their importance, with one mill in Ohio and one in Illinois. Two hundred and seventy-three of the machines, or about 47 percent of the total, are located in Rhode Island. The industry is composed mostly of large units, but the European system, ownership of small numbers of machines by enterprising workmen, obtains in the United States to a certain extent.

There are no available statistics of production in France, and the figures of the British census are not comparable with those of the United States. There are about 2,600 Levers machines in France, 2,000 in England, 280 in Germany, and small plants in Austria, Italy, Poland, Russia, and Spain.

Imports.—Imports of the products of the Levers or go-through lace machine were separately recorded under the act of 1909, when they were entered at a higher rate of duty than other laces and lace articles. Commencing with 1912, machine-made laces were separately recorded; while these imports included Alençon laces, Barmen laces, and embroidery laces, the great bulk under the acts of 1913 and 1922 were the products of the Levers or go-through lace machine. Under the Tariff Act of 1930, Levers laces, although dutiable at the same rate as other laces, are separately recorded if of cotton, silk, rayon, or metal threads.

Average annual value of imports for consumption of machine-made laces of cotton, and of silk (including veils and veilings), under the Tariff Acts of 1913 and 1922 were as follows:

Tariff act of—	Value	Duty	Average ad valorem rate
			Percent
1913	$11,320,797	$6,802,045	60.08
1922	7,896,538	7,106,885	90.00

Levers laces containing linen threads are no longer made, as mercerized cotton has displaced linen. Imports of laces of rayon, wool, and metal threads are relatively unimportant, and furthermore are not always shown separately, being combined in some instances with lace articles, embroideries, fringes, galloons, trimmings, ornaments, and other items.

Imports of cotton and silk machine-made laces were first separately recorded in 1912. The table presented does not include for the portion of the Tariff Act of 1909 shown, some recorded imports of the Levers or go-through lace machine—nets, veils, flouncings, which are included without special mention in tables under other headings.

Machine-made laces: Value of imports for consumption, 1912 to the end of the Tariff Act of 1922

Fiscal year ending June 30 (unless otherwise stated)	Cotton	Silk [1]	Total	Duty collected	Average ad valorem rate
					Percent
1912	$11,322,908	$945,469	$12,268,377	$7,776,586	[2] 63.39
1913	17,637,798	1,482,893	19,120,691	12,303,739	[2] 64.35
1914 (July 1–Oct. 3, 1913)	6,259,981	484,856	6,744,837	4,232,883	[2] 62.76
1914 (Oct. 4, 1913–June 30, 1914)	12,692,769	1,190,820	13,883,589	8,330,134	60.00
1915	11,652,772	1,101,190	12,753,962	7,652,328	60.00
1916	10,895,059	1,792,984	12,688,043	7,612,826	60.00
1917	8,506,537	1,509,924	10,016,461	6,009,140	59.99
1918	5,143,495	947,417	6,090,912	3,649,436	59.92
1918 (July 1–Dec. 31, 1918)	2,686,920	627,804	3,314,724	1,988,004	59.97
1919 (calendar year)	7,773,818	2,684,406	10,458,224	6,273,109	59.98
1920 (calendar year)	10,752,993	3,126,944	13,879,937	8,322,348	59.96
1921 (calendar year)	[3] 9,697,472	2,974,714	12,672,186	7,658,529	60.44
1922 (Jan. 1–Sept. 21)	[4] 4,213,671	1,605,843	5,819,514	3,536,198	60.76
1922 (Sept. 22–Dec. 31)	1,641,075	298,730	1,939,805	1,745,820	90.00
1923 (calendar year)	9,018,528	1,706,135	10,724,663	9,652,196	90.00
1924 (calendar year)	11,683,201	1,409,485	13,092,686	11,783,418	90.00
1925 (calendar year)	7,908,793	852,566	8,761,359	7,885,223	90.00
1926 (calendar year)	5,355,854	691,760	6,047,614	5,442,853	90.00
1927 (calendar year)	4,900,073	891,712	5,791,785	5,212,607	90.00
1928 (calendar year)	4,551,528	1,157,540	5,709,068	5,138,161	90.00
1929 (calenadr year)	5,213,745	1,049,589	6,263,334	5,637,001	90.00
1930 (Jan. 1–June 17)	2,288,142	520,225	2,808,367	2,527,530	90.00

[1] Includes veils and veilings.

[2] Under the act of 1909, Levers laces were dutiable at 70 percent, other machine-made laces at 60 percent; therefore, the extra duty levied upon the imports which were products of the Levers, or go-through lace machines, placed the total equivalent ad valorem rate between 60 and 70 percent.

[3] Includes, under the emergency tariff act, 204,310,664 yards (828,249 pounds), valued at $4,984,894, composed in chief value of cotton having a staple of 1⅜ inches or longer, paying, on the basis of 7 cents a pound in addition to 60 percent ad valorem, a total duty of $3,048,914.

[4] Includes 164,257,860 yards (625,463 pounds), valued at $3,672,691, subject to emergency tariff act surtax of 7 cents a pound and paying a total duty of $2,247,397.

Levers machine-made laces, including veils and veilings: Imports for consumption under Tariff Act of 1930

Year	Cotton	Silk	Rayon [1]	Metal thread	Total	Duty collected	Average ad valorem rate
							Percent
1930 (June 18–Dec. 31)	$1,237,466	$120,985	$3,187	$3,534	$1,365,172	$1,228,655	90
1931	4,087,246	390,366	44,524	4,757	4,526,893	4,074,204	90
1932	2,681,150	157,544	45,450	11,067	2,895,211	2,605,690	90
1933	3,046,266	118,272	32,634	1,633	3,198,805	2,878,925	90

[1] Excluding veils and veilings.

Imports of machine-made laces were largest in the fiscal year 1914, when their value totaled $20,628,426, cotton laces alone being valued at $18,952,750. The largest imports of silk laces, including veilings, entered the country in 1920, the value being $3,126,944. The value of imports of all machine-made laces decreased steadily during the years of the war and reached the lowest level in the fiscal year 1918. The 3 immediate post-war years showed an increase, although in spite of the general rise in prices the value of imports was much below that of 1913–14. Imports of cotton laces in 1924 were the largest since 1914, though the increase in price offsets the high figure; since 1924 the trend has been downward.

More than half of the imports of cotton Levers laces are from France, and the outstanding styles are Valenciennes and Alençon laces of narrow widths. About 90 percent of the imports of silk laces and lace articles are from France, and the principal style is Chantilly.

Exports.—Export statistics of laces are combined with those for embroideries and, except for the years 1922–25, also include lace window-curtains. Available statistics for the last 16 years are shown as follows:

Domestic exports of cotton laces and embroideries

Calendar year	Value	Calendar year	Value
1918	$1,569,322	1926	$257,862
1919	1,731,675	1927	216,155
1920	1,629,409	1928	210,820
1921	611,506	1929	215,750
1922	359,634	1930	127,160
1923	319,454	1931	86,249
1924	205,088	1932	47,849
1925	245,057	1933	61,207

Canada constitutes the main market, and is followed by the Philippine Islands, Mexico, and Cuba.

Relation of production and imports to consumption.—In the absence of separate export statistics for machine-made laces it is not possible to show the actual consumption of the country, but the ratio of the landed value of imports for consumption to domestic production is given. In the more extended census analysis furnished for 1927 and subsequent census years, production is compared with imports of laces of the same materials, though in some cases the classification of imports contains other articles than machine-made laces. Landed value is taken as foreign value plus duty and 7½ percent landing charges.

Ratio of landed value of cotton machine-made laces to domestic production of Levers laces, census years 1914–25

Year	Domestic production	Domestic exports [1]	Landed value, imports for consumption	Apparent consumption [2]	Percentage of consumption	
					Domestic production [3]	Imports for consumption
1914	$5,009,975	$232,457	[4] $35,887,448	$40,664,966	11.75	88.25
1919	12,432,905	1,731,675	[5] 18,565,769	29,266,999	36.56	63.44
1921	6,833,022	611,506	[5] 22,904,052	29,125,568	21.36	78.64
1923	10,922,216	319,454	[6] 23,297,999	33,900,761	31.28	68.72
1925	7,873,447	245,057	[6] 19,723,006	27,351,396	27.89	72.11
Total	43,071,565	3,140,149	120,378,274	160,309,690	24.91	75.09

[1] Cotton laces and embroideries.
[2] Domestic production, minus exports, plus landed value of imports for consumption.
[3] Domestic production, minus exports.
[4] Foreign value plus $12,992,133, about 61 percent ad valorem duty, and 7½ percent landing charges. (Part of the imports for 1914 were dutiable at 70 percent ad valorem.)
[5] Foreign value plus 60 percent ad valorem duty and 7½ percent landing charges.
[6] Foreign value plus 90 percent ad valorem duty and 7½ percent landing charges.

Ratio of landed value of imports of machine-made laces to domestic production of Levers laces of all materials, census years 1927–31

	Domestic production	Exports	Landed value, imports for consumption [1]	Apparent consumption [2]	Percentage of consumption	
					Domestic production [3]	Imports for consumption
1927						
Cotton	$2,728,987	[4] $216,155	[5] $9,677,644	$12,190,476	20.61	79.39
Silk	168,087	----------	[6] 1,761,131	1,929,218	8.71	91.29
Rayon	500,134	----------	540,285	1,040,419	48.07	51.93
Mixed fibers	2,865,723	----------	[7] 914,705	3,780,428	75.80	24.20
Total	6,262,931	216,155	12,893,765	18,940,541	31.93	68.07
1929						
Cotton	3,479,666	[4] 215,750	[5] 10,297,146	13,561,062	24.07	75.93
Silk	89,593	----------	[6] 2,072,939	2,162,532	4.14	95.86
Rayon	1,201,243	----------	540,206	1,741,449	68.98	31.02
Other	3,985,470	----------	[7] 362,811	4,348,281	91.66	8.34
Total	8,755,972	215,750	13,273,102	21,813,324	39.15	60.85
1931						
Cotton	2,600,825	[4] 86,249	[8] 8,072,311	10,586,887	23.75	76.25
Silk	443,218	----------	[8] 770,973	1,214,191	36.50	63.50
Rayon	368,679	----------	[9] 87,935	456,614	80.74	19.26
Other	3,892,367	----------	[10] 33,788	3,926,155	99.14	.86
Total	7,305,089	86,249	8,965,007	16,183,847	44.61	55.39

[1] Foreign value plus 90 percent ad valorem duty and 7½ percent landing charges.
[2] Domestic production, minus exports, plus landed value of imports for consumption.
[3] Domestic production minus exports.
[4] Cotton laces, embroideries, and lace window curtains.
[5] Cotton machine-made laces.
[6] Machine-made laces and veils and veilings of silk.
[7] Laces and lace articles, etc., of wool; laces, fringes, galloons, trimmings, and ornaments of tinsel wire, etc. (T.D. 40180).
[8] Levers machine-made laces including veils and veilings.
[9] Levers machine-made laces.
[10] Laces and lace articles, etc., of wool; Levers machine-made laces, etc., of decorative metals.

Competitive conditions.—Two of the conditions affecting the operation of lace mills abroad depend upon factors which are the result of climatic and of economic and industrial conditions in the particular country. The natural humidity of the atmosphere in France and England enables the lace manufacturers to use singles yarn in the brass bobbins, whereas the relative dryness in the United States renders the use of such yarn difficult and productive of a larger percentage of damaged work. Domestic mills, therefore, mainly use the more expensive two-ply yarn. Some of the finishing processes—clipping, scalloping, and drawing—are performed as spare time, home labor in France, and to a smaller extent in England, the work being distributed and collected by agents. The wages are small and there is an avoidance of overhead expense; in the domestic industry this work is mostly confined to the premises of the manufacturers, and is remunerated at the American standard. In addition, the foreign custom of small proprietorship on the part of enterprising workmen, as contrasted with the American plan of large manufacturing units, enables the owner of the machines to economize by utilizing the services of himself, and the other members of his family for accessory labor, such a system not obtaining in the domestic mills. On the other hand, the superior financial resources of the American manufacturers enable them to take advantage of the opportunities presented from time to time, of purchasing quantities of raw material at a reduced figure when market conditions are favorable. Other advantages in the foreign industries are to be found in more stable labor conditions, due to continuity of service and the influence of the traditional "atmosphere" engendered by generations of development.

The demand for styles, texture, and quality depends upon the dictates of fashion. All styles of Levers laces which are imported are also made in the United States, but not all grades of these styles, and there are no styles or varieties made in the United States which are not imported. Domestic laces are, grade for grade, and gage for gage, equal in quality to imported laces, and the landed price differential is on some styles in favor of the domestic and in others in favor of the imported laces, the landed value of the latter being the basis of calculation in both instances. Domestic consumption of cotton bobbin-fining and Cluny laces, and of silk and rayon Spanish, and of wool and metal thread laces is mostly supplied by the domestic industry. On the other hand, consumption of narrow Valenciennes and Alençon laces, which constitute the bulk of the imports of cotton machine-made laces, of Chantilly laces which form the largest part of the imports of silk laces, and of silk veilings, is mainly provided by imports.

Valenciennes laces are practically the only style of Levers lace which is standardized. Imports are for the most part made on machines of 12-point gage and are of four widths, 16, 20, 24, and 32 carriages, the two middle widths predominating. These four widths are sold at a price fixed by the Chambre Syndicale des Fabricantes de Tulles et Dentelles de Calais. This price is subject to a majoration which fluctuates with the value of the franc and with changes in the price index of commodities. The fixing of the price without reference to quality, design, and finish is one of the factors which has caused domestic manufacturers to find difficulty in competing with imports. They also experience difficulty in competing upon any laces, the Chantilly style being the salient example, requiring hand clipping, the labor cost of which is much higher in the United States than abroad.

Articles which compete with cotton Levers laces are burnt-out lace and other embroidery laces, produced domestically on a large scale, and so-called Alençon laces of cotton or silk, imported in quantities from Lyons, France, there being no machines of this type in the United States.

Styles are mainly controlled by the couturiers of Paris, but domestic manufacturers have the advantages of proximity to their own market and greater integration of organization.

Many European manufacturers specialize on certain styles of lace. The French lace industries are run largely for export purposes. Foreign laces are imported into the United States for two reasons—price and novelty of design. Importers purchase domestic lace in ever increasing quantities, and prices of domestic merchandise are largely controlled by domestic competition, except during the brief seasons when the demand is such that price becomes of secondary consideration.

Advertising in trade journals is a practice among domestic manufacturers and importers, and both domestic and imported articles meet in open competition in the same markets.

NETS AND NETTINGS MADE ON THE BOBBINET MACHINE—SUMMARY

Description and uses.—Bobbinet machines in domestic mills range from 204 to 320 inches in width, and the gages from 6½ to 13 points, the term gage or point implying, as in the case of Levers lace machines, the number of brass bobbins to the half inch. The net is made in one piece the full width of the machine and is cut into breadths of required widths, varying from 36 to 120 inches. While the basic principle of movement in the machine is similar to that of the Nottingham lace-curtain and Levers machines, there are important differences. There are two rows of bobbins and carriages which traverse the machine in opposite directions, each bobbin twisting, in turn, round each warp thread. There is no pattern, and no jacquard, and there are only two types of yarn—warp threads and brass-bobbin threads. Bobbinets are made of six materials, used singly or in combination—cotton, flax, wool, silk, rayon, and metal threads. The great bulk is made of cotton. Cotton-warp yarns range from 20/2 to 140/2, and brass-bobbin yarns from 24/2 to 140/2. All prepared yarns and most yarns finer than 80/2 are imported. A small amount of silk bobbinet is produced, and the same count is generally used for both warp and brass-bobbin yarns. Bobbinets are also made of rayon, and the same count of yarn is used for both warp and brass-bobbin thread in the coarser quality nets, but in some of the finer qualities the warp is of cotton and the bobbin threads are of rayon. The rayon counts used are 80, 100, 125, 150, and 300 deniers. Nets and nettings of flax are not made in this country; therefore, the domestic demand is filled entirely by imports. Nets and nettings of wool and metal threads (usually the bobbin threads alone are of these materials, the warp being of cotton) are ultranovelties, made spasmodically at the dictates of fashion.

Ordinary bobbinet is an unfigured, plain, open-mesh fabric with hexagonal interstices, uniform in size throughout the piece, and is a machine-made imitation of the net made by hand and used in Belgium in the eighteenth century. It resembles exactly the net made by hand on the lace pillow, hence the name "bobbinet." Net, sometimes used as a synonym for netting, is, correctly, a particular length of netting. Coarse and medium grades are used for mosquito nets, the bulk of the product of the domestic industry being of this type and being made for the United States Government for Army purposes; large quantities are also used in the South where insect-borne diseases are a serious problem. Coarse nets are also used as the foundation fabric of embroidered curtains, for the lining of men's straw hats, and for hat shapes. Wash blondes, the name given to the finer grades of bobbinet, are made of small mesh, of high-count yarns, and are used for the foundation fabric of embroidered laces, bridal veils, yokes, sleeves, and as trimming for women's wearing apparel. Point d'esprit net, which contains small spots throughout the length and breadth of the piece, without, however, constituting a pattern, is not made in the United States. Bobbinets are made abroad in narrow widths known as "quillings" or "footings" and are used as insertions. Nets and nettings constitute a portion of the stock of most importers of lace but are largely sold wholesale by importers who specialize in these fabrics.

Production.—Domestic production of bobbinets has not always been recorded by the Bureau of the Census. In 1914 and 1919 the value of bobbinets produced in the country was included in the figures shown for all other laces. In 1921 the linear yards and the value of bobbinets were shown separately; in 1923 the value was included with that of other articles as "all other nets and laces"; and in 1925, and subsequently, value only was recorded. The data, as far as available, are given:

Bobbinets: Domestic production as recorded by the Bureau of the Census, 1914–31

Census year	Value	Census year	Value
1914	(1)	1925	$155,726
1919	(1)	1927	465,752
1921	$334,652	1929	836,873
1923	(2)	1931	149,655

[1] Included in "All other laces."
[2] Included in "All cotton nets and laces."

The advance in value of production from 1925 to 1929 was approximately 537 percent, but production in 1931 was the smallest recorded. Silk nets and nettings are produced in silk mills primarily engaged in making other silk goods, and the census figures are combined with those for lace, veils, and latterly with those for embroideries. As it is not possible to indicate the value of nets and nettings alone, the figures are not quoted.

Nets and nettings are made on bobbinet, point d'esprit, and Mechlin machines. There are, in the United States, a few Mechlin machines, but no point d'esprit machines. The domestic production of bobbinets began in 1895, but has developed very slowly, there being only 61 machines in the country at the close of 1933. These machines are distributed in New York, Pennsylvania, Rhode Island, and New Jersey, half of them being in the State of New York. None of the mills is of any considerable size, the largest comprising only 16 machines, this being the only mill making bobbinet as the sole product.

The number of bobbinet machines abroad is large, England having 2,600, Germany 944, France about 500,[4] and Switzerland 30—rather more than 4,000 altogether.

Imports.—Imports of nets and nettings were not separately recorded prior to 1912, official statistics sometimes combining nets and kindred articles not the product of the bobbinet machine; they were separately listed part of the time under the act of 1909, but under the act of 1913 included, without specific mention, imports of Nottingham lace-curtain machine nets and nettings, and under the act of 1922 imports of cotton and flax veils and veilings. Wherever possible, imports of nets and nettings apart from other items are shown in the tables.

Average annual imports for consumption of nets and nettings and veils and veilings of cotton, and of nets and nettings of silk, under the Tariff Acts of 1913 and 1922, were as follows:

Tariff Act of—	Value	Duty	Average ad valorem rate
			Percent
1913	$3,343,480	$2,012,423	60.19
1922	2,000,023	1,799,997	90.00

The following table shows nets and nettings, imports for consumption, from 1912, when they were first separately recorded, to 1933 inclusive.

Nets and nettings: Imports for consumption, by years, 1912–33

Year	Value			Total value	Total duty collected	Equivalent ad valorem rate
	Cotton [1]	Flax, etc.[1]	Silk			
						Percent
Fiscal:						
1912	$1,042,564	$1,873	$685,433	$1,729,870	$1,094,732	63.28
1913	985,151	292	1,137,217	2,122,660	1,350,339	63.62
1914 (July 1–Oct. 3, 1913)	465,638	1,153	480,149	946,940	587,170	62.01
1914 (Oct. 4, 1913–June 30, 1914)	1,221,078	3,278	926,364	2,150,720	1,290,431	60.00
1915	1,036,044	781	1,067,704	2,104,529	1,262,718	60.00
1916	1,996,992	365	2,010,188	4,007,545	2,404,527	60.00
1917	2,221,800	2,266	2,107,391	4,331,457	2,598,731	60.00
1918	1,651,732	9,419	893,751	2,554,902	1,532,941	60.00
1918 (July 1–Dec. 31)	439,666	155	260,517	700,338	420,203	60.00
Calendar:						
1919	2,645,382	13,718	1,508,110	4,167,210	2,500,346	60.00
1920	1,983,802	6,062	2,246,970	4,236,834	2,542,100	60.00
1921	1,996,008	2,151	1,740,597	3,738,756	2,266,917	60.63
1922 (Jan. 1–Sept. 21)	1,287,236	112	758,392	2,045,740	1,260,772	61.63
1922 (Sept. 22–Dec. 31)	203,451		138,145	341,596	307,436	90.00
1923	1,103,381	7,152	625,760	1,736,293	1,562,664	90.00
1924	1,065,543	1,467	495,849	1,562,859	1,406,573	90.00
1925	1,173,478	802	456,617	1,630,897	1,467,807	90.00
1926	1,136,014	3,266	486,315	1,625,595	1,463,036	90.00
1927	1,372,999	5,397	490,872	1,869,268	1,682,341	90.00
1928	1,774,571	7,269	849,712	2,631,552	2,368,397	90.00
1929	1,903,473	2,633	860,063	2,766,169	2,489,552	90.00
1930 (Jan. 1–June 17)	933,194	837	415,669	1,349,700	1,214,730	90.00
1930 (June 18–Dec. 31)	[2] 251,933	473	214,116	466,522	419,870	90.00
1931	[2] 1,148,615		300,905	1,449,520	1,304,559	90.00
1932	[2] 810,624	254	196,956	1,007,834	907,051	90.00
1933	[2] 837,254		145,796	983,050	884,745	90.00

[1] Includes veils and veilings. [2] Excluding veils and veilings.

The data shown for the portion of the act of 1909 also include nets and nettings made on the Levers lace machine; this fact accounts for the duty being over 60 percent.

[4] Before the war there were 556 bobbinet machines around Caudry, in the north of France, but these were mostly destroyed during the military occupation by the German forces, and it is uncertain how many

The year of largest total imports was 1917, the imports of cotton nets including mosquito nets made on the bobbinet machine for the United States Army. The year of largest cotton net imports was 1919, and of silk was 1920, the cotton figure being due to depletion of stocks during the war, and the silk figure being due to an insistent fashion demand. Since 1920 imports have declined. Imports of cotton nets are mainly from the United Kingdom, which supplied about 48 percent in 1929, the last year for which imports by countries were tabulated, and was followed by Germany with 31 percent, and France with 11 percent. Until 1927 imports of silk nets were chiefly from France, but in 1928, for the first time, the United Kingdom led, and in 1929 supplied 54 percent of the total, France supplying about 43 percent. Under the act of 1930, record was commenced of nets and netting, combined with veils and veilings, of rayon; these amounted to $76,804 in 1930, $170,341 in 1931, $85,298 in 1932, and $226,414 in 1933.

Exports.—Exports of nets and nettings are not separately recorded, but Canadian import figures of nets from the United States indicate that they are negligible to that country, which is probably the chief market.

Relation of production and imports to consumption.—Domestic production and landed value of imports (foreign value plus duty and 7½ percent landing charges) and percentage of consumption filled by each are shown in the following table.

Bobbinets: Relation of value of domestic production and of landed value of imports to total value of domestic consumption, in census years 1921–31

Census year	Value of domestic production	Landed value of imports [1]	Value of apparent consumption	Percentage of consumption	
				Domestic production	Imports
1921	$334,652	$6,285,970	$6,620,622	5.05	94.95
1923	[2]	3,429,179	[2]	[2]	[2]
1925	155,726	3,221,022	3,376,748	4.61	95.39
1927	465,752	3,691,804	4,157,556	11.20	88.80
1929	836,873	5,462,789	6,299,662	13.28	86.72
1931	149,655	[3] 3,203,330	3,352,985	4.46	95.54

[1] Cotton and flax nets and nettings, veils and veilings, and silk nets and nettings.
[2] Not available.
[3] Includes nets and nettings, veils and veilings of rayon.

Competitive conditions.—As there is no design or pattern, it is not possible to give the preference to foreign bobbinets on the ground of superiority of idea or technique. The only bases of choice between the domestic and comparable foreign articles are color and finish, strength and price, the last item being the dominant factor.

BARMEN LACES MADE ON THE CIRCULAR LACE-BRAIDING MACHINE—SUMMARY

Description and uses.—Barmen laces are included without specific mention with other machine-made laces dutiable under paragraph 1529 (a) of the tariff act of 1930.

Barmen laces, also known as braided laces, are produced on the lace-braiding machine, a special type of braiding machine with a jacquard attachment. Although invented in France, this machine attained its greatest development at Barmen in Germany. Barmen laces are machine-made imitations of hand-made pillow bobbin laces in Cluny, torchon, and Valenciennes styles. They are produced in the form of narrow edgings, insertions, and galloons, in widths ranging from half an inch to about 5 inches. Each machine produces one width of about 5 inches or several narrower widths connected by "lacers" which are afterwards withdrawn. The lace is finished, with the exception of drawing the lacers, when it is taken from the machine, and is then usually wound on pasteboard cards and put up for sale.

Barmen laces are usually made of mercerized cotton yarn; small amounts are made of other materials, such as linen, ramie, rayon, or metal threads. They are mainly used for upholstery purposes, such as edging curtains; fine grades are used for trimming dresses and underwear.

Production.—The domestic production of Barmen lace has been separately recorded, under the name of "braided laces" for the years 1919, 1925, and 1927 only. These data follow:

Census year	Linear yards	Value	Value per linear yard
1919	101,663,950	$1,886,470	$0.019
1925	45,405,305	1,718,237	.038
1927	34,063,112	1,192,373	.035

Barmen laces were first produced in the United States in 1910, and from that time to 1919 production steadily developed; at present there are 955 machines in the country. Three domestic mills produce these laces; more than half the machines are located in Connecticut and the remainder in Pennsylvania. The machines are mostly operated in aggregations of considerable size; the two largest aggregations are in mills where other types of lace and narrow fabrics are produced.

Imports.—Imports of Barmen lace are included, without separate record, under the heading of "machine-made laces." Barmen laces imported into the United States before the war were entered at the American consulate at Barmen, Germany, but these records ceased with the withdrawal of the consul in 1917, and there were no records between February 9, 1917, and December 5, 1921. After the war an American consul was stationed at Cologne, and Barmen was included within that district. It is estimated that 80 percent of the imports of Barmen lace are from Germany; exports of such articles through consulates in France and Great Britain have not been separately recorded, which would indicate that they have never been of sufficient importance to warrant enumeration.

Available data as to exports of Barmen lace from Germany to the United States from 1910, the year in which domestic production commenced, are as follows:

Exports of lace to the United States as recorded by the American consulates at Barmen and Cologne, Germany, 1910–32

Recorded at—	Year	Value	Recorded at—	Year	Value
Barmen	1910	$977,179	Cologne	1924	[1] $601,994
Do	1911	1,389,524	Do	1925	[1] 249,308
Do	1912	1,294,517	Do	1926	[1] 138,053
Do	1913	1,206,584	Do	1927	[1] 179,066
Do	1914	967,494	Do	1928	[1] 103,169
Do	1915	520,872	Do	1929	[1] 51,573
Do	1916	237,886	Do	1930	[1] 32,457
Cologne	1922	[1] 229,832	Do	1931	[1] 22,772
Do	1923	[1] 309,723	Do	1932	[2] 16,641

[1] Cotton lace and lace articles.
[2] Machine-made lace.

The year 1911 showed the largest shipments, domestic production not having attained any considerable proportions. Thereafter imports declined and the years 1914 to 1916 are eloquent of Germany's loss of trade through the war. Imports of laces of all types were large in 1924, but the imports from Cologne were only 43 percent in value of those from Barmen in 1911. Since 1924 imports have declined sharply, partly through lack of demand and partly through the domination by the domestic industry of the American market, until in 1932 they were only 2.76 percent of those of 1924.

The foreign production of Barmen lace is carried on principally in Germany, France, and England. The town and neighborhood of Barmen is the German center, and the industry there operates about 4,000 machines. Barmen laces are produced in France, mainly at Le Puy en Velay in the department of Haute Loire (the oldest hand-made lace district in France), and there are smaller aggregations in other parts of the country, the total number of machines being around 2,500. There are about 1,250 machines in England, and smaller numbers in Belgium, Holland, and Italy.

Relation of production and imports to consumption.—The following table shows the ratio of domestic production and landed value of imports to domestic consumption. Landed value of imports is taken as foreign value, plus 90 percent ad valorem duty, and 7½ percent landing charges; value of consumption is taken as value of domestic production plus landed value of imports.

Barmen laces: Relation of value of domestic production and of landed value of imports for consumption to total value of domestic consumption in 1925 and 1927

Calendar year	Value of domestic production	Landed value of imports [1]	Value of apparent consumption	Percentage of consumption	
				Domestic production	Imports
1925	$1,718,237	$492,383	$2,210,620	77.73	22.27
1927	1,192,373	353,655	1,546,028	77.12	22.88

[1] Cotton laces and lace articles.

In 1932, although domestic production data are not available, it is probable that imports constituted less than 5 percent of the domestic consumption. This consumption is almost wholly of coarse Barmen laces for upholstery purposes; because of changes in fashion the demand for fine millinery laces of this type has dwindled.

Competitive conditions.—Conditions under which Barmen laces are produced in the United States and abroad do not vary as much as in other branches of the lace industry. The average size of the producing units and the integration of organization is similar in the porducing countries, with such differences as are the results of differences in national trade customs. The bulk of the yarn used in the domestic industry is of domestic origin, and there are no insurmountable labor difficulties. In many instances the same patterns are made in the United States and abroad, and the domestic production of these patterns is equal in every way to the foreign laces. The small domestic consumption of the finest grades of Barmen lace, which may be said to be comparable with the hand-made article, is provided by imports, as the ratio of the cost of labor to the cost of production increases with the quality, and domestic mills do not attempt to produce them. Originally produced to give an exact imitation of some styles of hand-made lace, Barmen laces for a time offered strong competition to the coarser and cheaper kinds, but now experience competition from cheap hand-made laces imported from China.

LYONS ALENÇON LACE—SUMMARY

Lyons Alençon laces are the product of the bobbinet-jacquard machine, formerly called in England the "pusher" machine. There are no machines of this type in the United States, and domestic consumption of these laces is, therefore, filled exclusively by imports. These laces and lace articles are sometimes sold and used in the state in which they are taken from the machine, without ornamentation or embellishment of any kind; in other instances the motifs are outlined, by hand or machine, with a thick thread, some of these additions being of exceedingly elaborate nature. Prices are largely affected by the amount of thread superimposed upon the lace groundwork by hand or machines. Lyons Alençon laces are made as edgings and insertions, and also as scarfs, collars, shawls, and capes. In addition, upholstery articles, such as bedspreads, doilies, and table runners, are made on the bobbinet-jacquard machines. Table runners are sold, singly or in sets, of the same sizes as hand-made lace articles from China, Italy, and Belgium—12 by 18, 18 by 36, 18 by 45, 18 by 54 inches. The prices are high. The materials used consist of cotton, silk, rayon, and metal threads, articles of the two last-named materials being partly of cotton.

No statistics of any kind—foreign production, foreign exports, or domestic imports—are available for Lyons Alençon laces except for laces of cotton in 1933. Under the Tariff Act of 1922, imports were classified as machine-made laces and were included in the statistics of laces so described. Under the Tariff Act of 1930 they were entered as machine-made laces other than nets and nettings and Levers machine-made laces, and in 1931 of imports of a value of $1,431,391, the bulk may reasonably be assumed to have been Lyons Alençon laces by elimination of laces made upon the other lace machines, the products of which are not separately recorded, knitting, Bonnaz, and Barmen-lace machines, imports of which are known to be small. In addition in 1931, 68 percent of these imports were from France, which is the principal producing country of Lyons Alençon laces and is a negligible factor in the production of knitted, Bonnaz, and Barmen laces.

Lyons Alençon laces are imported on a large scale and sold wholesale by the New York and Chicago branch houses of the largest French producer, by the high-class lace importing houses, and by the Syrian dealers of hand-made lace who are largely monopolizing the market for Chinese hand-made laces. These laces are also imported by department stores and specialty shops.

HAND-MADE LACES—SUMMARY

Hand-made lace, sometimes known as "real" lace to distinguish it from machine-made imitations, is not produced on a commercial scale in the United States, and practically all of it sold here is imported. Cheap laces are supplied by China, more expensive qualities by Europe.

European hand-made laces are made mainly in Belgium, France, and Italy, but also to some extent in Germany, Ireland, Malta, Switzerland, the United Kingdom, and elsewhere. The making of lace by hand is mainly a home industry, being carried on by peasant women in the winter months, when work on the land is impossible; a certain quantity is also made in convents, which act as schools of instruction in the art. The industry suffered cruelly during the war, as two important areas of production—Belgium and northern France—were districts in which active operations were continuous during the entire period of hostilities. The system of apprenticeship ceased to function, workers were drafted into other trades and war industries, and commercial operations were difficult or impossible in the producing regions. Many of the workers have not returned to the craft, and it is estimated that their number has been reduced by 50 percent.

The material used before the war consisted largely of linen thread, but since the war hand-made laces have been made chiefly of cotton. There are still small imports of silk and linen hand-made laces, but the quantity is negligible. Some of the European articles are large, elaborate, and expensive and are of such beauty as to be veritable works of art.

The rise of the hand-made lace industry in China is a phenomenon of the twentieth century. Originally introduced into the country by missionaries as a small occupational industry in convents, it now employs thousands of workers, many more than in the entire European industry, and the products have world-wide distribution. The material most largely used is cotton thread, imported into China mainly from England. The designs were originally copies of French and Belgian laces, but oriental characteristics have been incorporated and the patterns are becoming original. The principal styles at present (1933) are imitations of Italian filet, Irish crochet, Venetian, and Cluny laces. The output is very great, and the total quantity produced is further increased by the number of motifs made separately and inserted into household articles of linen. The price of these laces is low, because of the small wages paid. Chinese laces now constitute the great bulk of the imports of hand-made laces into the United States, and in Italy the smaller motifs are even displacing Venetian laces.

No data are available of the production of hand-made laces.

Imports.—Average annual imports for consumption of hand-made laces under the Tariff Acts of 1913 and 1922, the only ones for which complete data are available, were as follows:

Hand-made laces of all materials: Average annual imports for consumption under the Tariff Acts of 1913 and 1922

Tariff Act of—	Value	Duty	Average ad valorem rate
			Percent
1913	$774,235	$465,359	60.11
1922	1,466,778	1,319,537	89.96

Imports of hand-made laces were first separately recorded in the fiscal year 1912. The complete detailed record of imports for consumption is shown below.

Hand-made laces: Imports for consumption, by materials from July 1, 1911, to Dec. 31, 1933

Year	Cotton	Flax, etc.	Silk	Total
Fiscal:				
1912	$909,075	$84,871	$8,418	$1,002,364
1913	671,805	52,545	1,152	725,502
1914 (July 1–Oct. 3, 1913)	51,483	2,691	32	54,206
1914 (Oct. 4, 1913, to June 30, 1914)	146,320	7,648	91	154,059
1915	42,817	2,952	780	46,549
1916	208,057	79,188	24,345	311,590
1917	730,471	77,807	16,371	824,649
1918	663,387	133,003	10,392	806,782
1918 (July 1–Dec. 31)	76,436	14,332	4,933	95,701
Calendar:				
1919	913,350	33,065	28,269	974,684
1920	986,499	31,854	81,489	1,099,842
1921	570,358	46,335	122,722	739,415
1922 (Jan. 1–Sept. 21)	1,786,273	35,447	71,911	1,893,631
1922 (Sept. 22–Dec. 31)	589,134	30,570	19,637	639,341
1923	1,944,550	389,943	76,368	2,410,861
1924	2,125,728	168,143	34,048	2,327,919
1925	1,566,194	193,220	17,840	1,777,254
1926	1,005,803	153,511	32,089	1,191,403
1927	1,224,856	125,130	16,584	1,366,570
1928	777,585	22,472	8,396	808,453
1929	596,080	31,838	8,095	636,013
1930 (Jan. 1–June 17)	193,573	4,766	328	198,667
1930 (June 18–Dec. 31)	201,119	16,912	3,524	[1] 222,251
1931	444,364	10,608	1,657	[1] 457,201
1932	337,332	2,371	272	[1] 340,102
1933	286,929	7,569		[1] 294,498

[1] Including rayon laces, separately recorded under act of 1930. These amounted to $696 in 1930, $572 in 1931, and $77 in 1932; none were recorded in 1933.

Imports were reduced remarkably during the early years of the war, advancing again, however, in 1916, 1917, and 1918. In 1922, with a total of $2,532,972 in value, they were the largest recorded, but have since declined, the value in 1933 being less than 12 percent of those of 1922.

The source of imports of hand-made laces is shown in the table of general imports in chapter VI, the total for 22½ years during which they have been separately stated, to the end of the year 1933, being $19,391,445. Imports from China were 69 percent of the total, from France 7 percent, from Italy 6 percent, and from Belgium 3 percent. Imports from Switzerland were slightly less than from Belgium, but Switzerland is not specially noted as a hand-made lace producing country, and it is probable that imports of "Princess laces", which consist of machine-made braids, appliqued on machine-made net or otherwise grouped into designs, the objects of which are connected by hand, were recorded as hand-made laces.

The rise of the trade in Chinese laces is phenomenal. In 1912, the first year of separate record of general imports by countries, China's contribution to United States imports of hand-made laces was about one-fiftieth part of 1 percent of the total, and in 1922, the year of largest importations, China supplied about 93 percent of the total.

Domestic trade in hand-made laces.—Recent years have seen the establishment of distributing houses which specialize in Chinese laces, embroideries, and articles in whole or in part of lace or embroidery. In addition, many general wholesale houses dealing in lace as a commodity, purchase Chinese laces in large quantities.

There are some wholesale dealers in European hand-made lace in New York, but the trade is small and is mainly confined to staple styles of low or medium price; this branch of trade is largely in the hands of American citizens of Syrian origin. The trade in high priced laces and in articles of such values as are solely within reach of the wealthy is offered almost exclusively by the large department stores.

ARTICLES, WHOLLY OR IN PART OF LACE, N.E.S.

A large quantity of hand-made lace articles made with a knotted filet ground as the basic fabric, is imported from China and Europe. The articles from China are coarse, constitute the great bulk of the imports, and are called "Russian filet" and "Sardo"; the finer pieces are from Europe. The material used in China was originally linen but is now cotton, sometimes mercerized.

Imports of hand-made lace articles include table runners, squares, bedspreads, antimacassars, and chair-arms. The table runners are sold in sets of 3 and 4, and are made in sizes which approximate to 36, 45, 54, 63, and 72 inches in length by 18 inches in width; squares are made in sizes of 36, 45, 54, and 72 inches; bedspreads are made 72 by 90, and 90 by 108 inches. Thirteen-piece luncheon sets consist of 12 doilies and 1 scarf.

Articles of the same sizes, of venetian lace, are imported from Belgium, and China, and articles of linen edged with lace and with motifs inserted are imported from Belgium, France, and Italy. In addition some articles are machine-made, Normandy and Lyons Alençon, in the same sizes.

Imports have been separately recorded since July 1, 1918; under the Tariff Act of 1922 the average annual value was as follows: Cotton, $1,264,102; flax, etc., $588,600; silk, $282,589. From 1924 to 1928 imports of lace articles of all materials were valued at over $2,000,000 per annum, the peak being reached in 1925, with a value of $2,776,832. Imports of articles of cotton predominated in all years and the highest value of imports of the different materials were—cotton, 1928, $1,463,841; flax, etc., 1925, $1,110,403; silk, 1926, $414,320. Imports have declined, in 1933 totaling $279,894 or 10.08 percent of the value of imports in 1925.

General imports by countries, of cotton articles in part of lace, were first recorded in 1922. In 1933 imports from China were 65 percent of the total.

SUNDRIES—SUMMARY

The first eight lines, to the word "machine", of paragraph 1529 (a) of the Tariff Act of 1930 refer to the various types of machine- and hand-made laces and other similar items. Information is available concerning either imports or domestic production of these "similar items." The following résumé discusses the information so far as available.

1. *Tuckings, flouncings, and all-overs.*—Some of these items are of woven material, tucked linen for shirt bosoms being dutiable under this classification. The average annual imports under the act of 1922 were as follows: Cotton, $6,900; flax, etc., $272; silk, $3,004; the highest value of total imports of all materials was $69,367 in 1932.

2. *Lace window curtains, n.s.p.f.*—The principal item comprised in this classification is the Swiss embroidered curtain, made by cutting pieces of bobbinet into curtain lengths and widths and ornamenting them with cut-out woven shapes which are sewed on to the basic fabric with a fancy embroidery stitch by the Bonnaz, Cornely, or similar sewing machines. These curtains are largely used by hotels and other institutions which have window decorations carrying monograms, names, or a coat of arms.

Domestic production, for which no census data are available, is confined to one or two firms, and is intermittent, and only the simpler styles are produced. Imported curtains, made in Switzerland, are often very elaborate and require a large amount of handwork, the labor for which is not available in the United States, and the price for which, if available, would far exceed that paid in Switzerland. The lack of production does not imply a nonproductive investment in machinery, as the machinery is suitable and is utilized for other purposes. The articles are made as pairs of curtains and as panels, the latter being of such a width as will cover an entire window. Curtains are usually 2¼ to 3 yards in length and 36 to 48 inches in width.

These articles are produced abroad at and in the neighborhood of St. Gall, in the St. Gall Canton of Switzerland. The industry is mainly conducted in homes, the machines being placed in the cottages of the workers and the materials supplied by the manufacturers. This system largely eliminates overhead expense. The production of elaborate articles entails about 15 processes, some of which require artistic taste and meticulous workmanship.

Imports of these curtains have been separately recorded since 1912, and have been of considerable value. The peak was reached in 1920, when imports were valued at $912,022; the average annual value under the Tariff Act of 1922 was $428,718. The trend of imports since 1920 has been steadily downward until in 1933 the value was only $147,537. Imports of hand-made lace window curtains from Belgium, France, Italy, and China, mostly of the coarse filet type, are included in the record; panels, curtains, and shades, of linen and other woven materials, may be included also if made in part of lace. Switzerland supplied approximately 75 percent of the recorded general imports of lace window curtains, which include among others, some Nottingham lace window curtains. The vogue for woven curtains, which has so

seriously affected the demand for Nottingham lace window curtains, has also affected the demand for Swiss embroidered curtains. Throughout the steady decline of imports since 1920, Switzerland's percentage has been constant to the shrinking total.

Bobbinet, the basic material of the industry, is more costly in the United States than in Switzerland. Swiss curtain manufacturers are in a position to obtain bobbinet from a plant in Switzerland, but the counts of net used for making curtains in American factories can be imported cheaper from England. Bonnaz or Cornely machines, which are relatively inexpensive machines, are imported and pay a duty of 30 percent ad valorem under paragraph 372 of the Tariff Act of 1930. Labor capable of producing curtains of intricate and elaborate designs is not obtainable in the United States, and other important factors adverse to domestic manufacturers are the small demand for patterns and the requirement of exclusiveness. Three of the most important manufacturers in Switzerland have offices and carry a full line of articles in New York, and in addition such articles are imported by department stores.

3. *Braids other than Barmen lace.*—The record of the Bureau of the Census for braids is confined to those of two materials—cotton and silk—braids of the latter material being combined with silk bindings. The record of braids of artificial horsehair is only partial. These records are as follows:

Braids: Value of domestic production, 1914–31

Census year	Cotton braids	Silk braids and bindings	Artificial or imitation horsehair braids
1914	[1]	$3,073,648	
1919	$17,431,154	13,218,284	
1921	13,025,750	15,879,046	
1923	15,064,245	17,555,885	
1925	13,079,928	14,512,719	
1927	12,117,760	11,284,678	
1929	21,125,539	4,862,521	$1,284,856
1931	13,068,141	2,583,657	864,644

[1] Not available.

Imports are mainly of rayon or other synthetic textile, followed by braids of cotton. Total imports, from the commencement of the Tariff Act of 1922, have been recorded as follows:

Braids, loom woven and ornamented in weaving, or made by hand or on braid, knitting, or lace machines: Imports for consumption, 1922–33

Calendar year	Cotton	Flax, etc.	Silk	Rayon	Metal threads	Total
1922 (Sept. 22–Dec. 31)	$63,519	$6,199	$28,947	$348,096	$4,707	$451,468
1923	157,829	5,745	64,154	409,114	19,866	656,708
1924	115,142	3,435	42,643	421,783	20,580	603,583
1925	431,508	18,352	64,065	1,113,137	10,369	1,637,431
1926	704,803	23,288	45,328	1,041,131	23,893	1,838,483
1927	336,709	3,168	52,174	585,274	19,436	996,761
1928	135,070	615	42,861	588,248	29,621	796,415
1929	154,305	4,374	30,536	394,927	11,138	595,280
1930 (Jan. 1–June 17)	134,622	231	9,244	330,024	2,197	476,318
1930 (June 18–Dec. 31)	11,949		1,657	75,005	1,765	90,376
1931	47,134		981	287,317	6,385	341,817
1932	4,218		298	35,662	1,416	41,594
1933	2,858		152	34,908	2,647	40,565

Imports of cotton and silk braids are small compared with domestic production, and those of flax and metal-thread braids are negligible. Imports of braids of rayon and other synthetic textiles have been considerable but have declined since 1926, and there are no data of domestic production to compare with the recorded figures of import. Braids of rayon are used largely for making women's hats and hoods and are imported from Switzerland. Braids of cotton are imported from Germany and Czechoslovakia. Some of the imports of cotton braids are of distinctive colors and widths, though there is little variety in appearance.

4. *Ornaments and trimmings, n.s.p.f., fringes and gimps.*—These terms cover a wide range of articles extending from narrow upholstery goods for the trimming of furniture to silk velvet pillow covers and ornamental banners. Domestic production of such items has been recorded by the Bureau of the Census as (a) silk fringes and gimps; (b) silk military trimmings; (c) braids, trimmings, fringes, etc.; and (d) regalia badges and emblems. The recording of silk military trimmings, and of braids, trimmings, fringes, etc., has not been constant but in 1925, when production of (a), (c), and (d) was recorded, the total amounted to $24,270,009.

Imports of ornaments, trimmings, n.s.p.f., of cotton, flax, etc., and silk have been recorded from July 1, 1918; under the Tariff Act of 1922 fringes and gimps of cotton were also recorded and are included in this discussion. Imports of ornaments, trimmings, fringes, and gimps of rayon are recorded under the Tariff Act of 1930 but have not been large. If these articles are of wool or metal threads, the value of imports is recorded with that of imports of laces and other items dutiable under this paragraph. The average annual imports of these items under the act of 1922 were as follows: Cotton, $432,843; flax, $154,627; silk, $541,770. The value of these imports was largest in 1923 and totaled $1,633,172; by 1933 the value had shrunk to $138,068 or 8 percent of the former figure. Imports are from France, Germany, Italy, and Czechoslovakia.

5. *Flutings, quillings, neck rufflings, and ruchings.*—The most important item in this group is quillings, which are narrow insertions of plain net made on the bobbinet machine, and of which there is no domestic production. Imports of these items were not recorded prior to July 1, 1918; average annual imports under the act of 1922 were as follows: Cotton, $4,696; flax, etc., $170; silk, $760; the highest value of total imports of all materials was $58,159 in 1931. England is the main source of imports.

6. *Lace wearing apparel.*—Imports of wearing apparel, wholly or in part of lace, made of cotton or silk, were considerable under the Tariff Act of 1922, the average annual imports of those of cotton being valued at $273,060 and of those of silk at $720,766, the total of the annual average being approximately $1,000,000. This sum is heavily discounted for consideration as pertaining to lace by the fact that the greatest part of the value is of other materials than lace, because wearing apparel composed in any part, "however small," of lace was assessed at 90 percent, the amount of duty primarily placed on laces under paragraph 1430 of the Tariff Act of 1922. Wearing apparel of lace consists of dresses, underwear, and neckwear. As information concerning the domestic production of women's neckwear and lace goods, etc., is shown only for 1914 and 1925 of the census years and as the classification was changed after 1925 comparative figures are fragmentary, but these indicate that domestic production was many times the value of imports. Imports of lace trimmed dresses are partly the creations of the couturiers of Paris and are imported for their novelty of idea and style, sometimes for the purpose of being copied. Most of these dresses are imported by department stores and specialty shops, as is also underwear trimmed with lace. Neckwear is largely imported by wholesale dealers who specialize in these articles and consists of collar and cuff sets and collars or yokes of Belgian Princess, Guipure, Bohemian, appliqué, Lyons Alençon and German embroidered laces. In the data recorded by countries lace wearing apparel of cotton and ready-made clothing of silk are combined with that of embroidery, but France appears to be the source of the bulk of the lace underwear and dresses. Importers of lace maintain that the placing of a duty of 90 percent on the total value of a dress in part of lace is detrimental to the use of lace on dresses, as it leads foreign dressmakers to avoid the use of lace as an embellishment, silk wearing apparel (for example) without lace, being dutiable at 65 percent under the Tariff Act of 1930.

REVENUE DERIVED FROM IMPORTS UNDER PARAGRAPH 1529

Under the Tariff Acts of 1922 and 1930, the lace paragraph, paragraphs 1430 and 1529, respectively, has been among the principal sources of revenue under the textile schedules.

The importance of paragraph 1430 of the Tariff Act of 1922 and of its successor 1529 of the Tariff Act of 1930 is emphasized by reference to the ratio as to duty collected, to the other textile paragraphs in the years 1928 and 1932. These years have been chosen because of their importance as being at the opposite poles of economic factors, 1928, the height of prosperity, and 1932, the depth of depression. The total value of dutiable textile imports for 1928 was $376,816,920, and of free textile imports $511,603,027, making a grand total of $888,419,947 of imports for consumption of textile materials and manufactures of all kinds. The total duty collected was $155,642,703. Of these totals, imports of lace, embroidery, etc., of any material, in 1928 under paragraph 1430 of the Tariff Act of 1922 amounted to $40,656,510, and the duty to $29,599,142. The value of imports under paragraph 1430 in 1928 was 10.79 percent of the dutiable textile imports and 4.58 percent of the total textile imports, and the duty was 19.02 percent of the total textile duties.

The duty on articles imported under paragraph 1430 exceeded the duty assessed on imports under the cotton, vegetable fiber other than cotton, and silk schedules separately, not because the value of imports was larger but because of the rates of duty collected—75 and 90 percent ad valorem.

The average rate of duty collected on imports under paragraph 1430 of the act of 1922 was 72.8 percent ad valorem. This rate was lower than either of the rates levied under the paragraph and was due to the inclusion in the total of free goods from the Philippines.

The total imports of textiles in 1932 were valued as follows: Dutiable, $92,273,982; free, $143,222,653; total, $235,496,635. The duty collected was $50,719,103. These figures are, respectively, the following percentages of those of 1928—24.49 percent; 27.99 percent; 26.51 percent of values, and 32.59 percent of duty. The shrinkage

of approximately 74 percent of the imports is evidence of the extent of economic results of the depression, no account being taken of the influence of fashion, as the bulk of the imports are staples. The difference of about 6 percent between the shrinkage of the percentages of value of imports and duty may be attributed to one of two causes, better qualities of goods resulting in higher prices per unit in 1932, and consequently, higher collections of duty, or the increases of rates of duty under the Tariff Act of 1930 over those of the act of 1922.

Total imports in 1932 under paragraph 1529 of the Tariff Act of 1930 were valued at $15,159,066 and the duties levied upon these imports amounted to $10,659,905, an equivalent ad valorem rate of 70.32 percent. This is below the assessable duty, 90 percent, on all items, on account of free shipments from the Philippines, etc. The value of imports under paragraph 1529 for 1932 was 16.43 percent of the dutiable textile imports and 6.44 percent of the total textile imports, and the duty was 21.02 percent of the total textile duties.

No valid comparison can be made of duties for the years 1928 and 1932 on account of the differences in rates of duty on lace and embroidery, 75 and 90 percent ad valorem, respectively, under the act of 1922, and 90 percent ad valorem under the act of 1930, and because of the inclusion in paragraph 1529 of hose, half hose of cotton or of wool, of handkerchiefs of lace or embroidered at compound rates, and of corsets, etc., at rates varying from 60 to 75 percent ad valorem. The duties collected on paragraph 1529 in 1932 were higher than those collected on the cotton, the silk, and the rayon schedules separately, and higher than those collected on any other individual textile paragraph. In value, imports under paragraph 1529 were exceeded only by imports under paragraph 1008 (burlaps and other jute cloths, n.s.p.f.). The items treated in this report "Laces and lace articles" are detailed in the first eight lines of paragraph 1529, therefore the items so dutiable are segregated as "lace" from other items under the paragraph which are designated as "embroideries, etc." Imports of wearing apparel of embroidery and lace are recorded together, and as they consist mainly of embroidered articles they are tabulated as embroideries. Free imports are shown separately and included in the total value of imports but consist mainly of embroidered articles. Imports of laces, embroideries, etc., under paragraph 1529 (a), exclusive of clocked hose and half hose, wholly or in chief value of cotton or wool, and the duty assessed upon them are shown in the following table.

Value of imports of laces and embroideries, etc., under paragraph 1529 (a) of the Tariff Act of 1930 and duty collected thereon, calendar year 1932

Material	Imports				Duty		
	Lace, etc.	Embroidery, etc.	Free	Total	Lace, etc.	Embroidery, etc.	Total
Cotton	$5,013,252	$1,037,645	$231,693	$6,282,590	$4,511,928	$933,881	$5,445,809
Flax, etc	40,432	2,373,296	282,820	2,696,548	36,390	2,135,944	2,172,334
Wool	13,602	65,009		78,611	12,242	58,508	70,750
Silk	570,441	458,114	18,440	1,073,995	513,397	412,302	925,699
Rayon	379,343	82,360		461,703	341,408	74,125	415,533
Metal threads	32,617	2,142		34,759	29,355	1,928	31,283
Beads	23,438	42,414		65,852	21,094	38,173	59,267
Total	6,073,125	4,087,980	532,953	10,694,058	5,465,814	3,654,861	9,120,675
Percent of total	56.79	38.23	4.98	100.00	59.93	40.07	100.00

WORLD TRADE IN LACE AND LACE ARTICLES

The report of the Tariff Board on schedule I of the tariff law of 1909, issued in 1912, showed the world's trade in laces, tulle, lace curtains, trimmings, embroidery, etc., through the imports and exports of such items for 29 of the principal countries of the world—17 European, 3 African, 1 Asiatic, 3 North American, 4 South American, and Australia. The records for 21 of these countries were for the year 1910, 6 were for 1909, 1 was for 1906, and 1 was for 1911. Although not definitely stated, these items are presumably for cotton only. The total value of the lace imported by these 29 countries was $90,858,647, and the total value exported by 12 producing countries was $100,250,948, leaving exports of lace of the value of $9,392,301 not recorded in this list and distributed throughout the rest of the world. The United States headed the list of importing countries of articles of cotton lace and embroidery, with an import of $35,927,461, which was more than double the value of the import of any other country, including that of Great Britain, which totaled $16,863,926. Switzerland was the chief exporting country of laces and embroideries, the value being $38,974,612; the United Kingdom was second in rank, with a total of $21,038,074; France was third, with exports of the value of $20,747,154; Germany was fourth, with a total of $16,116,170; the value of exports from these 4 countries totaled $96,876,010, or 96.63 percent of the whole. China was not listed as an exporting country, the large-scale production of hand-made lace not maturing until some years later.

The case considered is apparently the only instance in which any attempt has been made to estimate the world trade in lace and lace articles.

The decline in production and consequent use of lace commenced during the war, through inability of the principal producing countries, England, France, and Germany, to operate fully. The restrictions then imposed by necessity have been applied voluntarily since the war for another reason. A high Parisian authority on fashion maintains that the decline is the result of the changes in women's attire, which had their origin in the manual work done by women during the war, such as driving public vehicles, riding bicycles as messengers, and other tasks demanding increased freedom of movement for safety. The authority quoted held the opinion that these changes, having proved their value by conferring greater convenience and being more conducive to health, are likely to be permanently retained.

This decline in production is reflected in the value of exports of lace from the principal producing countries. It is not feasible to quote values for the numerous items comprised in the first eight lines (to the word "machine") of paragraph 1529 (a) of the Tariff Act of 1930, and values of imports and exports for the basic articles—hand-made lace, machine-made lace, lace window curtains, and nets and nettings of all materials—are not available for all countries, neither is classification uniform, but the figures quoted, if separately obtainable, are for laces only, exclusive of embroideries and other similar items. In addition, records of quantity are incomplete or conflicting in the recorded unit; add to the difficulties mentioned the confusion caused by fluctuating currencies in different countries and it will be seen that the impediments to the correct tabulation of imports and exports of lace in detail from the different producing countries are almost insurmountable. The principal exporting countries of lace at present are France, Great

Britain, Germany, Switzerland, Italy, Belgium, and China; the United States is the country of largest imports and, although a manufacturer of laces on a large scale, does not export to any appreciable extent. Some idea will have been formed from the various tables of imports and exports included in this report of the shrinkage of imports and exports of lace in various countries, and this is further emphasized by the following table. The years chosen are 1914 and 1931, the pre-war year and the latest available year of the United States census of production. Production figures for other countries, with the exception of Great Britain, are not available, and census years in that country do not coincide with those of the United States. Foreign currencies for 1914 are converted at the average exchange rates as follows: France, $0.1930; Great Britain, $4.9054; Germany, $0.2382; [1] Switzerland, $0.1950; Italy, $0.1926; Belgium, $0.1930; [1] and the Chinese Haikwan tael, $0.670. The same currencies for 1931 were converted at the following rates: France, $0.0392; Great Britain, $4.5350; Germany, $0.2363; Switzerland, $0.1940; Italy, $0.0521; Belgium, $0.0279; and the Chinese Haikwan tael, $0.3673 (exports), gold value unit, $0.40 (imports).

Lace and lace articles: Value of exports and imports of lace of the principal lace-producing and exporting countries of the world; exports, imports, and production of the United States, 1914 and 1931.

Country	Exports		Imports		Production	
	1914	1931	1914	1931	1914	1931
United States	[1] $232,457	[1] $86,249	$26,548,304	$8,267,533	$14,165,523	$17,086,296
France [2]	17,134,400	11,258,553	1,496,020	301,486	----------	----------
Great Britain [3]	17,515,879	5,358,851	8,677,069	1,986,063	----------	----------
Germany [4]	6,649,829	1,674,423	3,736,643	844,554	----------	----------
Switzerland	1,005,223	641,988	618,221	537,729	----------	----------
Italy	993,639	7,529,322	2,043,581	2,071,953	----------	----------
Belgium [4]	1,639,987	802,182	1,096,106	803,576	----------	----------
China	[5] 93,694	[6] 1,300,339	[5] 280,683	[6] 114,197	----------	----------
Total	45,265,108	28,751,907	44,496,627	14,927,091	----------	----------

[1] Lace and embroidery.
[2] Lace, net, and lace curtains.
[3] Lace and net and articles thereof (except embroidery).
[4] 1913, figures for 1914 not available.
[5] Lace.
[6] Lace and trimmings.

Ratio of value of exports and imports of laces and United States production of 1931 to that of 1914 taken as 100

Country	Exports	Imports	United States production	Country	Exports	Imports	United States production
	Percent	*Percent*	*Percent*		*Percent*	*Percent*	*Percent*
United States	37	31	120	Italy	767	101	--------
France	65	20	--------	Belgium	48	73	--------
Great Britain	30	22	--------	China	1,387	40	--------
Germany	25	22	--------				
Switzerland	63	86	--------	Total	63	33	--------

This table indicates a large decrease in the international trade in lace between 1914 and 1931; for the countries enumerated there

[1] 1913.

was a total decrease of about one-third in value of exports and of about two-thirds in value of imports. The increase in exports from Italy consisted mainly of silk and artificial-silk nets, recorded with silk crepe, and from China of hand-made laces of cotton. Production in the United States increased about 20 percent, and imports decreased about 69 percent. The countries named import principally laces of the types they do not produce. The radical decline in the imports of Great Britain is explained by the fact that in 1931 foreign lace for export was entered under bond, and the value did not appear in the records of either imports or exports.

CHAPTER I

NOTTINGHAM LACE-CURTAIN MACHINE PRODUCTS

1. GENERAL

The manufacture of lace curtains on the Nottingham lace-curtain machine was the first among the several branches of the lace industry to attain any measure of importance in the United States and has been the most successful one in dominating the American market. Beginning in 1885, when the first machine was imported, domestic production has developed to the point of providing more than 99 percent of domestic lace curtain requirements.

1. Differences between the products of the Nottingham lace-curtain machine and the Levers lace machine

At the outset it is essential to emphasize the fact that the production of lace curtains on the Nottingham lace-curtain machine is a separate and distinct branch of the lace-making industry; particularly should it be distinguished from the manufacture of laces on the Levers lace machine, which is the largest and most important branch of the lace-making industry. The lace curtain industry, using the Nottingham lace-curtain machine, produces chiefly lace curtains, whereas the Levers lace industry, employing the Levers lace and the Levers go-through lace machines, produces a wide variety of fancy trimming laces, insertions, all-over nets, etc. The Nottingham lace-curtain machine, using a heavier yarn, makes a coarser product than does the Levers lace machine and is not capable of making the wide variety and delicate patterns that the Levers machine produces.

These differences in product correspond to differences in the machines and details of their inside measurements. The jacquard of the Nottingham lace-curtain machine is of the overhead or Manchester type, which has not the scope and capacity for movement of threads possessed by the spring-dropper jacquard of the Levers lace machine. The gage of the Nottingham lace-curtain machine is ex-expressed in terms of an inch, that of the Levers lace machine is in terms of half an inch. A 10-point Levers lace machine has 20 carriages working within the inch; a 10-point Nottingham lace-curtain machine has but 10. This diminution in the number of carriages within a given space necessitates a readjustment of the sizes of yarns used for the various purposes of the machine and accounts for the coarseness of texture and the extra weight of yarns required. The Nottingham lace-curtain machine can produce an article 72 inches wide, the whole surface of which may be covered with an independent pattern; it seldom makes narrow millinery laces. The Levers lace machine makes a lace as narrow as half an inch in width and rarely makes any wider than 12 inches, except crossbands.

Some products of the two machines are identical in construction, the so-called radium laces made on the Levers lace machine being of

the same construction as the style known as "Nottingham or ordinary" made on the Nottingham lace-curtain machine. Some of the silk veilings produced on Nottingham lace-curtain machine cannot be distinguished from the radium laces made on the Levers lace machine.

2. Description and uses of Nottingham lace-curtain machine products

Nottingham lace-curtain machine fabrics are made principally as window curtains, panels, and nets, each in several styles. Corresponding to usage dating from the seventeenth century, window curtains are made in pairs, with the border of one curtain at the right edge and that of the other at the left; panels are made as curtains of a greater width with the two borders alike and are hung singly to cover an entire window; they are sometimes made by putting side by side several smaller panels of the same pattern. Another style of curtain, known as brise-bise, covers the lower window sash only. Nets are made in various widths in continuous lengths without top or bottom, with the pattern repeated in a definite size throughout the piece. Among other household articles are bedspreads, valances, and pillow shams; piano, table, cushion, and chair covers and antimacassars; lamp shades; collarettes and lace edges and insertions for the trimming of women's wearing apparel. The basic types of curtains and nets are known as Nottingham or ordinary, combination, Swiss, and bar ground, which includes Madras, Brussels, and filet. Other effects are produced by combinations of these types.

In fabrics for upholstery, considerable variety is obtained by introducing colored threads into a basic structure of square ground, these being in imitation of the Belgian hand-made filet fabrics. Tablecloths are made with solid centers and patterns around the edges in imitation of linen articles.

The sizes of Nottingham lace curtains vary with changes in decorating fashions and in window dimensions. Twenty-five years ago the universal length was 4 yards, whereas now the greater number are 2½ yards long; the width ranges from 36 to 48 inches.

3. Development and present status of the lace-curtain industry in the United States

The first Nottingham lace-curtain machine in the United States was imported from England in 1885 by John Willoughby and erected at Fordham, N.Y. Early in 1886 a factory was started at Wilkes-Barre, Pa., this location in the mining region being chosen because of proximity to abundant unskilled female labor. The early establishments were aided by the Tariff Act of 1883 which for the first time listed lace curtains separately and gave them a duty of 40 percent as compared with the previous duty of 31.5 percent on "cotton laces." The Tariff Act of 1890 increased this duty to 60 percent. Between 1890 and 1901 a number of firms started operations, several of them backed by English and Scottish manufacturers. By 1903 every mill now in operation had been established.

In 1933 the industry comprises 11 mills, 10 of which are contiguous to the Atlantic seaboard; the other is at Zion, Ill. Four of them produce Nottingham lace curtains exclusively, 3 operate other types of lace machinery, and 5 produce textiles other than lace. The proprietorship of the 11 mills is entirely American. Although in the early years of the industry various British lace-curtain firms had branch establishments in New York and held interests in several domestic mills, all such branches and holdings have now been liquidated.

The 11 mills operate 511 Nottingham lace-curtain machines in the United States distributed as follows: Pennsylvania, 402; New York, 78; Illinois, 29; and New Jersey, 2. Of the machines in Pennsylvania mills, 241 are in Philadelphia. Of the 402 machines in Pennsylvania, 182, or 36 percent of the entire number in the industry, are owned or controlled by one family; another 76 of the Pennsylvania machines, or 15 percent of the entire number in the industry, are controlled by a branch of the same family. Thus more than 50 percent of the total number of machines in the United States are controlled by members of one family.

Various factors contribute to the concentration of the Nottingham lace-curtain industry in Pennsylvania. Originally lace-curtain plants were established adjacent to the Atlantic seaboard in order to save freight charges on raw materials and on machinery coming from abroad. Proximity to kindred textile industries and to fuel supplies was also an important factor.

According to official statistics presented by the industry to the N.R.A. the capitalization of the Nottingham lace-curtain industry in 1933 was $16,352,899, and the aggregate number of persons employed was 3,216.

4. The Nottingham lace-curtain machine

The Nottingham lace-curtain machine is the largest, heaviest, and most expensive of the various types of lace-making machinery. As the demand for such machines is limited by their exceedingly long life and by the demand for their products, American engineers and machinists have never undertaken their construction; all of the machines used in the United States have, therefore, been imported from England whose city of Nottingham enjoys a practical monopoly in their construction.[1]

The governing factor in the productivity of the machine is its width, which ranges from 245 inches for the finest to 480 for the coarsest gage machines. The gage, the term used to designate the number of points or warp threads working in a space of an inch, in the domestic industry ranges from 5½ to 16 points. The odd or bastard gages are employed only infrequently. A small number of finer gage machines—18 and 20 points—are to be found in the mills of England and Scotland; imports into the United States of the products of these machines are supplementary to rather than competitive with the domestic production.

The number of machines of each gage in the entire industry as given at the hearings before the Senate Committee on Finance in 1921 is shown in the following table.[2] These figures would be slightly different if brought up to date, as new machines have been added and old ones scrapped, but they are sufficiently accurate for present use.

[1] Among the best known firms of lace-curtain machine builders with headquarters at Nottingham are: John Jardine, Ltd.; Swift & Wass; Reader & Sons; Newton & Pycroft; Stevens & Williamson; F. W. Burton; and William Hooton.

[2] Hearings before the Committee on Finance, p. 3440.

TABLE 1.—*Number and gages of Nottingham lace-curtain machines in domestic mills in 1921*

Gage	Machines	Percent of total		Gage	Machines	Percent of total	
5-and 6-point	101	21.49	54.04	13-and 14-point	29	6.17	8.51
7-and 8-point	153	32.55		15-and 16-point	11	2.34	
9-and 10-point	115	24.47	37.45				
11-and 12-point	61	12.98		Total	470	100.00	

Approximately one third of the domestic machines are of 8-point gage, one quarter are of 10-point, and one-fifth are of 6-point; the number of 12-point is about half the number of 10-point, the number of 14-point half the number of 12-point, and the number of 16-point a third of the number of 14-point. This proportionate distribution of the gages indicates strongly the texture of the articles for which a demand exists, although this statement is subject to qualifications on account of the influence of fashion, pertinent instances of which were the demand for fine-gage filet nets in 1908 and 1909, 1916 and 1917, and the demand for coarse Tuscan nets in 1923 and 1924.

The width of lace-curtain machines used in the United States ranges from 111 to 450 inches. Nine of the firms manufacturing Nottingham lace-curtains and lace-curtain nets were investigated by the United States Tariff Commission in 1924; at that time these 9 owned and operated 464 machines or 90 percent of the entire number used by the domestic industry. Of these 464 machines, 12 were less than 200 inches wide, and 9 were wider than 400 inches; the most common width was 360 inches, there being 142 of these. The next most common width was 324 inches, of which there were 128 machines.

Pre-war and post-war prices for the Nottingham lace-curtain machines have been furnished by a large firm of English machine builders for a standard 10-point machine 360 inches wide, arranged to make single or double action, 2- and 3-gait, and 3- and 4-gait, single and double tie. The foreign value, together with the duty charges entering into the landed cost in the United States is shown in the following table:

TABLE 2.—*Foreign value and duty-paid value of a 10-point, 360-inch, Nottingham lace-curtain machine in 1914–32*

Year	Foreign value	Rate of exchange	Foreign value converted	Duty	Value plus duty	Ratio of value plus duty to 1914 figure
						Percent
1914	£864	$4.8665	$4,219	$1,055	$5,274	100
1923	1,651	4.5748	7,553	2,266	9,819	186
1932	1,588	3.5038	5,564	1,669	7,233	137

The duty assessed on Nottingham lace-curtain machines was 45 percent ad valorem under paragraph 197 of the Tariff Act of 1909,[3] 25 percent under paragraph 165 of the act of 1913, and 30 percent under paragraph 372 of the acts of 1922 and 1930.

[3] The exemption from duty extended for a limited period under the act of 1909 to Levers and go-through lace machines did not apply to any other type of lace-making machine.

There has been no extension of physical plant by domestic lace-curtain mills since before the World War, importations of machinery and parts since that time consisting largely of replacements.

The following accessory machines are required in a Nottingham lace-curtain mill: reading frames, automatic punching press, specially large warping mills, mending machines, overhead Scottish system for bleaching, stenter for dressing purposes, calenders, overlock sewing machines, folding machines, and hydraulic press.

The factory buildings are of various types, some being of the sawtooth model, and others, especially where the curtain machines form a part of a general lace plant, being several stories in height. On account of the weight of the machines, these buildings must be especially constructed, and as the jacquard extends above the body of the machine, the rooms are necessarily lofty.

II. YARNS USED IN THE LACE-CURTAIN INDUSTRY

Most products of the Nottingham lace-curtain machine are made of cotton yarns. In recent years, however, rayon spool yarns have been used in increasing quantities in the ornamentation of cotton lace curtains and nets, but no data are available showing the extent to which such yarns are used.

Three sets of yarn[4] are required in making any fabric on the lace-curtain machine: the main warp (or ground warp) yarn; a spool yarn, jacquard controlled and thrown to form the pattern, and the brass-bobbin yarn which acts as binder between the warp and spool yarns by spiraling around both. Additional beam and spool yarns are required in producing special types of curtains. The extra beam yarn is used to produce a variety of grounds, such as cross ground, Madras, Brussels, or filet. Spool yarn is used for ornamentation; for the shaded effect an extra bank of spools is used, and the yarn is known in the trade as fine-spool or Swiss spool yarn.

1. Cotton yarns

The cotton yarns used in making Nottingham lace-curtain machine products range from 18/2 to 120/2; most of these lie between 40/2 and 80/2 and are of domestic origin; all prepared bobbin yarn and most other lace yarns finer than 80s are imported. The principal importations are 68/2 or 70/2, the standard counts of the brass-bobbin yarns for the coarser gage machines, of which there is a preponderance in the domestic industry. Only one domestic lace-curtain firm spins yarns for its own use; it makes chiefly the coarser counts. Of the total cotton yarns used in the industry about one fourth is imported and about three fourths are produced in the United States. According to the Bureau of the Census, production in the domestic industry reached its peak in 1923, when it was valued at $23,255,978; in that year the value of the consumption of cotton yarn by the industry approximated $6,000,000. The investigation of the Tariff Commission in 1923 and 1924 disclosed that about 7 square yards of Nottingham lace-curtain fabric weighed 1 pound. The articles are of a linear width which is sometimes greater than 36 inches but if linear yards be accepted as 36 inches in width it is estimated that the amount of

[4] During the war, a mosquito net was made on Nottingham lace-curtain machines for Government purposes, which consisted of three sets of yarns which were different from these. They comprised the brass bobbin, the warp, and a beam which made a Madras weave; as there was no pattern, the use of spool threads and of the jacquard was eliminated.

cotton yarn used in 1923 was about 8,638,500 pounds or 4,319 short tons.

The counts of yarn in use at any given time are, to an extent, governed by whether the trend of fashion demands fine or coarse gage curtains. The restrictions imposed by war conditions resulted in substitutions and the complete elimination of some counts, the number of counts imported in 1914 being 22 and in 1918 being 13.

(*a*) *Brass-bobbin yarns.*—Brass-bobbin yarns must be smooth and uniform and must be made of long-staple cotton, spun and doubled carefully, so as to have strength to support abnormal strain. The American lace-curtain industry is entirely dependent upon English mills for this essential yarn, without which no curtain can be made. As a matter of fact, the American supply is furnished largely by a single English mill. American yarn manufacturers, in spite of a tariff, have never been able to produce at a competitive price a brass-bobbin yarn of a sufficiently high-grade quality.

Bobbin yarns are plain (ungassed), and may be carded or combed; in order to get as many yards as possible on each brass bobbin and thus reduce the number of stoppages for renewal of bobbins, the yarn is "prepared" by a calendering process which flattens the yarn to an oblate shape, renders it more flexible, and polishes it in the process. The yarn is usually greased with coconut oil or other lubricants, and when the pressed bobbins are placed in the oven and steamed, the lubricant prevents the steam from caking the yarn. Gassed and unprepared yarn is round and does not give the same amount of yardage on the bobbins.

Brass-bobbin yarns are made chiefly of Egyptian cotton, although Sea Island cotton is used for the best quality. They are usually two-ply. There are uniform counts of brass-bobbin yarn which give the most satisfactory result on each gage of the machine, and which have been adopted universally; 6-point, 58/2; 8- and 10-point, 68/2; 12-point, 78/2; and 14- and 16-point, 98/2. Very fine gage machines of 18 and 20 points, found only in Great Britain, use 140/2 for brass bobbins. The number of yards that can be wound on brass bobbins varies between 80 and 180 yards according to the count of the yarn and size of the brass bobbins. It is possible when articles are made half-gage or less, to use "reinforced bobbins" which hold considerably more yarn and effect a saving, estimated at one third, in the cost of processing the bobbins.

(*b*) *Warp yarns.*—The yarns used for main warps range in counts from 24/2 to 80/2. As a rule they are not gassed or prepared, as the warp threads in lace-curtain machines are entered into the machine at wider intervals than in the Levers lace machines and do not have the same tendency to twist together and break. The warp threads are not under great strain except "in combination" work, where the count of yarns used in fine-gage machines is heavier than would be used normally. The main counts of warp yarns are 28/2, 40/2, 50/2, 58/2, 68/2, and 78/2. The coarser counts up to and including the 50/2 are domestic in origin; the finer counts are usually imported.

(c) *Beam yarns.*—Beam threads, as a rule, work throughout the surface of the curtain and underneath the pattern. Beam yarns range from 28/2 to 70/2 and in exceptional cases to 100/2. They are not gassed or prepared and are usually finer in count than the warp yarns used in the same machine. Where the threads are thrown across, beam yarns are subjected to sudden tension. Imports are confined to counts of 68/2 and finer; the coarser counts are chiefly of domestic origin.

(d) *Spool yarns.*—The spool threads are not worked from main beams but from individual spools, for the reason that the different lengths of threads are drawn from each spool in accordance with the requirements of the pattern. The thickness of the yarn depends upon the gage of the machine and the style of work. Spool yarns are the heaviest yarns used in lace-curtain machine products, though in exceptional cases they may be finer than the warp threads used in the making of "combination" curtains. The counts of spool yarns range from 18/2 to 80/2. The yarns used for Swiss or fine spool yarn are as a rule finer in count than the ordinary yarn, ranging from 58/2 to 100/2. Practically all spool yarns are of domestic manufacture, importations being confined to yarns of 80/2 and finer.

2. Rayon yarns

The use of rayon opened up new possibilities in textiles. For lace curtains, cotton yarns are still the only materials used for the warp, beam, and bobbins, but rayon spool yarns, when used in different parts of the design, or in alternating narrow panels of a wider panel, are productive of striking color effects. The yarns of celanese take a different dye from that taken by yarns made by other processes; by means of the "union" bath, different colors may be obtained at one dipping and 2-tone effects achieved for different parts of an object, such as flowers and leaves. Some attention is now being given to household color schemes, such as the manufacture of Nottingham lace curtains to match wall paper, furniture, etc.

III. STATISTICAL REVIEW OF PRODUCTION AND FOREIGN TRADE IN NOTTINGHAM LACE-CURTAIN MACHINE PRODUCTS

The unit of production for Nottingham lace-curtain machines is a "rack" of 1,440 single motions or 720 double motions or complete revolutions of the carriages. A machine makes from 70 to 78 complete revolutions per minute and produces about six racks per hour. In making combination work, it yields a lessened production with a larger percentage of damage and waste. Further, the working of a jacquard at double speed interferes somewhat with the amount produced in a given time. An average weekly production based on an 18-hour day and a 97-hour week is estimated to be 485 racks. This is only five racks per hour for the entire week, but time is lost in renewing sets of bobbins and carriages, replacing empty spools, pulling pieces off the machine, changing patterns, and performing other necessary tasks.

The "quality" signifies the number of machine motions in 3 inches. The number of inches in a rack may be obtained by the following formula: $\frac{720 \times 3}{\text{Quality}}$ = inches to the rack; for example, for 72 quality the output is $\frac{720 \times 3}{72}$ = 30 inches to the rack.

On the basis of 485 racks, of 72 quality, in a week of 97 hours, a machine 360 inches wide, making ten 36-inch curtains, side by side, each 2½ yards long would make 16⅔ curtains (or 8⅓ pairs) per hour, or 1,616⅔ (or 808⅓ pairs) per week. The same machine making net of the same quality and the same width would produce 4,041⅔ linear yards (36 inches wide) in the same week.

The gage of the machine can be most easily counted at the front and the quality at the back; this process is reversed when the piece is removed from the machine.

1. Domestic production

Prior to 1914 there were no separate statistics for domestic production of Nottingham lace curtains; earlier classifications gave only total figures of all branches of the American lace industry. Domestic production of Nottingham lace-curtain machine products since 1914 are shown in the table following.

TABLE 3.—*Nottingham lace-curtain machine products: Domestic production, 1914–31*

Census year	Lace curtains			Lace curtain nets			Total value
	Quantity	Value	Unit value	Quantity	Value	Unit value	
	Pairs			*Linear yards*			
1914	5,891,154	$4,678,847	$0.8368	7,504,809	$1,258,307	$0.1677	$5,937,154
1919	3,933,493	8,165,447	2.0759	19,464,962	7,616,339	.3913	15,781,768
1921	3,915,412	8,435,424	2.1544	17,235,736	6,785,333	.3937	15,220,757
1923	6,038,378	12,944,108	2.1436	30,277,712	10,311,870	.3406	23,255,978
1925	4,559,617	10,276,737	2.2539	28,612,343	8,823,034	.3084	19,099,771
1927	5,661,119	10,797,895	1.9074	19,197,410	5,518,338	.2875	16,316,233
1929	6,112,561	11,249,575	1.8404	14,312,593	4,674,795	.3266	15,924,370
1931	4,517,850	6,867,575	1.5201	6,282,392	1,830,770	.2914	8,698,345

Pennsylvania is the only State for which separate statistics are shown. Having about 80 percent of the total number of machines in the country, this State has produced the greater part of the output of the domestic industry, amounting in 1929 to the following percentages of the total: Pairs of curtains, 80.06 percent, value 79.56 percent; linear yards of net, 85.33 percent, value 81.35 percent; total value, 80.09 percent.

Since the early years of the war there has been a large increase in unit value of Nottingham lace curtains. Assuming the linear yards to be 5, and translating lace curtains into linear yards in order to add the figures to those for lace curtain nets, the average unit value per linear yard is found to be $0.1674 in 1914, and $0.4033 in 1919, an increase of 140.92 percent. Similarly computed, the unit value per linear yard was $0.3013 in 1931.

(a) *Nottingham lace-curtain unit values compared with the General Commodity Price Index.*—The Bureau of Labor Statistics' Wholesale Price Index for all commodities, using 1913 as 100, increased between 1914 and 1925 from 98.1 to 158.7 percent, or by 61.8 percent as

compared with 121.92 percent for Nottingham lace-curtain machine products. Shifting the General Commodity Index with 1926 as the basis (100), the index number in 1927 was 95.4 percent, in 1929, 95.3 percent, a decrease of one-tenth of 1 percent from 1927, and in 1931, 73 percent, a decrease of 23.48 percent from 1927. From 1927 to 1929 the unit value of Nottingham lace-curtain machine products increased 3.32 percent, and from 1927 to 1931 decreased by 12.26 percent. Obviously, then, prices of Nottingham lace curtains between 1914 and 1925 rose twice as high as did the general commodity average and since 1927 has declined only half as much.

The following table shows the trend of domestic production of Nottingham lace-curtain machine products since 1914.

TABLE 4.—*Nottingham lace-curtain machine products: Domestic production*

(*a*) PERCENTAGE INCREASE OR DECREASE SINCE 1914

Census year	Lace curtains			Lace curtain nets			Total value
	Quantity	Value	Unit value	Quantity	Value	Unit value	
1919	−29.65	+74.52	+148.08	+159.37	+505.28	+133.33	+165.81
1921	−29.97	+80.29	+157.46	+129.66	+439.24	+134.77	+156.36
1923	+8.00	+176.65	+156.17	+303.44	+719.50	+103.10	+291.70
1925	−18.45	+119.64	+169.35	+281.25	+601.18	+83.90	+221.70
1927	+1.25	+130.78	+127.94	+155.80	+338.55	+71.44	+174.82
1929	+9.33	+140.43	+119.93	+90.71	+271.51	+94.75	+168.22
1931	−19.20	+46.78	+81.66	−16.29	+45.49	+73.76	+46.51

(*b*) PERCENTAGE INCREASE OR DECREASE OVER THE PRECEDING CENSUS YEAR

1919	−29.65	+74.52	+148.08	+159.37	+505.28	+133.33	+165.81
1921	−.46	+3.31	+3.78	−11.45	−10.79	+.61	−3.55
1923	+54.22	+53.45	−.50	+75.67	+51.97	−13.49	+52.79
1925	−24.49	−20.61	+5.15	−5.50	−14.44	−9.45	−17.87
1927	+24.16	+5.07	−15.37	−32.91	−37.46	−6.78	−14.57
1929	+7.97	+4.18	−3.51	−22.55	−15.29	+13.00	−2.40
1931	−26.09	−38.95	−17.40	−50.11	−60.84	−10.78	−45.38

Accepting 5 linear yards per pair as a standard, the yardage of curtains over nets was great in 1914 and 1921; in 1923 the yardage of curtains and nets approximated, and in 1925 the yardage of nets exceeded that of curtains. In the census years following 1925 the excess of curtain yardage over that of nets has been consistently maintained.

(*b*) *Production of Nottingham lace-curtain machines compared with that of all branches of the lace industry.*—Since the war the Nottingham lace-curtain machine industry has constituted the most important branch of the American lace industry. The following table demonstrates the value of Nottingham lace-curtain machine products as compared with those of the rest of the industry.

Imports of Nottingham lace-curtain machine products are dutiable under a different paragraph and rate of duty from the remainder of the lace products imported, thus implying a fundamental economic difference, and as the larger portion of the domestic production of articles listed as "Lace goods" are lace-curtain machine products, the collective census figures may imply a degree of prosperity in the other branches of the industry which has no existence in fact.

TABLE 5.—*Lace goods:*[1] *Value of domestic production, and percentage distribution of Nottingham lace-curtain machine products and all other laces*

Census year	Total	Nottingham lace-curtain machine products		All other laces	
		Value	Percent of total	Value	Percent of total
1914	$13,206,785	$5,937,154	44.96	$7,269,631	55.04
1919	29,396,853	15,781,786	53.69	13,615,067	46.31
1921	25,839,539	15,220,757	58.90	10,618,782	41.10
1923	35,593,207	23,255,978	65.34	12,337,229	34.66
1925	29,836,628	19,099,771	64.01	10,736,857	35.99
1927	24,171,744	16,316,233	67.50	7,855,511	32.50
1929	27,885,844	15,924,370	57.11	11,961,474	42.89
1931	17,066,267	8,698,345	50.97	8,367,922	49.03

[1] Production in lace mills, not including the small amount produced in mills engaged primarily in other industries, as recorded by the Bureau of the Census.

(*c*) *Production by styles.*—The styles of lace produced by a mill at any particular time are affected by fashion, by the gages of the machines in the mill, and by the particular clientèle of the mill. Certain styles, such as Nottingham and filet, are always more or less in demand. Coarse-gage machines, the 6- and 7-point, cannot produce certain styles requiring delicacy of design and fineness of texture. Small mills, as a rule, do not cater to fluctuating style trade but produce staple fabrics and articles. All lace-curtain mills do not record production by styles but seven of the mills canvassed by the commission in 1924 had such information, which is shown in table 6. The mill with the largest output shows a remarkable balance in its production of curtain nets of all styles. Filet predominates in 4 of the 7 mills, in mill no. 3 constituting about two-thirds of the production; Nottingham or ordinary was the chief item of production in 3 mills, in mill no. 5 constituting more than half of the total production; combination constituted about 25 percent of the output of mills nos. 2 and 4, and Swiss was an item of real importance in one mill only, no. 7, where it accounted for about 30 percent of the total.

TABLE 6.—*Number of racks made of each style of curtains and net in 7 domestic mills, 1923*

Mill no.	Nottingham or ordinary			Combination			Swiss			Filet			Grand total
	Curtains	Nets	Total	Curtains	Nets	Total	Curtains	Nets	Total	Curtains	Nets	Total	
1	140,026	66,817	274,375	37,008	85,492	121,335	2,362	1,419	25,219	77,867	98,202	312,105	742,371
2	65,125	65,271	196,844	9,838	38,174	122,500			3,781	92,288	228,369	176,070	502,877
3			130,396			48,012						320,657	499,065
4			134,546			258,911			32,358			392,468	915,944
5			427,641			28,834			2,321			302,875	761,721
6	255,200	240,284	495,484	32,800	32,050	64,850	21,200	20,044	41,244	206,000	204,768	410,768	1,013,020
7	21,800	46,784	68,584	3,737	13,415	17,152	21,582	82,595	104,177	37,790	140,906	178,696	368,609
Total			1,727,870			661,676			209,101			2,093,639	4,803,607
Percentage grand total			35.97			13.78			4.35			43.59	100.00

Mill no.	Madras			Bar-ground			Other			Total curtains	Total nets	Grand total
	Curtains	Nets	Total	Curtains	Nets	Total	Curtains	Nets	Total			
1			9,335				2,815	467	3,382	280,478	242,398	742,371
2	148		148	248		248				167,261	331,814	502,877
3									55,769			499,065
4			41,892									915,944
5										515,844	497,176	761,721
6	644		644							84,909	283,700	1,013,020
7												368,609
Total			52,020			248			59,051			4,803,607
Percentage grand total			1.08			0.005			1.23			100.00

NOTE: Fractions are eliminated, therefore detail may not add exactly to totals shown.

2. Imports

The peak of the American importation of Nottingham lace curtains was reached in 1900 with 2,642,323 square yards (cotton only). Imports in subsequent years, although fluctuating, tended downward until they reached a low of 81,952 square yards (cotton and other vegetable fibers) in 1930. Imports in the last 3 years have again tended upward and amounted to 1,512,108 square yards in 1933. These recent imports have included but few curtains, and have consisted principally of bedspreads, table cloths, and upholstery articles. These importations were largely of cotton; imports made of other vegetable fibers have always been very small. The average unit value of imports (cotton only) progressed from $0.099 under the act of 1897, to $0.154 under the act of 1909, and to $0.193 under the act of 1913; the average unit value of imports of cotton and other vegetable fibers under the act of 1922 was $0.328, from which peak it receded to $0.112 in 1932 and $0.126 in 1933.

Great Britain has been the chief source of imports, in 1933 supplying over 99 percent in value of the total. New York is the main port of entry. Curtains in pairs are imported chiefly by department stores, and curtains, nets, and nettings by wholesalers who sell to interior decorators.

The following table gives details concerning the American importation of lace curtains since 1898. The figures prior to September 22, 1922, do not include negligible imports of vegetable fiber laces which up to that date were recorded separately (in the entire period between 1898 and 1922 other vegetable fiber articles to the value of only $56,338 were imported); further, the figures for the importations under the acts of 1897 and 1913 do not include nets and nettings made on the Nottingham lace-curtain machine included elsewhere without specific mention.

TABLE 7.—*Lace window curtains, pillow shams, bed sets, etc., made on the Nottingham lace-curtain machine, and composed of cotton: Imports for consumption*[1]

Fiscal year (unless otherwise stated)	Quantity	Value	Duty collected	Value per unit	Average ad valorem rate
	Square yards				*Percent*
1898 (July 25, 1897, to June 30, 1898)	1,679,659	$152,775	$86,127	$0.091	56.38
1899	2,471,369	222,720	127,224	.090	57.12
1900	2,642,323	228,832	128,983	.087	56.37
1901	1,879,732	188,395	100,541	.100	53.37
1902	2,208,658	228,461	123,969	.103	54.26
1903	2,126,478	213,465	117,760	.100	55.17
1904	2,105,533	204,075	111,763	.097	54.77
1905	986,899	96,391	52,932	.098	54.91
1906	631,216	73,485	40,479	.116	55.08
1907	670,735	81,708	45,424	.121	55.59
1908	556,295	71,812	39,245	.129	54.65
1909	630,873	79,063	43,660	.125	55.22
1910 (July 1 to Aug. 5, 1909)	150,597	20,948	11,118	.139	53.07
Total (4,394 days, act of 1897)	18,740,367	1,862,130	1,029,225	.099	55.27
Annual average (act of 1897)	1,556,721	154,683	85,495	.099	55.27
1910 (Aug. 6, 1909, to June 30, 1910)	1,376,288	191,441	101,608	.139	53.08
1911	1,687,530	261,193	137,020	.155	52.46
1912	1,761,266	278,868	145,118	.158	52.04
1913	1,245,028	200,280	103,692	.161	51.77
1914 (July 1 to Oct. 3, 1913)	378,746	63,440	32,737	.168	51.60
Total (1,520 days, act of 1909)	6,448,858	995,222	520,175	.154	52.27
Annual average (act of 1909)	1,548,574	238,984	124,910	.154	52.27

Footnotes at end of table.

TABLE 7.—*Lace window curtains, pillow shams, bed sets, etc., made on the Nottingham lace-curtain machine, and composed of cotton: Imports for consumption*—Continued

Fiscal year (unless otherwise stated)	Quantity	Value	Duty collected	Value per unit	Average ad valorem rate
	Square yards				*Percent*
1914 (Oct. 4, 1913, to June 30, 1914)	726,336	$111,212	$48,876	$0.153	43.95
1915	740,056	97,938	42,757	.132	43.66
1916	467,368	67,106	29,820	.144	44.44
1917	327,872	60,364	26,228	.184	43.45
1918	173,465	38,528	17,273	.222	44.83
1918 (July 1 to Dec. 31, 1918)	79,226	27,603	12,300	.348	44.56
1919 (calendar year)	144,937	50,240	21,351	.347	42.50
1920 (calendar year)	361,813	144,089	58,207	.398	40.40
1921 (calendar year) [2]	404,600	55,097	22,032	.136	39.99
1922 (Jan. 1 to Sept. 21, 1922) [3]	90,152	28,110	12,060	.312	42.90
Total (3,275 days, act of 1913) [4]	3,516,325	680,287	290,904	.193	42.76
Annual average (act of 1913) [4]	391,896	75,818	32,421	.193	42.76
1922 (Sept. 22 to Dec. 31, 1922) [5]	77,925	25,634	15,793	.329	61.61
1923 (calendar year) [5]	282,622	91,920	56,154	.325	61.09
1924 (calendar year) [5]	316,965	113,313	68,006	.357	60.02
1925 (calendar year) [5]	262,777	96,631	58,778	.368	60.83
1926 (calendar year) [5]	253,809	72,487	44,507	.286	61.40
1927 (calendar year) [5]	205,914	56,822	34,619	.276	60.93
1928 (calendar year) [5]	90,073	30,602	18,372	.340	60.04
1929 (calendar year) [5]	87,393	39,638	17,795	.339	60.04
1930 (Jan. 1 to June 17, 1930) [5]	37,259	12,122	7,273	.325	60.00
Total (2,826 days, act of 1922) [5]	1,614,737	529,169	321,297	.328	60.72
Annual average (act of 1922) [5]	208,556	68,346	41,498	.328	60.72
1930 (June 18 to Dec. 31, 1930) [5]	44,693	11,422	6,853	.256	60.00
1931 (calendar year) [5]	96,443	16,539	9,923	.171	60.00
1932 (calendar year) [5]	274,483	30,784	18,470	.112	60.00
1933 (calendar year) [5]	1,512,108	190,339	114,203	.126	60.00

[1] Not separately recorded prior to act of 1897. Imports under acts of 1897 and 1913 were listed as "Lace window curtains, pillow shams, and bed sets"; under act of 1909 as "Lace window curtains, nets, nettings, pillow shams, and bed sets"; and under act of 1922 as "Lace window curtains, nets, nettings, pillow shams, curtain machine and composed of cotton or other vegetable fiber.

[2] Includes, under the Emergency Tariff Act, 29,487 square yards (4,012 pounds), valued at $14,243, composed in chief value of cotton of 1⅜ inches or longer, paying, on the basis of 7 cents a pound in addition to the ad valorem rates, total duty of $6,451.

[3] Includes 35,025 square yards (4,752 pounds), valued at $11,670, subject to Emergency Tariff Act surtax of 7 cents a pound and paying total duty of $5,250.

[4] Including imports under the Emergency Tariff Act.

[5] Including imports of other vegetable fibers.

(a) *Imports and domestic production compared.*—Imports of Nottingham lace-curtain machine products have since the war constituted a very negligible portion of domestic requirements. In the following table are given the value of domestic production, the landed value of imports for consumption, and the value of total domestic consumption. Landed value is obtained by adding to the invoice value, the prevailing duty and an additional 7½ percent to cover landing charges. A glance at the table will show that since 1919 the United States has supplied over 99 percent of domestic requirements.

TABLE 8.—*Nottingham lace-curtain machine products: Value of domestic production, imports, exports, and domestic consumption in census years 1914–31*

Census year	Domestic production	Landed value of imports for consumption	Domestic consumption	Relation of production to consumption	Relation of imports to consumption
				Percent	*Percent*
1914	$5,937,154	$270,454	$6,207,608	95.64	4.36
1919	15,781,786	75,359	15,857,145	99.52	.48
1921	15,200,757	82,667	15,303,324	99.46	.54
1923	23,255,978	155,058	23,313,707	[1] 99.33	.67
1925	19,099,771	162,656	19,197,342	[1] 99.15	.85
1927	16,316,233	95,703	16,411,936	99.42	.58
1929	15,924,370	49,656	15,974,026	99.69	.31
1931	8,698,345	27,702	8,726,047	99.68	.32

[1] Production plus imports, less exports valued at $97,329 in 1923, and $65,085 in 1925.

(b) *Grades of lace curtains imported.*—The unimportance of imports of lace curtains renders unnecessary any extended discussion of the types imported. Imports consist chiefly of novelties made on machines of various gages and small quantities of products made on machines with gages finer than 16 points, there being no such machines in this country.

An analysis of imports by gage does, however, reveal interesting facts regarding the curtain vogue prevailing at any given time. The diminution in quantity and value of imports from 1904 to 1905 was due to the decline in demand for lace curtains following the introduction of woven curtains. The increase in 1910 was due to a revival in demand consequent upon the production of filet nets. The demand for these in the 12-, 14-, and 16-point gages could not be filled by the domestic machines, and the general trend toward shorter curtains made possible a finer gage and quality curtain at a lower price; this factor stimulated a further demand for the products of the these finer-gage machines. The change to a larger proportion of coarse grades commenced in 1920 and continued with fluctuations on to 1924. This change was due to the introduction of a style called Tuscan, an imitation of coarse Russian filet made "combination" process on machines ranging from 5- to 8-point. Since 1925 the trend has been back to finer gage articles.

3. Exports

Despite the fact that the domestic industry has come to supply 99 percent of domestic lace-curtain requirements, it has never been able to export its products in any appreciable quantities. The reason is apparent. The domestic industry has dominated the home market with the aid of the tariff; in foreign markets domestically manufactured curtains encounter not only the competition of curtains of lower price but of foreign tariffs and in addition Great Britain enjoys the advantage afforded by a preferential tariff in exporting to Canada, the principal market for American exports. Exports of

domestic lace curtains in the years 1922–25, the only years in which they were separately recorded, were as follows:

TABLE 9.—*Cotton lace window curtains: Domestic exports from the United States, 1922–25*

Calendar year	Quantity	Value	Calendar year	Quantity	Value
	Yards			*Yards*	
1922	412,610	$115,395	1924	187,945	$79,344
1923	247,271	97,329	1925	167,848	65,085

Exports from the United States of foreign lace window curtains were separately recorded only from July 1, 1911, the beginning of the fiscal year 1912 to December 31, 1921. In these 10½ years they totaled $26,259 or an annual average of about $2,500.

IV. TARIFF HISTORY

Lace window curtains were specifically mentioned for the first time in the act of 1883 (par. 325). The rate on them then was 40 percent ad valorem. In the act of 1890 lace window curtains of cotton or other vegetable fiber were listed in paragraph 373 and were dutiable at 60 percent ad valorem. Under the act of 1894 (par. 276) the rate was 50 percent ad valorem.

Specific provision was made in the 1897 act (par. 340), and in subsequent tariff acts, for Nottingham lace window curtains. An ad valorem duty of 20 percent was imposed together with specific duties increasing progressively with the fineness of the article, the fineness being measured according to the gage of the machine producing it, and with a minmum rate of 50 percent ad valorem. This method of assessment was presented to the Committee on Ways and Means in 1896–97 by domestic lace-curtain manufacturers who stated that the method would eliminate undervaluation and that the proposed duty would average 50 percent ad valorem. They maintained that the fineness of the curtain depends upon the points or the number of warp threads set up in 1 inch. The greater the number of these threads, the finer must be the work; the higher the quality—that is, the more motions in the machine there must be to each inch of the fabric—the finer and more expensive the yarn and the greater the amount of labor.

The Tariff Act of 1909 (par. 351) retained the duties of the act of 1897.

The Tariff Act of 1913 (par. 265) applied three different ad valorem rates according to the gage of the machine. They ranged from 35 to 45 percent. The method of tariff assessment originated by the act of 1897 was revived in the Tariff Act of 1922 (par. 920), the only differences being that the ad valorem duty was 25 percent instead of 20 percent, while the specific duties were increased 50 percent, with a minimum ad valorem duty of 60 percent.

The Tariff Act of 1930 eliminated the specific rates and provided for an ad valorem duty of 60 percent.

Following are shown the tariff paragraphs and rates of duty on Nottingham lace-curtain machine products under the Tariff Act of 1897 and all subsequent tariff acts.

Nottingham lace-curtain machine manufactures: Rates of duty under Tariff Acts of 1897, 1909, 1913, 1922, and 1930

Act of		Tariff classification or description
Year	Paragraph	
1897	340	Lace window curtains, pillow shams, and bed sets, finished or unfinished, made on the Nottingham lace-curtain machine or on the Nottingham warp machine, and composed of cotton or other vegetable fiber, when counting five points or spaces between the warp threads to the inch, 1 cent per square yard; when counting more than five such points or spaces to the inch, one-half of 1 cent per square yard in addition for each such point or space to the inch in excess of five; and in addition thereto, on all the foregoing articles in this paragraph, 20 per centum ad valorem: *Provided*, That none of the above-named articles shall pay a less rate of duty than 50 per centum ad valorem.
	339	* * * nets or nettings, * * * all of the foregoing, composed wholly or in chief value of flax, cotton, or other vegetable fiber, and not elsewhere specially provided for in this Act, * * *, 60 per centum ad valorem: * * *.
1909	351	Lace window curtains, nets, nettings, pillow shams, and bed sets, finished or unfinished, made on the Nottingham lace-curtain machine or on the Nottingham warp machine, and composed of cotton or other vegetable fiber, when counting five points or spaces between the warp threads to the inch, 1 cent per square yard; when counting more than five such points or spaces to the inch, one-half of 1 cent per square yard in addition for each such point or space to the inch in excess of five; and in addition thereto, on all the foregoing articles in this paragraph, 20 per centum ad valorem: *Provided*, That none of the above-named articles shall pay a less rate of duty than 50 per centum ad valorem.
1913	265	Lace window curtains, pillow shams, and bed sets, finished or unfinished, made on the Nottingham lace-curtain machine, and composed of cotton or other vegetable fiber, when counting not more than six points or spaces between the warp threads to the inch, 35 per centum ad valorem; when counting more than six and not more than eight points or spaces to the inch, 40 per centum ad valorem; when counting nine or more points or spaces to the inch, 45 per centum ad valorem.
	358	* * * nets, nettings, * * * and articles made in whole or in part of any of the foregoing fabrics or articles; all of the foregoing of whatever yarns, threads, or filaments composed, 60 per centum ad valorem.
1922	920	Lace window curtains, nets, nettings, pillow shams, and bed sets, and all other articles and fabrics, by whatever name known, plain or Jacquard figured, finished or unfinished, wholly, or partly manufactured, for any use whatsoever, made on the Nottingham lace-curtain machine, and composed of cotton or other vegetable fiber, when counting not more than five points or spaces between the warp threads to the inch, 1½ cents per square yard; when counting more than five such points or spaces to the inch, three-fourths of 1 cent per square yard in addition for each point in excess of five; and in addition thereto, on all the foregoing articles in this paragraph, 25 per centum ad valorem: *Provided*, That none of the foregoing shall pay a less rate of duty than 60 per centum ad valorem.
1930	920	Lace window curtains, nets, nettings, pillow shams, and bed sets, and all other fabrics and articles, by whatever name known, plain or Jacquard-figured, finished or unfinished, wholly or partly manufactured, for any use whatsoever, made on the Nottingham lace-curtain machine, wholly or in chief value of cotton or other vegetable fiber, 60 per centum ad valorem.

It may be noted that the specific duties of paragraph 920 of the act of 1922 were largely inoperative and that almost all of the imports were entered at the minimum rate of 60 percent ad valorem. In paragraph 920 of the act of 1930 the ineffective specific rates were eliminated, the duty being made a straight 60 percent ad valorem. Table 10 shows the average value per square yard of imports under the act of 1922, together with the value per square yard at which the minimum ad valorem duty became applicable. The compound rates in 1924, the year of largest imports under the act, were operative only on imports of 19-point products, valued at $757, the duty averaging 62.39 percent, this compound rate advancing the duties under the paragraph for the year to 60.02 percent.

TABLE 10.—*Nottingham lace-curtain machine products: Average value per square yard of imports for consumption under the act of 1922, and value per square yard at which minimum ad valorem duty became applicable*

Article made on machine of—	Average value under act of 1922	Value per square yard above which minimum ad valorem duty became applicable	Article made on machine of—	Average value under act of 1922	Value per square yard above which minimum ad valorem duty became applicable
	Per square yard	*Per square yard*		*Per square yard*	*Per square yard*
Five points	$0.305	$0.0428	Thirteen points	$0.403	$0.2142
Six points	.286	.0642	Fourteen points	.374	.2357
Seven points	.367	.0857	Fifteen points	.462	.2571
Eight points	.287	.1071	Sixteen points	.389	.2785
Nine points	.316	.1285	Seventeen points	.322	.2999
Ten points	.239	.1500	Eighteen points	.136	.3213
Eleven points	.276	.1714	Nineteen points	.489	.3428
Twelve points	.255	.1928	Twenty points	.605	.3642

The compound duties were not only too low to be operative but were based upon an unsound theory, i.e., that the value of the lace-curtain product increased according to its fineness. The figures given in table 10 demonstrate that prices have no tendency to increase uniformly according to increases in number of points to the inch. Indeed, the greatest differences between the highest and lowest prices per square yard of goods imported in each year of the act, occurred in prices for the products of the 9-point machines—$0.921 in 1924 and $0.158 in 1926. Clearly, then, labor supply and prices of materials are not the only, or even the determining factors in the price of the finished product; those factors, together with the quality, style, weight, varying with pattern and yarn counts, all of which vary endlessly, determine the price of the finished product. The theory of progressive specific rates of duty such as were to be found in paragraph 920 of the Tariff Act of 1922 is therefore untenable on the basis of price.

TABLE 11.—*Nottingham lace-curtain machine products, composed of cotton or other vegetable fiber: Average value per square yard of imports for consumption, under Tariff Act of 1922.*

Classification by points per inch	1922 [1]	1923	1924	1925	1926	1927	1928	1929	1930 [2]
5 points	$0.364	$0.281	$0.234	$0.453	$0.430	$0.117	$0.268	$0.211	$0.340
6 points	.269	.179	.332	.489	.233	.233	.447	.314	------
7 points	.306	.354	.352	.546	.353	.337	.355	.321	.317
8 points	.538	.419	.369	.325	.246	.196	.289	.333	.222
9 points	.295	.462	.921	.381	.158	.203	.870	.314	.328
10 points	.688	.213	.366	.219	.219	.189	.378	.345	.198
11 points	.258	.396	.495	.326	.237	.349	------	.206	------
12 points	.800	.254	.315	.264	.155	.306	.301	.320	.360
13 points	------	------	.582	.311	.355	------	.312	.371	------
14 points	------	.392	.363	.492	.359	.296	.330	.347	.318
15 points	------	.357	.644	.492	.287	.523	.399	.418	.290
16 points	[3] .070	.309	.744	.354	.376	.369	.376	.410	.330
17 points	------	------	------	------	------	.348	.311	1.340	------
18 points	------	------	------	------	------	.136	------	------	------
19 points	------	------	.412	1.105	1.083	------	------	------	------
20 points	.876	.375	------	.871	.872	.654	.453	.390	.518
Total	.329	.325	.357	.368	.286	.276	.340	.339	.325

[1] From Sept. 22, to Dec. 31, 1922.
[2] From Jan. 1, to June 17, 1930.
[3] This price is based on data in Foreign Commerce and Navigation and, although obviously incorrect no data are obtainable at this date whereby it can be corrected.

V. SUBSTITUTES FOR NOTTINGHAM LACE CURTAINS

The major difficulties of lace-curtain manufacturers have arisen not from foreign competition in the production of the same article but from the competition of domestically produced woven curtains. At the tariff hearings in 1913 before the Committee on Ways and Means (p. 4013) a manufacturer testified that the decline in the production of Nottingham lace curtains was due, in his judgment, largely to competition of curtains of a different type, and that the consumption of Nottingham lace curtains as compared with other types had declined 50 percent. Evidence presented at the public hearings on lace before the Tariff Commission in 1926 indicated clearly that competition from woven curtains was still extremely active.

Woven curtains are dissimilar in style and effect to lace curtains, but inasmuch as they displace lace curtains they may be said to be highly competitive.

The first ruffled curtains were produced by John Hassal in 1895 and the phenomenal expansion of woven fabric is well illustrated by the following quotation from Miss Palmer's study, Labor Relations in the Lace and Lace-curtain Industries of the United States:

> It is reported that about 1902 a lace-curtain jobber went to one of the large schools for training in interior decorating and home economics and asked them to work on some substitutes for Nottingham lace curtains. He maintained that irregularity of production and the dealer's consequent inability to fill orders promptly made the Nottingham curtains a highly unstable product to handle. As a result of his request, the school introduced a scrim curtain trimmed with lace, and dotted Swiss curtains as "colonial curtains" and by 1905 these had completely driven lace curtains out of style. * * * Attempts were made by the lace-curtain manufacturers to regain their lost business by varying their patterns in imitation of the fabric draperies then in style, but to no avail, lace curtains were "out."

The term "woven curtains" includes a wide variety of materials, such as scrims, bordered and printed; Scottish Madras and cretonnes, dotted and grenadine, ruffled marquisette; ginghams, cheesecloth, casement cloth, percales, silks, and theatrical gauze. These materials lend an air of individuality to decorative schemes, and their use is ever widening. Unfortunately there are no statistics to demonstrate the competition which the Nottingham lace-curtain industry meets from this type of goods.

Woven curtains usually sell at a lower price than Nottingham lace-curtains. For woven curtains 27 inches wide and 2¼ yards long the net price in 1925 ranged from 42½ cents per pair to 57½ cents per pair; for the same size Nottingham lace curtain made on a 5½-point machine the price was 58½ cents per pair. At this price, woven curtains offer serious competition.

Two other kinds of curtains may be considered as offering a degree of competition to Nottingham lace curtains: Swiss embroidered curtains and hand-made lace curtains. These substitutes, however, appeal to a different class of trade.

Swiss embroidered curtains are made by cutting bobbinets into curtain lengths and widths and ornamenting them with cut-out woven shapes which are appliquéd on to the basic fabric with an embroidery chain stitch by the operation of Bonnaz, Cornely, or similar sewing machines, and are mainly used by hotels and other institutions which have window decorations carrying monograms, names, and coats of

arms. These curtains are known by various names—Irish point, Brussels, tambour, Marie Antoinette, Battenburg, Renaissance, and Venetian, according to the style and differences in construction; they are usually higher priced than Nottingham lace curtains and appeal to a different trade.

Production of these articles in the United States is small, uncertain, and confined to simple designs, and no census data are available. The bulk of the world's supply is made in the St. Gall Canton of Switzerland; the canton of Appenzell and the adjacent portions of Austria are also producing sections, but production in other European countries is so small as to be almost negligible.

Handmade lace window curtains are mostly of the coarse filet styles, known as Russian, Sardo, and Richelieu. These articles are imported from France, Belgium, Italy, and China. In addition, panel curtains and shades are made of fine linen and other woven materials with inserts of motifs of handmade lace and the entire foot is sometimes of Cluny or Venetian lace. These articles, of course, are very much higher in price than Nottingham lace curtains.

VI. FOREIGN PRODUCTION

Great Britain

The machine-made lace industry is distinctly British in origin and belongs peculiarly to the city of Nottingham, which was a rallying point of lace-machine inventors and the center of the lace industry. Subsequent improvements and adaptations of the machines were made by machinists of Nottingham, the Nottingham lace-curtain machine being the last of the type of lace machines to be evolved from Heathcoat's basic patent. From Nottingham the trade has spread to several European countries and to the United States. Great Britain maintains the lead in the manufacture of lace window curtains, and in spite of the fact that a considerable portion of the lace-curtain industry is now located in Scotland, Nottingham remains the center of the British industry.

At the present time Great Britain has approximately 800 Nottingham lace-curtain machines; the United States is second with 511; Germany third, with 509. The total number now in operation is not known, but according to evidence presented at the tariff hearings in 1921 there were 1,711 distributed among 114 firms.

The Nottingham industry includes 31 mills, the Nottingham district comprising not only mills in the city of Nottingham but lace-curtain mills in Sandiacre, Stapleford, Southwell, Beeston, and other outlying towns. All of these mills are members of the Nottingham and District Lace Manufacturers Association.

Of the machines operated in Great Britain, between 300 and 350 are in Scotland and are operated by 40 firms, most of which are members of the Scottish Lace Manufacturers Association. A portion of the Nottingham lace-curtain industry was first moved to the Irvine Valley, Ayrshire, Scotland, at the beginning of the twentieth century upon the refusal of certain manufacturers to submit to terms demanded by trade unions. The lace-curtain manufacturing district now includes the towns of Darvel, Galston, Kilmarnock, Newmilns, and Stewarton; there are two plants in Glasgow. In Darvel there are about 150 machines, and in Newmilns about 120; one firm in Darvel operates between 30 and 40 machines, and two firms in Newmilns

more than 20 machines each. These factories are all modern. Taxation in these Scottish towns is lighter, and cost of living is cheaper than in Nottingham.

The foreign usage of curtain yarns varies slightly from the domestic practice. In foreign mills, the bobbin and warp yarns are somewhat finer in count. Although essential, they are invisible in the finished curtain. In the bobbin yarn, the finer count is a distinct advantage, as it gives a greater yardage on the bobbins, longer pieces, and there is, therefore, less preparatory labor to the rack. The beam, spool, and fine spool yarns have a tendency to be coarser in count in foreign mills than in domestic mills.

Two significant features of the British lace-curtain industry demand notice. To a large degree the machine manufacture of curtains is carried on apart from the subsequent processes of bleaching, dyeing, dressing, and finishing; the products are sent "in the brown" to a company specializing in "finishing" the goods at commission rates. The firm in Great Britain which does most of this work is the Nottingham Lace-Curtain Bleachers, Dressers & Finishers Association. This association issues periodically to the trade a price list giving the finishing rates for curtains, per pair; for nets, per dozen yards, and for all other products of the lace-curtain machine. A few manufacturing firms carry out all the finishing processes themselves, but most lace-curtain products are finished apart from their manufacture.

Another feature of the Nottingham lace-curtain industry is the number of small operators who rent lace-curtain machines from machine builders, and floor space or "standings", including power and heat in tenement mills.

The British lace-curtain industry has been less vulnerable to periodic trade slumps than other branches of the lace industry; it has been able to maintain its production on a fairly even keel. During the war it was fairly well employed; immediately after the war it enjoyed a tremendous boom, large orders pouring in from domestic as well as from foreign markets. This boom disclosed a shortage of labor and material which caused considerable delay in filling orders.

Beginning in 1921, in spite of the fact that the British lace industry as a whole suffered a severe and prolonged depression, the lace-curtain branch, although its production decreased considerably from boom times, maintained a fairly prosperous condition. This is clearly shown in the interim report of the lace, embroidery, and silk industries committee in 1923, which states that the lace-curtain branch was in a "comparatively good position" and that the situation in the lace-curtain industry "did not call for special consideration." However, the committee recommended the same rate, namely 33⅓ percent tariff on lace-curtain machine products as on other lace products, because "the administrative difficulties arising out of their exclusion from the scope of any duty which is imposed would be considerable." The recommendation was not put into effect until 1925.

In 1927 and 1928 the lace-curtain industry in Great Britain enjoyed another boom period. A consular report from Nottingham in 1928 stated that the lace-curtain industry in Great Britain was as prosperous in 1927 as at any time in its history, that most factories were running to capacity, and that every capable worker was employed on full time. It further stated that for a year or two preceding this period, when lace curtains seemed in danger of being displaced as

window draperies by casement-cloth (woven curtains), the manufacturers, calling dyers and finishers to their aid, produced lace curtains in attractive shades of color, adopted the slogan "Lace lets in the light", and so vigorously defended their trade that they became more prosperous than ever.

Incidentally, the British have retained to a large extent their use of long window curtains and heavy lace curtains, and have adopted less generally than have the Americans the use of woven curtains. These factors are of importance in the prosperity of the British industry.

Statistics of the production of lace curtains in Great Britain are scanty and incomplete. Production is reported only in the census years 1907, 1912, 1924, and 1930, and for these years do not include the output of all factories. The figures given for value of products represent curtains "in the brown", and the values given for finishing processes contain duplications.

The census of 1907 gives the following production figures for the lace curtain section of the lace industry: £1,571,000, of which amount England produced £665,000 and Scotland £906,000, constituting 42 and 58 percent, respectively, of the total. The number of machines for which data were furnished was 692. Complete data for 1912 are not available, only the total value of the products being shown, £1,865,000; this is an increase in value over 1907 of about 19 percent. In 1924 this total value was given as £2,474,000, of which amount England produced £951,000 and Scotland, £1,523,000 or 38 and 62 percent, respectively, a slight increase for Scotland. The increases over the totals for 1907 and 1912 are discounted by the increase in price of raw materials following the war, and it is evident that the quantity produced was less in 1924 than in 1907 and 1912. The number of machines for which data are shown was 620. The final report on the census of production, 1930, states the value of cotton lace curtains, piece goods, and other cotton lace goods made on curtain machines as £1,865,000, of which amount England produced £683,000 and Scotland £1,182,000, or 37 and 63 percent, respectively. The total was about 25 percent less than in 1924.

Great Britain is the only country which exports Nottingham lace curtains to any degree; her exports, however, are fairly small when compared with her total production. Further, British exports have declined considerably since 1920 as is shown in the following table:

TABLE 12.—*British exports of cotton lace curtains, 1920–32*

Year	Exports	Year	Exports
1920	£872,815	1927	£410,459
1921	523,221	1928	371,222
1922	597,080	1929	336,003
1923	463,033	1930	250,627
1924	457,049	1931	184,968
1925	466,014	1932	212,251
1926	381,797		

The United States was formerly an important importer of Nottingham lace-curtain machine products from Great Britain, and although American imports of lace curtains are small at the present time, they come almost entirely from Great Britain. There is no single large foreign market for British lace curtains; practically every country in the world imports small quantities, 35 countries being listed in 1932. More than 73 percent of British exports in 1932 were taken by the British possessions. Among the larger importers of British lace curtains are: The Irish Free State, Australia, Canada, the Netherlands, and Japan. Most of the Nottingham lace-curtain machine products exported to the United States are consulated at Sheffield and shipped from Liverpool, but marine freight rates from all British ports to New York are the same.

Labor conditions in British curtain mills.—Lace-curtain weavers, or twisthands, are cited as being the best paid textile workers in Great Britain; they are strongly organized as a branch of the Amalgamated Society of Operative Lace Makers. The oldest union card for the payment of twisthands appears to be that of November 7, 1869. This card was in use until January 1891; the revised card instituted at that time was further revised and issued September 20, 1897; this card was amended by the Government arbitrator on September 5 and December 13, 1905, was further amended April 12, 1907, and was reissued with revisions on June 22, 1914.

The twisthands in Scottish mills maintained a separate organization until 1920 when the establishment of the British Lace Operative Association united the workers throughout the United Kingdom. The most significant result of this amalgamation of March 1, 1920, was the equalization of wage rates throughout the British lace-curtain industry. Previous to that time there were serious discrepancies in the rates of payment between the English and Scottish mills which had grown up after the removal of a considerable portion of the industry to Scotland about 1900. The disparities is payment were uniformly to the disadvantage of the Scottish worker. The new agreement of 1920 standardized wages and hours of labor throughout the industry, except that twist hands' wages are 5 percent lower than in Nottingham, this deduction offsetting the increased cost of yarn and of other raw materials incurred for transportation from distant yarn-spinning centers.

Other countries

The almost universal use of lace curtains has resulted in the establishment of factories in Spain, France (since 1850), Italy, Germany (since 1879), Austria, Norway, Sweden, Denmark, Poland, and Russia. In each of these countries the foreign trade in lace curtains is negligible, the local industries supplying the respective home markets. In Germany there are 19 mills containing 509 machines. One mill in Dresden contains 100 Nottingham lace-curtain machines and is the only foreign mill approximating in size the largest American mill, which contains over 100 machines.

VII. LABOR

Types of employees

The two important branches of the lace industry, the lace-curtain and the Levers, require to a certain extent the same types of workers. Employees who might work in either branch are yarn winders, warpers, brass-bobbin winders, and threaders; in addition, the lace-curtain industry requires spoolers. The remaining types of workers, the designers, draftsmen, readers of the pattern, punchers, correctors of the Jacquard cards, and twisthands are employed in both branches of

the industry, but their training is so different that it is rare for the workers in one branch to know anything about the work in another. Another member of the force whose importance should be emphasized is the expert fitter for changing machines to make different classes of work.

Twisthands are always men, as the manipulation of the machines requires great strength and constant climbing of ladders (for the purpose of adjusting Jacquard cards for the repeat and bottom border of the curtains) which become very slippery from the floating graphite used to lubricate the inside parts of the machine. Slip-winding is done entirely by women; warping is performed by men; brass-bobbin winders comprise both men and women; and threading is done by boys and girls. Some women who have studied the principles of design in art schools are to be found among designers; draftsmen, readers, and punchers are exclusively men, although girls are used to some extent in copying and repeating parts of drafts. Menders, overlockers, and finishers are entirely women, and the auxiliary help in the dressing room is chiefly female; most of the help in the bleachery is male.

Designers and draftsmen are highly skilled and the best paid employees in curtain factories. They, together with the readers and punchers (the total number of all four in each factory being very small) receive fixed monthly salaries.

The twisthand is a skilled worker among whose duties are close supervision of the threading of the machine, which consists in putting thousands of warp and spool threads through the eyelets and their respective guide bars, and the adjustment of the pattern cards on the Jacquard cylinder, which is connected by hundreds of strings with the jacks and the well of the machine. This Jacquard harness must be of a definite length and tension and though the strings are of high grade linen yarn the heat of the summer months is apt to induce differences which must be found and carefully adjusted. During the operation of the machine the twisthand must provide for equality of tension among the thousands of threads which operate simultaneously; he must replace empty brass bobbins and tie broken threads. Twisthands are paid entirely by the "rack."

The "auxiliary workers", the yarn winders, warpers, brass-bobbin winders, threaders, spoolers, etc., are unskilled workers paid by the hour, or piece rate.

Although American-born labor predominates in the auxiliary occupations of the domestic industry, most of the twisthands are English or Scottish. The reasons are apparent: First, the industry is of foreign origin and was rather abruptly transplanted into this country; it is natural, therefore, that the original twisthands, along with designers and draftsmen, should have been imported; second, the trade is so skilled that it requires 3 years of apprenticeship in order to become a twisthand; third, the twisthand's knowledge and skill acquired by years of patient training and experience are useless in other trades; therefore, as the worker is paid exclusively by piece rates (the wages are good in the busy season), the position of the twisthand is rendered insecure by the fluctuating demand for his product through periodic depression and other causes.

Obviously, a long apprenticeship at low pay in order to acquire an insecure position does not appeal to American-born labor. Even

the sons of the twisthands show no disposition to adopt the trade of their fathers. The results are an extremely low labor turn-over, long periods of service, and continued dependence of the industry upon foreign-born labor.

Domestic Nottingham lace-curtain factories run 18 hours per day and 97 hours per week,[5] two twisthands operating a machine on alternating shifts of 9 hours. Although most domestic mills operate upon this 2-shift basis—from 5 a.m. to 2 p.m., and from 2 p.m. to 11 p.m.—one mill in Pennsylvania operates upon the European 4-shift system. It is important to note that these are the hours worked by the twisthands only; the operation of the machine does not require the continuous services of the auxiliary workers, who have regular hours fixed by the individual mill or by State legislation.

Labor union organization

Workers in Nottingham lace-curtain mills, together with those in all other branches of the lace industry, are members of the Amalgamated Lace Operatives' Society of America. This organization is divided into three practically independent sections: The Curtain section (composed of lace-curtain twisthands with whom are generally included bobbinet hands), the Levers section (composed of Levers twisthands), and the Auxiliary section (composed of auxiliary workers in both branches). For a scholarly and detailed account of labor problems in the lace industry, the reader is referred to Miss Gladys Palmer's study, "Labor Relations in the Lace and Lace-Curtain Industries in the United States", published by the Bureau of Labor Statistics in 1925. Only a brief review of the subject is here given.

Twisthands.—Twisthands in the Nottingham lace-curtain industry, comprising a restricted group of highly-skilled workers, have maintained an effective labor organization since 1893, particularly as compared with their coworkers in the Levers branch of the industry. In the United States the earliest Nottingham lace-curtain twisthands were members of British unions and retained their memberships therein but formed local benefit societies chiefly to obtain insurance. As a direct result of periodical communication between the secretaries of these societies, the Society of Amalgamated Lace-Curtain operatives of America was formed in 1893. The turbulent history of this society up to the present time will not here be recited, but it may be well to quote one pertinent paragraph from the study referred to:[6]

> In the industry in which great irregularity of employment, accompanied by a high degree of specialized skill, places a premium on security of the job, a trade-union's efforts to improve working conditions tends to center first in measures affecting the entrance to the trades. Control of the labor supply has long been recognized as the most important feature of trade-union policy in those industries in which it is economically possible. In the case of the lace and lace-curtain weavers, a natural monopoly of highly-skilled crafts in an industry in process of transplantation was molded into effective control of the labor supply through the following union policies: (1) High initiation fees if the circumstances warranted restriction; (2) length-of-service requirements in accepting transfer or traveling cards from European lace worker's trade unions; (3) regulation of apprenticeship with respect to numbers allowed, age limits, and length of term to be served; (4) semiofficial and official action on importation of such weavers by American employers, under the alien contract labor law; and (5) attainment of the closed shop.

[5] These hours have since been reduced to 80 operative hours per week under the conditions of the N.R.A., Code regulating the Nottingham Lace-Curtain Industry.

[6] *Labor relations in the Lace and Lace-Curtain Industries in the United States,* Bureau of Labor Statistics, 1925, p. 27.

Probably the most extensive entries of skilled workers were those in 1900 and 1901 at the founding of Zion Lace Industries at Zion City, Ill. Lace-curtain and Levers draftsmen, designers, readers, punchers, foremen, fitters, and twisthands, and in addition, an expert bleacher, dresser, warper, also menders and finishers were brought into the country in four installments. These importations were opposed by the labor unions, though it is doubtful if they could have proved that such an extensive amount of "labor of like kind" was unemployed at the time. After several appeals on behalf of the first group of immigrants, who were detained in Philadelphia, the case was eventually decided by the Secretary of the Treasury, who was at that time the final arbiter in the matter, and they were allowed to enter. An influencing factor may possibly have been the simultaneous importation of many lace-curtain and Levers lace machines, of auxiliary machinery of various kinds, and of quantities of fine yarn, all of which were forwarded to the custom house in Chicago for ultimate transfer to the location of the projected industry. Further importations of skilled labor on a large scale took place in 1909 and 1910, the period during which Levers lace machines entered the country free of duty under the special provisions of the Tariff Act of 1909.

That there was some system of joint control by labor unions and manufacturers is indicated by the fact that when, during the war, the domestic bobbinet mills were not able to supply sufficient netting for Army purposes and recourse was had to a substitute made on Nottingham lace-curtain machines, one firm, which was awarded a contract for a large amount by the Government, had to submit the question of supplying the needed material to the union officials. Further evidence of such control may be cited as follows: In an effort to enforce punctuality, at the early shift, on the part of the twisthands, one firm asked permission of the union to install a time-clock system.

It is important to note that the twisthands' organization was very successful in securing the closed shop. By 1902 the closed shop had been obtained in the lace-making departments of 11 mills making lace curtains. At the present time, the lace-curtain section maintains the closed shop in the lace-making departments of 9 plants employing more than 80 percent of lace-curtain twisthands. No general strike has ever been called in the Nottingham lace-curtain industry, all strikes have been strictly local and susceptible of satisfactory adjustment between the employees and the union.

Auxiliary workers.—The auxiliary workers in the Nottingham lace-curtain factories were slower in forming themselves into industrial unions and have been less effective in their organized activities. They have never obtained closed shops in any of the domestic mills but have exerted considerable strength in local collective bargaining.

VIII. WAGE DATA

Twisthands and the price list.

The basis of payment of twisthands[1] in the Nottingham lace-curtain industry has not changed in two-thirds of a century. Its history dates back to the old English piece-work price lists established in the early years of collective bargaining in the industry. The revised English price lists of 1869 constituted the foundation for the revised price lists of 1884, 1889, and 1897, as well as for the first uniform domestic price list established in the lace-curtain industry in the United States in 1900. Table 13 reproduces the 1900 price card which is the basis of the revised price card of today.

[1] The use of the word "weaver", now common in the domestic lace industry, tends to confuse the operator of a lace machine with the operator of a cloth loom, and is here replaced by the term used in England—"twisthand".

TABLE 13.—*Revised list of prices, 1900, paid twisthands for making Nottingham lace-curtain machine products: Rates (in cents) per rack on machines of specified gage and width*

Type of product	6-point		7-point	8-point			9-point	10-point		
	324 inches	360 inches	324 inches	300 inches	324 inches	360 inches	324 inches	272 inches	300 inches	324 inches
Ordinary, 3-gait	6¼	6¾	6½	6½	6¾	7¼	7	6¾	7	7¼
Ordinary, 4-gait	6¾	7¼	7	7	7¼	7¾	7½	7¼	7½	7¾
Double action, 3-gait	6¾	7¼	7	7	7¼	7¾	7½	7¼	7½	7¾
Double action, 4-gait	7¼	7¾	7½	7½	7¾	8¼	8	7¾	8	8¼
Madras, 3-gait	------	------	7½	7½	7¾	8¼	8	7¾	8	8¼
Madras, 4-gait	------	------	8	8	8¼	8¾	8½	8¼	8½	8¾
Double action, madras, 3-gait	------	------	8	8	8¼	8¾	8½	8¼	8½	8¾
Double action, madras, 4-gait	------	------	8½	8½	8¾	9¼	9	8¾	9	9¼
Double spool	------	------	9¾	9¾	10	10½	10¼	10	10¼	10½
Double spool fish net	------	------	------	11¼	11½	12	11¾	11½	11¾	12
Combination	------	------	9¾	9¾	10	10½	10¼	10	10¼	10½
Swiss and combination	------	------	12½	12½	12¾	13¼	13	12¾	13	13¼

Type of product	11-point	12-point				14-point		16-point
	324 inches	240 inches	256 inches	300 inches	324 inches	240 inches	272 inches	240 inches
Ordinary, 3-gait	7½	7	7¼	7½	7¾	7½	7¾	8
Ordinary, 4-gait	8	7½	7¾	8	8¼	8	8¼	8½
Double action, 3-gait	8	7½	7¾	8	8¼	8	8¼	8½
Double action, 4-gait	8½	8	8¼	8½	8¾	8½	8¾	9
Madras, 3-gait	8½	8	8¼	8½	8¾	8½	8¾	9
Madras, 4-gait	9	8½	8¾	9	9¼	9	9¼	9½
Double action, madras, 3-gait	9	8½	8¾	9	9¼	9	9¼	9½
Double action, madras, 4-gait	9½	9	9¼	9½	9¾	9½	9¾	10
Double spool	10¾	10¼	10½	10¾	11	10¾	11	11¼
Double spool fish net	12¼	11¾	12	12¼	12½	12¼	12½	12¾
Combination	10¾	10¼	10½	10¾	11	10¾	11	11¼
Swiss and combination	13½	13	13¼	13½	13¾	13½	13¾	14

Width: A ¼-cent rise and fall for every 3 quarters. All inches less than a quarter not to be paid for. A quarter and over to be paid for as 3 quarters.
Gage: All gages to rise or fall ¼ cent for every gage.
Ordinary double action with 1 cylinder ½ cent more than when made with 2 jacquards.
All laces and edgings to be paid the same price as curtains.
Punched through patterns ¼ cent less. Patterns not punched through up to and including 30 quality shall be paid ½ cent extra, and if punched through up to and including 30 quality the ¼ cent shall not be deducted.
Nets of 30 quality and under, ¼ cent less than curtains; over 30 quality ½ cent less.
6 hours time work for entering or reentering beams.
Drop threads: All time lost putting up threads to be paid for.
Time work to be paid at the rate of 25 cents per hour, or $15 per week. Men on time work to make the same hours as men on shifts.
Percentage to be added: 5 and 6 points, 12 percent above card price; 7 and 8 points, 10 percent above card price; all gages above 8-point, 8 percent above card price.

The principles of payment established in these lists have never been fundamentally changed; however, the card has been revised and elaborated to embrace new styles and new types of construction. The basis of payment of a curtain twisthand is the "price per rack", the "rack" being a standard production unit of 720 double or 1,440 single motions. The price list specifies variations in price according to the width of the machine, the gage, and the added equipment necessary for producing different styles, and kinds of yarn. The width of the machine is reckoned in quarters—a quarter of a yard—9

inches—the standard by which lace machines are measured. The lowest price paid is for ordinary 3-gait work, with increases in proportion to the difficulties induced by finer gages, increased widths, extra gaits, working two jacquards or one jacquard at double speed (double action), extra bars (Madras), extra bars and double action together, two spool boards (Swiss), combination, and the conjunction of Swiss and combination. The price paid for the last item is nearly double that paid for the simplest style, ordinary, 3-gait. Patterns not punched throughout but in which the twisthand is required to turn the cards to make extra repeats are paid for at an extra rate.

The principle of payment of curtain twisthands has been summarized by Miss Palmer, as follows:

> The larger the machine, the finer the gage, or the more complicated the working apparatus, the more arduous is the work and greater is the responsibility of the weaver. A greater number of threads in the machine, or more delicate threads, increases the liability of breakage and requires greater dexterity and speed. The worker is therefore entitled to greater compensation, and it is upon this principle that the piecework price list was evolved.

Before the establishment of uniform price lists in the American industry, prices paid varied considerably, Scranton paying the highest wages, Wilkes-Barre the lowest, and Philadelphia midway between. As early as 1893 the question of inequality was raised in the union meetings, and an attempt was made to have the Philadelphia price card recognized as uniform, but it was not until 1900 that the uniform card was adopted.

The introduction of new styles and of more complicated processes led to the issuance of a new and much more elaborate price card in 1920. For example, filet, which now constitutes the larger part of the American production, did not appear upon the price card of 1900. The latest card, issued in 1933, includes 27 styles instead of 12, and 62 machine widths distributed among the various gages instead of 18 as in the card of 1900. In addition, the width of machines is quoted for both smaller and larger machines from 108 inches for 16-point machines to 450 inches for 6 points. The quoting of a rate for machines under 200 inches in width indicates the presence of very old machines, and the increase to 450 inches is indicative of the progress in machine building. Whereas only 4 of the simplest items were scheduled for the 6 points in 1900, the whole range of styles is included for that gage in 1920. Obviously, the new card is much more comprehensive and complicated than the old. Further, the new card provided considerable advances in basic rack prices. The following table demonstrates the advance in these prices for making "Swiss combination".

TABLE 14.—*Nottingham lace-curtain machine products: Advance in payment for Swiss combination, the same width of machines under the domestic wage rate cards of 1900 and 1933*

Gage	Width	Price 1900 card	Price 1933 card	Percentage of increase	Gage	Width	Price 1900 card	Price 1933 card	Percentage of increase
	Inches					*Inches*			
7-point	324	$0.12½	$0.3284	162.72	11-point	324	$0.13½	$0.3483	158.00
8-point	324	.12¾	.3349	162.67	12-point	324	.13¾	.3546	157.46
9-point	324	.13	.3353	157.93	14-point	240	.13½	.3483	158.00
10-point	324	.13¼	.3419	158.04	16-point	240	.14	.3612	158.00

Time work was paid at a rate of 25 cents per hour in 1900 and under the 1920 card was advanced to 69 cents per hour, at which price it remained in 1933, an increase of 176 percent.

Increases or decreases in payment do not change the basic price list but are reckoned on a percentage basis from the price list. These increases and decreases have corresponded rather closely to the prosperity or depression of the industry as induced by decorative fashion and not the general trend of business. For example, there were substantial annual increases between 1897 and 1903, the period of greatest prosperity to the industry. These increases were granted without collective bargaining. The first collective bargaining occurred in 1907, when a 9-hour day and increases in time rates and rack prices were obtained. The industry was severely depressed between 1907 and 1916, and consequently there were no payment increases. The war and post-war boom resulted in many price conferences and many price increases, culminating in 1921 when rack prices were 103 percent above those paid in 1909 and 18 percent above those established by the card of 1920. Subsequent to 1921 there were rack price reductions. Since 1922 conferences between manufacturers and the union have been held twice a year, October or November and February or March. They are held at these seasons to establish wage levels before the issuance of price lists for the products of the machines.

British wage rates

The revised list of "Prices for lace goods made on the curtain machine" (meaning piecework rates paid the machine operator, the "twisthand") promulgated in September 1905 and reprinted in 1914 was superseded by another list issued in September 1931. It is of interest to note the differences shown by the British cards of 1914 and 1931.

In 1914 fabrics were grouped under 11 standards, with variations, for 16 gages of machines, from 5 to 20 points, inclusive, of 26 different machine widths listed by the standard of quarters of 9 inches, 15 to 40 quarters or 135 to 360 inches. In 1931 fabrics were grouped under 3 standards, with variations, for 12 gages of machines, 5, 6, 17, and 19 points omitted, and 11 widths listed by standards of 30 inches, from 180 to 480 inches. Time work was paid at 1 shilling and 6 pence per hour, less 17½ percent ($0.30 at par value of $4.8665).

The card for the American industry lists 27 varieties of fabrics according to technical differences of construction for 9 gages of machines, and 22 machine widths ranging from 108 to 450 inches. These differences in classification of products under the respective cards make it impossible to draw an accurate conclusion as to the percentage of difference paid in the respective industries. Time work in American mills is paid at the rate of 69 cents per hour; this is 130 percent more than the price paid in the foreign industry.

The difference in the organization of the domestic and foreign industries—mill ownership in the United States as contrasted with the tenement factory system in Great Britain, and continuity of operation in the United States as contrasted with the performance of processes on commission in Great Britain—render a comparison of processing and auxiliary wages in the two countries impossible.

Payment for the processes in domestic mills

There is no uniformity of payment for the different preparatory processes in domestic curtain mills; neither is there any established method of fixing rates. The weighted average rate per hour paid for the different processes in 6 of the 9 curtain mills investigated by the United States Tariff Commission in 1924, and which kept detailed records for employees and hours, is shown in table 15. As shown by this table, the largest percentage of wages, about one third, is paid to the twisthands; one fifth of the total is paid to the highly skilled machinists, the designers, and the draftsmen; the other departments—yarn processing, bleaching, finishing, and others—in the order named.

The amount paid in 1923 to Nottingham lace-curtain machine twisthands, apart from foremen and auxiliary help, in the nine mills investigated by the United States Tariff Commission was $1,188,897.13 and the amount paid to the drafting force was $284,865.45. The ratio of the designing and drafting to twisthand labor affords an index of the importance of the style element; for every dollar paid to the twisthands, of whom there are many, $0.24 was paid to the drafting force, of whom there are few; or conversely, $4.17 was paid twisthand labor for every dollar paid to the drafting force.

TABLE 15.—*Weighted average wage-rates per hour in domestic Nottingham lace-curtain mills, 1923*

Process	Rate per hour		Weighted average	Percent of total
	Lowest	Highest		
Yarn processing:				
Slipwinding	$0.3305	$0.4584	$0.4155	
Brass-bobbin winding	.4623	1.1234	.5928	
Threading	.2990	.7087	.3811	
Warping	.4373	1.1004	.7047	
Auxiliary	.2545	.3120	.2914	
Supervision	.4539	1.1825	.9187	
Spooling			.9625	
Subtotal			.4768	17.33
Lace making:				
Making	.7988	1.1479	1.0091	
Auxiliary	.3715	.7656	.6198	
Supervision	1.0000	2.0754	1.4599	
Subtotal			.9432	34.28
Bleaching, dyeing, dressing:				
Bleaching	.3403	.6229	.4067	
Dyeing	.4018	.4641	.4119	
Dressing	.2855	.5726	.3247	
Auxiliary	.2513	.3802	.2764	
Supervision	.5889	1.3040	1.0335	
Subtotal			.3868	14.06
Mending and finishing:				
Mending	.3306	.8316	.4838	
Drawing	.3477	.4489	.4219	
Overlocking	.2810	.5159	.3209	
Finishing	.2446	.5028	.3340	
Auxiliary	.2212	.3412	.2475	
Supervision	.7049	1.4181	1.1062	
Folding			.3612	
Cutting			.3463	
Fringing			.4264	
Edging			.6316	
Subtotal			.3857	14.01

TABLE 15.—*Weighted average wage-rates per hour in domestic Nottingham lace-curtain mills, 1923*—Continued

Process	Rate per hour		Weighted average	Percent of total
	Lowest	Highest		
Expense labor:				
Operating power department	$0.4468	$0.6757	$0.5765	
Operating repair department	.6333	.8608	.6866	
Clerks and timekeepers	.2454	.5238	.4610	
Yardmen and watchmen	.4038	.4829	.4534	
Sweepers	.1333	.4408	.3353	
Sample and shipping labor	.3732	.7778	.4106	
Designing, drafting, reading, and punching	.6241	.6458	.6382	
General	.5209	.8900	.7819	
Subtotal			.5592	20.32
Weighted grand average			.5406	

IX. COST OF PRODUCTION

Seven variable factors affecting cost

There are seven variable factors in the manufacture of Nottingham lace curtains: Style, pattern, gage, quality, yarn, size, and finish.

Style.—The principal styles are Nottingham or ordinary, Swiss or double-spool, bar ground (of various types, filet net, etc.), and combination. The merging and adaptation of these basic styles results in a labyrinth of different styles, an analysis of the 1926 line of one firm showing 15 different fabrics.

Pattern.—The number of patterns which can be made of each style is practically limitless; pattern affects cost vitally because it is a determining factor in the weight of the product.

Yarns.—Each pattern varies according to the counts of yarn used, and there is no uniformity of practice in the use of yarns for the production of the same style of fabric on the same gage machines in different mills.

Quality.—Quality varies with the gage of the machine and the style of the fabric produced.

Gage, size, and finish.—Most styles are made on machines of at least 10 different gages. Difficulties in cost comparisons which arise from differences in sizes of curtains or nets may be overcome by reducing the area to a square yard basis. The product may be finished in various ways; overlocked, trimmed with lace or fringe.

Difficulties in establishing comparability

The cost of materials and of labor in the manufacture of lace curtains varies according to the incidence of the seven variable factors. Clearly, then, the cost of production, even of the simpler, standard, domestic lace curtains is difficult to compute. To select comparable domestic and foreign samples in which all factors are equal for cost comparisons becomes an impossibility. The law, however, requires that the articles compared be "like or similar", not identical.

Material costs

A piece of lace curtain or lace-curtain net, in the brown or unfinished state, is generally taken from the machine in a length which is termed a winding, that being the name given to the number of racks made by one filling of the brass bobbins.

All Nottingham lace curtains and lace-curtain nets have three sets of threads, the bobbin, the warp, and the spool, all of which are essential for the production of the simplest styles. These yarns are used in different proportions. The exact amount of bobbin and warp yarn used in a winding can be ascertained with accuracy by the following methods of calculation: In a 12-point machine, 360 inches wide, there are 4,320 brass bobbins working, if the whole width of the machine be utilized, and if 100 yards of 100/2 cotton[7] be placed on each brass bobbin the total weight of such yarn will be

$$\frac{4{,}320\ \text{(bobbins)} \times 100\ \text{(yards)}}{42{,}000\ \text{(yards per pound)}} = 10.2856\ \text{pounds}$$

When the winding is made, and the empty set of bobbins is taken from the machine, the residue of yarn in them is stripped off and weighed, the amount is deducted from the full weight of yarn in the set and the remainder is the amount of bobbin yarn in the piece. Therefore, if the amount of waste stripped off the empty bobbins amounts to 1.2856 pounds,[7] it follows that the amount of bobbin yarn in the completed piece is 9 pounds.[8]

The amount of warp yarn in a winding may be calculated by two methods. First, when the warp is wound a ticket is placed between the warp threads every hundred yards; this makes it possible to ascertain with accuracy the number of racks of a given quality made by 100 yards of the warp. The method already shown for calculating the weight of yarn on a set of brass bobbins is the formula to be used for finding the weight of warp in the machine racks made by 100 yards of warp yarn. Second, a thread from the warp may be pulled off (preferably at the edge of the piece where it will not show in the pattern) for 100 racks of a given quality, and carefully measured to the fractional parts of an inch. This measurement, multiplied by the number of warp threads and divided by the number of yarn yards to the pound, will give the weight of warp yarn in 100 racks. The amount of yarn used from the extra beam, in filet and other bar ground fabrics may be calculated in the same manner except in the rare instances where the beam threads are jacked. When the weights of the brass-bobbin yarn, the warp yarn, and the beam yarn are deducted from the total weight of the piece, the remainder of the weight is spool yarn. When only one count of spool yarn is used, there is no difficulty in computing the weight, but in Swiss or double spool patterns, while the amount of the total spool yarn can be ascertained, the amount of each count of spool yarn cannot be accurately ascertained and must be the subject of judicious estimate from a study of the different amounts of the two spool yarns required, according to the details shown by individual patterns, with proper appreciation of the difference in the weight of the yarn counts used. A small percentage is allowed for yarn waste in the preparatory processes.

Adjustment of costs for different counts of yarn

Some manufacturers compute costs of patterns, assuming different counts of yarn from those which have been actually used; the procedure consists of taking the known weight of yarn used for an individual count, multiplying by the number of the count used and dividing by the number of the count of yarn which it is desired to substitute for the original. This gives the weight of yarn for the substitute count, and based upon the premise of the same length of yarn being used in the pattern for the original and substitute counts, the estimate is practically correct, as the yardage of the counts is fixed by a definite arithmetical ratio and the variation in the length, which might be due to a coarser or a finer count of yarn, would be very slight. The following examples demonstrate the method of procedure. Weight 20 ounces number 40/2 used; weight required for 50/2.

$$\frac{20\ \text{ounces} \times 40}{50} = 1\ \text{pound, or if the same weight be taken for 50/2}$$

and the weight be required for 40/2, $\frac{20\ \text{ounces} \times 50}{40} = 25$ ounces.

The new weight obtained by this method will then be multiplied by the price of the substitute yarn.

[7] The amount, the yarn count, and the waste are hypothetical for the purposes of the illustration of this system of calculation.

[8] The cost of bobbin yarn waste, when identified with a specific piece, is charged against that piece.

Analysis of domestic and foreign costs

In 1923 and 1924 cost of production data were obtained by the United States Tariff Commission from 9 representative manufacturers of Nottingham lace-curtain products who operated 466 machines, 89.62 percent of the machines of the domestic industry. Figures were obtained on four principal current styles—Nottingham or ordinary, filet, Swiss, and combination. Similar data were obtained from 9 mills in Great Britain, 3 in England, and 6 in Scotland, all of which were engaged solely in making Nottingham lace-curtain machine products.

The most conclusive significant information resulting from this investigation is that disclosing the percentages of total cost in the United States and Great Britain represented by material, labor, and manufacturing expense per square yard. The following table shows, for the domestic industry, these percentages for the averages of 40 samples of filet, 16 of Nottingham or ordinary, 7 or Swiss, and 8 of combination.

TABLE 16.—*Percentages of total cost of production represented by material, labor, and manufacturing expense—71 samples of domestic Nottingham lace curtains and nets, 1923*

Style	Samples	Material	Labor	Manufacturing expense	Total mill cost
		Percent	*Percent*	*Percent*	*Percent*
Filet	40	50.10	27.41	22.49	100
Nottingham or ordinary	16	49.29	28.10	22.61	100
Swiss	7	53.58	25.99	20.43	100
Combination	8	48.35	28.54	23.11	100
Total of samples and average of percentages	71	50.12	27.52	22.36	100

With the percentages in the above table may be compared those appearing in the table below giving the same information for 32 samples produced in Great Britain, 16 of filet and 5 of Nottingham or ordinary, 5 of Swiss, and 6 of combination.

TABLE 17.—*Percentages of total cost of production represented by material, labor, and manufacturing expense—32 samples of lace curtains and nets produced in Great Britain, 1923.*

Style	Samples	Material	Labor	Manufacturing expense	Total mill cost
		Percent	*Percent*	*Percent*	*Percent*
Filet	16	56.32	27.33	16.35	100
Nottingham or ordinary	5	57.31	28.71	13.98	100
Swiss	5	64.57	27.11	8.32	100
Combination	6	55.75	29.69	14.56	100
Total of samples and average percentages	32	57.41	27.93	14.66	100

Classifying the 71 domestic samples and 31 of the British samples according to the gage of the machine producing them and analyzing the percentages of total costs represented by material, labor, and manufacturing expense, we obtain the figures shown in the following tables:

TABLE 18.—*Percentages of total cost of production represented by material, labor, and manufacturing expense—71 samples of domestic Nottingham lace curtains and nets divided according to gages, 1923*

Gage of machine	Samples	Material	Labor	Manufacturing expense	Total mill cost
		Percent	*Percent*	*Percent*	*Percent*
6-point	13	50.68	26.86	22.46	100
7-point	3	55.20	23.85	20.95	100
8-point	16	51.89	26.75	21.36	100
10-point	17	46.22	29.45	24.33	100
12-point	10	52.30	26.27	21.43	100
14-point	9	50.81	27.78	21.41	100
16-point	3	48.19	28.17	23.64	100
Total of samples and average percentages	71	50.12	27.52	22.36	100

TABLE 19.—*Percentages of total cost of production represented by material, labor, and manufacturing expense—31*[1] *samples of Nottingham lace curtains and nets produced in Great Britain divided according to gages, 1923*

Gage of machine	Samples	Material	Labor	Manufacturing expense	Total mill cost
		Percent	*Percent*	*Percent*	*Percent*
8-point	5	60.50	29.21	10.29	100
10-point	11	57.69	28.00	14.31	100
12-point	5	58.71	25.67	15.62	100
14-point	7	57.24	29.21	13.55	100
16-point	3	56.94	25.71	17.35	100
Total of samples and average percentages	31	57.93	27.75	14.32	100

[1] One 18-point sample is omitted, there being no comparable domestic machine.

Perhaps the most striking fact revealed by these tables is that the percentage of total cost represented by labor is almost identical in the domestic and British industries and that the figure is low, an average of between 27 and 28 percent, as compared with material costs which average 50 percent in the domestic industry and 57 percent in the British industry. These facts explain to a substantial degree why the domestic industry aided by the tariff has been able not only to compete in but to control completely the domestic market. In some other branches of the lace industry where labor costs range from 50 to 65 percent the domestic industry finds difficulty in competing even with a higher tariff.

Manufacturing expense, which includes overhead, constitutes a larger proportion of total cost in the domestic than in the British industry, which fact reflects essential differences in organization of the industries of the two countries: In the domestic industry, larger factories situated in highly industrialized areas, where all the industrial processes are carried out, and higher rentals; in the British industry, smaller factories located in smaller towns, lower rentals, and the practice of sending products off the premises for finishing.

X. PRICES

Range of wholesale prices from 1913 to 1933—before, during, and after the war

Prices of Nottingham lace-curtain machine products are affected not only by the physical details of manufacture, such as materials used, gage of the machine, style, weight, size, and quality, but also by the attractiveness of the pattern and other factors not easily evaluated. They are not, therefore, quoted in trade journals, and the trend of prices over a period of years can be shown only by using prices given by individual manufactures for typical products.

It is not to be expected that the same individual patterns run for 20 years; the same patterns however, shown in the table carried to the end of the year 1923, but following that time the price is given for different patterns of the same style, gage, quality, finish, and width, but in the same standard selling range. Prices after 1929 were fixed without reference to the cost of production, trade being small and competition keen. In 1923 nets constituted 44 percent, in value, of production and in 1931 only 21 percent, and filet nets were no longer representative, but to preserve continuity these are shown throughout the period, in the case of manufacturer no. 4, plain filet nets overlapping figured nets and eventually replacing them. Overlock shadow curtains gradually changed in weights, yarns, and quality, and a continuance of prices would be indicative of a different article; overlocked square ground curtains were replaced by tailored or hemstitched curtains.

Table 20 shows the range of wholesale prices of typical Nottingham lace-curtain machine products, as stated by four representative domestic manufacturers for the years 1913 to 1933.

TABLE 20.—*Nottingham lace curtains and lace-curtain nets of cotton: Wholesale prices, 1913–33,*[1] *given by 4 large domestic manufacturers*

Article	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Overlock curtains, 2½ yards long:											
6-point, 30 inches wide (manufacturer no. 4)—per pair	$0.35	$0.32½	$0.35	$0.35	$0.40	$0.70	$0.65	$1.20	$0.67½	$0.70	$0.77½
8-point, 40 inches wide (manufacturer no. 4)—do	.85	.90	.84	.90	1.10	1.40	1.50	2.87½		1.30	
10-point, 40 inches wide (manufacturer no. 4)—do	1.26	1.44	1.44	1.42	1.55	2.00	2.05	3.37½	1.65	1.70	1.95
12-point, 40 inches wide (manufacturer no. 4)—do	1.64	2.00	2.00	2.06½	2.10	2.77½	2.87½	5.50	3.10	2.42½	2.62½
Filet curtains, 2½ yards long:											
6-point, 36 inches wide (manufacturer no. 4)—do						1.35	1.20	2.12½	1.07½	1.12½	1.30
8-point, 40 inches wide (manufacturer no. 4)—do				1.25	1.42½	1.97½	1.95	3.65	1.75	1.70	1.82½
10-point, 40 inches wide (manufacturer no. 4)—do		1.56½	1.56½	1.74	2.15	2.60	2.70	5.00	2.55	2.57½	2.55
12-point, 40 inches wide (manufacturer no. 4)—do						3.37½	3.85	7.00	3.25	3.25	3.10
Filet net:											
6-point, 36 inches wide:											
Manufacturer no. 2—per yard					.14½	.17¾	.21¾	.27½	.21½	.19	.20½
Manufacturer no. 3—do					.17	.20¼	.27½	.33¾	.21½	.21½	.22½
Manufacturer no. 4—do					.15	.19½	.21	.35	.19	.19½	.22½
8-point, 36 inches wide:											
Manufacturer no. 2—do	.15½	.15	.14¾	.14½	.16½	.20	.28	.35	.33	.27½	.28
Manufacturer no. 4—do				.21	.21	.30	.30	.60	.27½	.30	.30
8-point, 45 inches wide:											
Manufacturer no. 1—do	.26¼	.21¼	.21¼	.21¼	.26¼	.36¼	.40	.55	.48¾	.42½	.42½
Manufacturer no. 3—do	.25	.25	.25	.25	.30	.33¾	.47½	.60	.42½	.42½	.45
10-point, 36 inches wide (manufacturer no. 2)—do	.20½	.20	.20	.21	.24¾	.33¾	.41½	.45	.55	.41¼	.41¼
10-point, 40 inches wide (manufacturer no. 4)—do				.37½	.37½	.50	.45	.87½	.45	.45	.46½
10-point, 45 inches wide (manufacturer no. 1)—do	.31¼	.32½	.32½	.36¼	.42¼	.52½	.56½	.78¾	.57½	.57½	.57½
10-point, 46 inches wide (manufacturer no. 3)—do	.32½	.32½	.32½	.32½	.45	.55	.67½	.82½	.60	.60	.62½
12-point, 40 inches wide (manufacturer no. 4)—do		.41¼	.43½	.47½	.52½	.65	.85	1.35	.62½	.62½	.60
12-point, 45 inches wide (manufacturer no. 1)—do	.37½	.36¼	.47¼	.47½	.55	.75	.78¾	1.10	.85	.82½	.80

Article	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Overlock curtains, 2½ yards long:										
6-point, 30 inches wide (manufacturer no. 4)—per pair	$0.80	$0.77½	$0.72½	$0.70						
10-point, 40 inches wide (manufacturer no. 4)—do	1.82½	1.80								
Filet curtains, 2½ yards long:										
6-point, 36 inches wide (manufacturer no. 4)—do	1.30	1.20	1.15	1.10	$1.10	$1.05	[2] $1.15	$1.05	$0.92½	$0.92½
8-point, 40 inches wide (manufacturer no. 4)—do	1.82½	1.80	1.60			[2] 1.62½	1.65	1.55	1.52½	1.52½
10-point, 40 inches wide (manufacturer no. 4)—do	2.57½			[2] 2.40	2.40	2.40	2.27½	2.22½	2.07½	2.07½
12-point, 40 inches wide (manufacturer no. 4)—do	3.10			[3] 3.00	3.00	3.00	2.97½	2.87½	2.70	2.50
Filet net:										
6-point, 36 inches wide:										
Manufacturer no. 2—per yard	.20½	.19½	.19	.16½	.17	.15¾	.15¾	.16	.16	.15½
Manufacturer no. 3—do	.20	.19	.17½	.16½	.16½	.16½	.16½	.15½	.15½	.15½
Manufacturer no. 4—do	.21	.21	.20	.18	.18	.17	.16½	.16½	.16	.15½
8-point, 36 inches wide:										
Manufacturer no. 2—do	.27½	.27½	.27	.23¾	.23	.21¾	.21¾	.21¾	.21¼	.21¼
Manufacturer no. 4—do	.30	.28	.26½	.24	.23	.22½	.22½	.22½	.21½	.21½
8-point, 45 inches wide:										
Manufacturer no. 1—do	.42½	.42½	.42½	.40	.40	.40	.40	.32½	.31	.31
Manufacturer no. 3—do	.45	.42½	.37¼	.35	.35	.35	.30	.30	.30	.30
10-point, 36 inches wide (manufacturer no. 2)—do	.40	.38¾	[3] .36¾	.34¼	.33	.32½	.32½	.32½	.31¼	.30
10-point, 40 inches wide (manufacturer no. 4)—do	.47½	.47½	.40	.40	.40	.37¾	.37½	.36	.35	.34
10-point, 45 inches wide (manufacturer no. 1)—do	.57½	.57½	.57½	.55	.55	.55	.52½	.47½	.45	.45
10-point, 46 inches wide (manufacturer no. 3)—do	.60	.60	.50	.45	.42½	.42½	.42½	.42½	.42½	.42½
12-point, 40 inches wide (manufacturer no. 4)—do	[3] .62½	.62½	.55½	.50½	.50½	.50	.50	.49	.47½	.47½
12-point, 45 inches wide (manufacturer no. 1)—do	.80	.75	.75	.75	.75	.75	.75	.67½	.60	.60

[1] Yearly price taken as average of spring and fall prices.
[2] Tailored in this and following years.
[3] Plain in this and following years.

The peak price was reached on all articles in 1920, except 10-point filet net, manufacturer no. 2, and spring prices for 1921 were uniformly lower than the fall prices of 1920, with the exception of the article named, and it is noticeable that prices in 1922 for this article were lower than in 1920. Prices since 1920 to the end of the table show a noticeable downward trend.

During the public hearings on the lace investigation held by the Tariff Commission in 1925–26, evidence was given to show that there were 10 manufacturers, all members of the Lace Curtain Manufacturers' Association, manufacturing fabrics with the range of prices shown in table 21.[9]

TABLE 21.—*Nottingham lace-curtain machine products: Prices of fabrics per yard manufactured in 10 domestic mills in 1923*

Gage	Number of fabrics	Minimum price	Maximum price	Gage	Number of fabrics	Minimum price	Maximum price
6	17	$0.11	$1.08	12	18	$0.33	$1.44
7	11	.17	.47	14	11	.43	1.02
8	18	.17	.58	16	6	.55	.93
10	18	.22	.73				

The minimum price is logically progressive with the increase in gage of the machine, but the maximum price does not show a consistent advance in accordance with the fineness of the gage of the machine on which the fabric is produced. The maximum price of the 6-point fabrics is second only to the maximum price of the 12-point fabrics. This indicates a variation which is due to the style factor, and is explained by the demand for Tuscan nets at the time in question; these were made on the coarse gage machines and were exceedingly heavy in weight, being composed of large amounts of coarse count yarns. The labor charges for making work of this class—combination—on a 6-point machine are about half a cent less than the price paid for making the simplest class of work on a 16-point machine of the same width; there is more yarn-preparing labor involved through the extra amount of yarn used, the weight to be bleached is several times the weight of 16-point finer goods, and the manufacturing expense being predicated as a percentage of direct labor is necessarily high. The reason for the high price shown on coarse gage fabrics is therefore apparent.

XI. DISTRIBUTION

The larger part of the products of the domestic Nottingham lace-curtain mills is sold directly to retailers. According to a bulletin of the Bureau of the Census in 1929, 42.6 percent of sales were made to wholesalers and 57.4 percent to retailers, while 90 percent of the total sales were made directly from the factory and 10 percent from jobbers.

Ten of the domestic mills manufacturing Nottingham lace curtains maintain offices in New York, 9 in Chicago, 2 in Philadelphia, 2 in Los Angeles, and 1 in Boston. One large wholesale and retail company, which also owns a lace-curtain mill, maintains houses in "key" cities for distributing its general merchandise, including its lace

[9] Transcript of hearings, p. 548.

products. The largest firms have their own traveling salesmen to solicit trade.

The small quantities of imports are purchased abroad by department-store buyers, from importing jobbers in New York, or from foreign salesmen traveling in the United States.

Competition is very keen in the sale of domestic lace-curtain products, particularly in the lower grades, and emphasis should be placed upon the fact that the greatest reduction in price is not upon the class of goods where the domestic industry meets foreign competition. This competition is real and frequently forces the selling price below cost of production. Some patterns are sold at a narrow margin or even at a small loss, the difference being regained in the larger profits on popular patterns. Prices to retailers are generally higher than to jobbers because of the smaller quantities purchased. The lack of uniformity in profit-taking on the range of patterns is an important feature in lace-curtain retailing.

Selling periods in the lace-curtain industry are divided into the spring and fall seasons, the former commencing November 1 and lasting until April 30, and the latter extending from May 1 to October 31. An effort is made to name a price at the beginning of the season and to maintain this without change for six months; sales are about equally divided between the spring and fall seasons.

The buyers in retail stores purchase the articles by gages, the term being well known. The articles are displayed in the upholstery department along with Swiss embroidered curtains, scrim curtains, woven curtains, and other household textiles.

XII. ECONOMIC ASPECTS OF THE AMERICAN AND BRITISH INDUSTRIES

The chief reason for the success of the lace-curtain industry in the United States is the fact that architecture and interior decorating styles are not and never have been determined abroad; they have always been distinctly original—American—corresponding to American needs and tastes. Further, tastes in architecture and in decorating styles change more rapidly in the United States than abroad. There is greater tendency to adopt new styles in this country. Domestic manufacturers exercising considerable independence, initiative, and ingenuity, have thus been able, not only to follow American tastes but to originate and popularize styles for the domestic market, and the articles manufactured in the United States are quite as good, gage for gage, as those of foreign make. In the production of fancy laces on the Levers machine these advantages, for various reasons which will be explained in the section dealing with the Levers laces, lie with the French.

The second important reason for the success of the Nottingham lace-curtain industry in the United States is that the work of the lace-curtain factory, supplying a staple product, is capable of greater standardization than that of the Levers lace mill; larger investments of capital, larger plants, greater numbers of employees working together, more extensive production of each style and pattern are possible. While the smaller mill operates a small number of machines and employs 100 to 150 workers the greater number of lace-curtain mills average over 30 machines and employ from 300 to 350 workers

each. The lace curtain has not the delicacy of pattern of the fancy trimming laces and the manufacture of the former does not require as extreme specialization or as great care as the latter. Domestic factories are larger than those abroad and are of sufficient size to possess the advantages which accrue from large-scale production. They complete the manufacture on the premises as compared with the British practice of sending the products "in the brown" to "finishers", which entails an extra profit. The "tenement factories" are unknown in the domestic lace-curtain industry.

The fact that labor costs in the manufacture of Nottingham lace curtains are low in relation to total cost of production and that material costs are similarly relatively high in the United States is the third reason why the United States with the aid of the tariff has been able to dominate the domestic market. In the manufacture of certain fancy laces, labor costs represent as high as 65 percent of the total cost of production, and in the manufacture of such products the United States cannot compete even with a 90-percent tariff.

Other factors contributing to the success of the domestic industry are: proximity to consumers, economies in transportation expenses, and ability to make quick deliveries of new and popular styles.

In gaining supremacy in the home market, the domestic lace-curtain industry has been forced, however, to overcome several striking disadvantages as compared with the British industry. In the first place, all Nottingham lace-curtain machines and extra parts, which have to replace worn or damaged items, are imported from Great Britain; they are not only very expensive but extremely heavy and bulky and must pay high transportation costs in addition to tariff duties upon entry into the United States. Thus the initial expense in the establishment of the lace-curtain factory is substantially higher in the United States than in Great Britain. Secondly, although most of the yarns used are domestic, all brass-bobbin yarns are imported from Great Britain and subject to tariff duties upon entering this country. The domestic industry, in fact, is practically dependent upon one British firm for this essential product. Thirdly, practically all designers, draftsmen, and twisthands in domestic lace-curtain factories are foreign-born. American-born labor does not take kindly to this specialized trade with its apprenticeship regulations, its insecurity, its irregular hours, and its tedious work. The result is that labor turnover is very low and periods of service are very long. Should the domestic industry enjoy a period of unusual prosperity, it would be confronted with a serious shortage of labor.

The United States is not in a good position with respect to the technically skilled and trained labor required for designing and drafting. Here, Great Britain has the advantages resulting from the traditions of a century and from the presence of an ample supply of labor. The habits, customs, and mental attitude of the British people make possible the acceptance of a system of apprenticeship which could not be easily enforced in the United States, and this explains why practically all the designers and draftsmen employed in the American industry were born in Great Britain and obtained their technical training in that country. With the preponderance of the machinery in Pennsylvania, and with such a large percentage in Philadelphia, it would seem that some local school or college could have profitably extended its curriculum to embrace designing and drafting of Nottingham lace-curtains, and given instruction in the technique of machine-made lace. Such has not been the case, and in this respect the United States lags behind England and France.

XIII. TECHNICAL-PROCESSES OF MANUFACTURE [10]

Yarn preparation

The yarns used on the Levers lace machine are so much more extensive in range of material and of yarn numbers than those used on the Nottingham lace-curtain machine that a description of the preparatory yarn processes is deferred to chapter II. The processes are the same, except that in some lace-curtain mills the yarn is wound directly on to the warp beam from spools without any intermediate warping, and that the brass bobbins for curtain machines coarser than the 14-point are not pressed.

Designing, drafting, reading, and punching in the preparation of the pattern, and bleaching, dressing, and finishing of the material after it is removed from the machine, are so essentially different in detail for lace curtains from such processes used for Levers laces that they require separate description.

Designing

The methods of designing and drafting for Nottingham lace curtains and nets and for Levers laces are widely apart and demand such a variance of technique that they are regarded as different trades, the men who are expert at one seldom touching the other; they are alike in their importance to the well-being of the business, as the volume of sales depends largely upon the attractiveness of the pattern, if the material be in demand. Curtains are so much larger than anything made on the Levers lace machine that there is considerably more scope for the artist in breadth of outline and largeness of conception, but on the other hand the comparative coarseness of the mesh does not lend itself to such fineness of detail as is usual in Levers laces, and the opportunity for practicability and effectiveness of detail in design in Nottingham lace curtains is less on coarse gage machines than on those of finer gage.

Styles are constantly changing. Designs have developed individuality and harmonize with period decorative schemes, such as the Empire or Napoleonic. The old fashioned, heavy, crowded lace curtain would be out of place with the lighter weight furniture of today, and most lace curtains now made have a narrow border with a plain center or with a center covered with small sprigs or figures. Within recent years a firm of English curtain manufacturers produced a series of designs illustrating Spanish fables, and the articles commanded a ready sale in Spain; this idea contains possibilities which can be greatly extended. Domestic development of a similar style was the production of designs containing classical and allegorical figures, armorial bearings, and heraldic devices.

The work of the designer calls for a high degree of intelligence, care, and application, and demands a mental organization which is a combination of technical accuracy and trained imagination; designers of originality are paid good salaries. To some extent designers specialize in definite styles and become noted for their own particular style.

[10] The technical details here given of the making of Nottingham lace-curtain machine products have not heretofore been available in published form. They will furnish the reader some idea of the complexity and importance of the operation of the machines.

Certain markets require distinct classes of design, some domestic firms importing designs from Nottingham, London, Paris, and St. Gall.

Drafting

Nottingham lace window curtains are mainly made in pairs, a usage of curtains which dates from the seventeenth century. They act as a screen and soften but do not exclude the light in the manner of draperies which, however, provide a note of warmth and color and are important in any decorative scheme. Nottingham lace window curtains and nets are made in types which are governed by the choice of material used, the manipulation of the machine, and the work of the draftsman, the last item, through its interpretation by the jacquard, governing the manipulation of the machine. The usual types of curtains and nets are (1) Nottingham or ordinary, (2) combination, (3) Swiss, (4) barground, including Madras and filet. These types are sometimes combined, so that more than one enters into the composition of the same article. So bound up with the work of the draftsman are these varieties that they are best explained in conjunction with the description of that work.

The reproduction of the design on the draft is of the actual size in which it is made on the machine. The drafting paper is proportionately ruled to the inch; 10-point paper, for example, has 10 horizontal lines within an inch, indicating 10 carriages; the perpendicular lines are an indication of the quality and are variable in spacing, the paper for a certain gage, therefore, is ruled invariably for the gage and variably for the quality, and all drafting paper is purchased ready ruled and squared. The quality is indicated by the number of motions of the machine required to make 3 inches of work of the machine. Qualities range from 28 to 108 or even up to 144 motions in 3 inches, and the quality is generally highest on the fine gage machines.

The design is traced onto the drafting paper, and the shapes of the objects are filled in with different colors of paint to indicate the layers of yarn and the kind of mesh required, as, with the exception of bar-ground, every tie of net must be indicated on the draft. Red is used to signify the heavy effect of 4-gait work, in which the spool threads overlap; green, the single tie of light effect which is produced by the manner of working the jacquard known as "double action" (green also is used to indicate the lighter spool yarn of Swiss or double spool); and blue the "nip" in combination.

The basic ground of "ordinary" or "Nottingham" curtain fabrics requires three sets of yarns—brass-bobbin, warp, and spool—and the draft is painted only in red and green for the heavy and fine clothwork of the objects. The warp thread is displaceable, one gait to the side and back again, by the action of a cam at the end of the machine; the warp and the bobbin thread intertwist and constitute the foundation upon which, by the action of the jacquard, the pattern and net are figured from the spools, which are individually controlled by mechanism operated from one or more jacquards by connecting strings.

Swiss or double spool work requires two spool boards, the extra board holding the spools of finer yarn used for giving gradations of shading.

Bar-grounds are formed by the use of an additional beam, the yarn from which is threaded through one or more bars which are operated by cams or wheels placed at the side of the machine; the grounds are of several kinds, and Madras, filet, and even Ensor net, which is a typical Levers lace net, are made by this arrangement. Some bar-grounds are the patented invention of firms having the monopoly of using them, or allowing them to be made by other firms under license.[11] Filet net, the most popular style of curtain fabric made at the present time, is a bar-ground formed by beam threads which work over 3 bobbins, and as there is a beam thread for every warp thread, there are always 2 thicknesses of beam yarn in the formation of each square. There are four threads in each gait for any kind of full-gage bar-ground—the bobbin, the warp, the beam, and the spool. In the full width of a 16-point, 324-inch machine there would be 5,184 threads of each class or a total of 20,736 threads in the machine. The bar net works everywhere, through the objects as well as in the open, unless the bar-ground is made from spool threads, instead of from a beam, when every bar thread is independent and can be jacked and prevented from working unless required. Filet patterns are sometimes drawn on the square and geometric styles, the objects generally begin and end at the commencement and finish of a square of filet; the drafts look somewhat like the old-fashioned samplers popular a century ago. The number of the quality of filet patterns is, almost universally, the gage of the machine multiplied by six.

Occasionally a bar-ground made by two beam threads crossing each other is used.

The type of lace-curtain fabric which offers the most difficulty in drafting is that known as "combination", in which the warp threads are mechanically nipped to pull two or more of them together with their attendant bobbin and spool threads to form a single strand and produce much the same effect as that given by "Duchesse" work on the Levers lace machine. The warp bar is thrown 3 gaits instead of 1, as is customary, by the movement of a cam; the threads are jacked and extra weight on the warp nips the threads together as the bobbin thread is worked round two or more warp threads. Therefore, combination ground is formed by causing the warp threads to function the same as pattern threads; 2 or 3 of them are twisted together into a strong strand by the displacement of the regular position.

Various patents have been taken out for the manipulation of the threads, among which may be mentioned patent no. 18895 in 1897 by J. Dudson, and no. 18635 in 1899 by C. Goodley. The object of the Goodley patent is to make double action, Swiss net, Swiss fining, double Madras, combination, and ordinary work all in one fabric, holes and pillaring being made in any part and no clipping being required. The different grounds are made by the pickers or jacks, under the control of two jacquards, being inserted wholly or partially through the threads or not at all. Additional colors are required in drafting these articles. Yellow points represent double Madras; yellow lines, cross ground; blue lines, Swiss fining; blue points, Swiss net; black, combination; red, clothwork; and the plain white paper represents pillaring.

The draft of a curtain in which there is a repeating pattern is not painted in its entirety; the corner is finished and 1 repeat only of

[11] Evidence was given at the hearings of the United States Tariff Commission on the lace investigation, which indicated that 1 firm made 15 different curtain fabrics, several of which were patented bar-grounds.

the side and bottom borders and 1 repeat of the center objects are filled in.

For each gage of machines separate patterns must be provided; idle machines of one gage cannot make the patterns of machines of another gage which may be happen to be oversold.

There is a small importation of finished drafts; these are recorded as "Jacquard designs on ruled paper, or cut on Jacquard cards, and parts of such designs" and are dutiable under paragraph 1409 of the Tariff Act of 1930 at 35 percent ad valorem.

Reading and punching of Jacquard cards

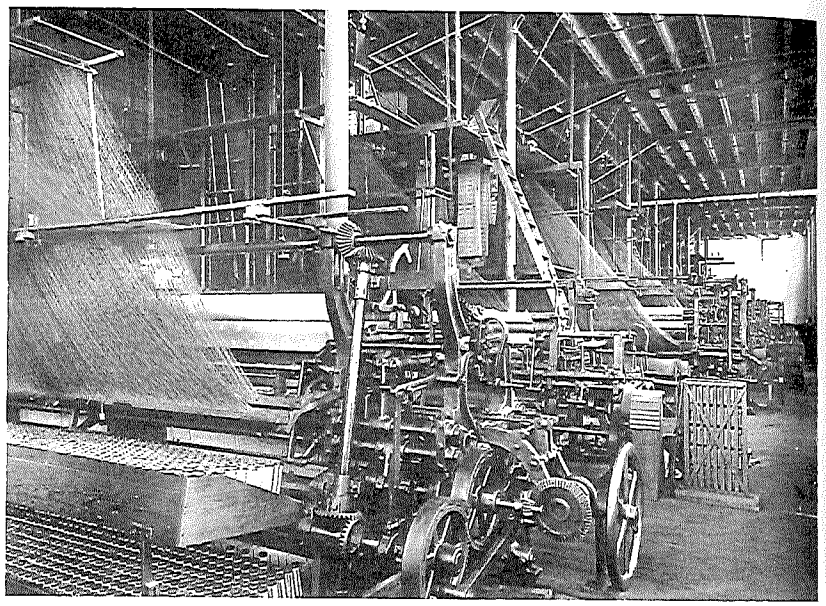
When the draft is finished it is "read" for the puncher. This consists of an operation whereby the drafted pattern is reproduced in string for use in punching the cards. The reader standing before an upright frame manipulates two sets of strings, a perpendicular set which corresponds to the cards and motions of the pattern, and a horizontal set which corresponds to the individual spool threads. These latter strings are passed over and under the others with incredible accuracy and swiftness until the pattern is reproduced in string. One, two, or three readings are required as the pattern is ordinary work, double action, or double action and combination. The pattern is read first for the red color, the 4-gait work, second for the green color or 2-gait work, and third for the blue color or combination. The webs thus produced are transferred to the punching machine; they are "hooked on", and the spool strings, the horizontal strings of the reader, are attached to pins in a plate and lie longitudinally, and the motion strings (the perpendicular strings of the reader) lie across them, and according as the motions are under or over the bar strings so do the bar strings pass under and over a steel bar. The strings under the bar are taut and leave the card blank; those over the bar are loose and allow the pin to work on the plate. This plate is taken out for every motion and placed over a card which passes rapidly through a press which punches holes or leaves the card blank according as the pins have been regulated by the web strings passing under or over the bar. Numbers of varying degree are not punched as in the case of Levers machine top bar cards, which numbers range for 0 to 31½ or higher, but it may be noted that when the cylinder of a bottom bar jacquard of a Levers machine is the same size as the cylinder of a curtain machine, it is possible to "read" Levers bottom bar sheets and punch them on the curtain press. In ordinary work of the curtain machine, one card governs a full revolution of the machine; in double action, when the spool threads may work either 4 or 2 gaits, alternate cards can govern the 2 kinds, and the 1 jacquard works at double speed, but this is unusual, the general rule being to have 2 packs of cards, 1 for each jacquard, working together and so timed that 1 card of each completes the full revolution.

A style of copying the draft on zinc was invented some years ago in which the punching is done directly from the zinc draft itself without the intervening work of the reader. The zinc draft, of a uniform size for every gage and quality, consists of a sheet of zinc perforated with small holes the size of a pin's head. These are painted over to represent the draft and the zinc copy then passes, a motion at a time, under a bar full of needle points, one for every spool thread in the pattern; when the bar passes on to the draft, motion after motion, the needle either passes through a hole or is lifted by the thick coat

PLATE 1

READING PATTERN OF A NOTTINGHAM LACE CURTAIN.

PLATE 2



BACK VIEW OF NOTTINGHAM LACE-CURTAIN MACHINE SHOWING SPOOL BOARDS AND JACQUARD HARNESS.

of paint and governs the pins in the plate in the same way as the transverse strings of the ordinary style of punching.

When the draft is finished, the work of the curtain draftsman is also finished, the pattern is run through on the machine, the reader corrector takes the punching mistakes out of the cards with the aid of an index, and makes any alteration necessary. The number of cards in a curtain pattern depends upon the size and quality of the pattern; as a rule, part of the pattern repeats, that is it is drafted, read and punched once, and the same cards are worked several times over to make the required length. For instance: A 90-quality article will have 30 cards per inch, and with a 20-inch repeat, there would be 600 cards for single action, twice this number for double action, and three times this number for double action combination. If a curtain were 3 yards in length and the pattern were independent and not repeated throughout its entire length, a 90-quality, double-action, combination pattern would require 9,720 pattern cards. Curtains of this style are called "stores", and if there be one repeat of the pattern, are called "semistores."

A machine has been invented to eliminate "reading" the pattern. The following extract from the Nottingham Journal of January 1, 1931, has reference to the new method employed:

> When the design has been made it is transferred to draughting paper—from this draught the design is read. In the old-fashioned way this operation is quite separate from the actual punching of the cards. In the up-to-date method the reading and punching is done on a patent machine in one operation, the operator reading off the designs on keys in a similar way to the playing of the piano. * * * The cards, after being punched, are released by the pressing of the operator's foot, thus eliminating a lot of time and labor.

This patent automatic punching press is coupled to a patent reading machine, and it is claimed that the output of cards, for one man is 8,000 to 10,000 per week, varying according to the class of work. In Scotland the trade unions permit their members to operate such machines at half the piece-work rate of pay of those employed in string reading. Some of these machines are used in the domestic industry.

Operation of the Nottingham lace-curtain machine

Curtains or breadths of curtain net are made side by side throughout the width of the machine; the threads which make these curtains or breadths of net are not entered into the machine in groups as described in the account of making fancy laces on the Levers machine, in chapter II, but are entered straight across the width of the machine. The warp is at the back of the machine and underneath; the spools are placed on perpendicular wires, arranged in rows on the spool-board, on cloth washers to regulate the tension, and are banked on a rack or board, also at the back, and are individually controlled to supply the thread, as needed, for the pattern; the beam is at the front of the machine. The threads of warp, beam, and spool are all passed through flat brasses and then through the eyelets of guide-bars in the well of the machine, and work perpendicularly to the place where the fabric is formed. Warp threads work in front of spool threads, and beam threads work in front of both; production of heavy parts of the pattern by spool threads is at the back of the basic ground as it is made on the machine by the warp and bobbin threads; this is the reverse of the principle adopted on the Levers machine, where the

thick threads are at the front. Therefore, the front or right side of the curtain when it is used is at the back or reverse side when it is made.

The guide-bars, which contain the warp, beam, and spool threads are supported by brackets and controlled by specially cut cams placed at one end of the machine. Each warp thread moves 1 gait, except in the case of combination work, which has been already explained, and works straight up and twists with 1 bobbin thread, over the facing bar and behind and over the porcupine roller to the work roller; the beam threads work over 2 or more bobbin threads as required, and spool threads either twist with the bobbin threads or are thrown 2, or 3, or 4 gaits.

The brass-bobbin threads are drawn from brass bobbins consisting of two flat, thin discs connected by a circle of small rivets on which the yarn is wound. Each brass bobbin is carried in a thin, steel carriage and rotates therein, being tensioned by a spring, the neb of which rides in the space between the flat sides of the bobbin; the thread is pulled off by the turning of the work roller and passes through a small hole in the top of the carriage. The carriages are propelled in a pendulum-like motion and pass between the groups of other threads, with a movement which is at right angles to theirs. The carriages are above the guide-bars and below the roller upon which the finished work is wound, and are propelled by steel bars called "catch bars" (the blades of which fall into the ears of the carriages), 1 at the front and 1 at the back of the machine, through the threads in the well of the machine; they keep an undeviated course by passing in fissures between steel blades or combs fixed in bars, of which there are 2, 1 at the front and 1 at the back, extending throughout the width of the machine. There are as many carriages working side by side, and as many warp, beam, and spool threads, in an inch as the number of the gage of the machine, the number of which in the domestic mills runs from 5½ to 16. The basic principle of working is similar in the Nottingham lace-curtain machine, the Levers lace machine, and the bobbinet machine, and the action of the bobbins and carriages, the comb bars and point bars (steel points set in lead and bolted to a movable bar), is explained to a fuller extent in connection with the Levers lace machine, which makes the greatest variety of articles.

The Nottingham lace-curtain machine can be used, by omission of the pattern cards, to make a plain fabric; an instance of this was the production on curtain machines of the Madras mosquito netting for the Government during the World War.

In making the normal patterned fabric, the spool threads are drawn off at right angles to the spool, pass over a rod, through the eye of a lingo, feeding bar, sley and guide bar, over the facing bar, porcupine roller, and work roller. They are controlled individually by jacks, as are the warp threads when the machine is set to make combination work, and as are the beam threads when they are worked from individual spools; it is the interposition of the jacks during the making of the fabric which produces the pattern. The jacks are upright pieces of wire, fixed in a cast-metal bar; they have a curve at the back, by which they are connected to the jacquard by strings, and bend forward to a straight point held at a right angle to the line of warp, beam, and spool threads. For each spool thread there is a jack, the interval between the jacks corresponding to the space between two adjacent spool threads.

Commencing with the carriages in the back comb bar, the jack bar cam rocks out the jacks, and the jacquard selects the jacks according to the pattern card which presses off the hooks of the jacks not required from the jacquard grid; this lifts and tightens the strings of those jacks which have been selected. The jack cam rocks back again and the jacks which are not selected enter between the threads, the other jacks being held out because of the tightened string. The warp guide bar, by the action of its cam, is moved 1 gait to the left, and simultaneously the cam of the spool guide bar is moved 2, 3, or 4 gaits to the left. When a jack is in and intercepts a spool thread, this thread is retained with its original warp thread, to which it is bound by the bobbin thread, thus leaving an open gait. When the jack is withdrawn by the action of the jacquard the spool thread traverses, by the action of the cam and the guide bar, to the next warp thread or to other warp threads to which it is bound by the bobbin thread. Thus there is achieved an effect of density which varies according as the spool threads overlap each other; where adjacent spool threads traverse four gaits and overlap each other, every gait is covered by a three-fold layer of yarn. The carriages now cross the well of the machine into the front comb bar and the twists, which are formed by the lateral movement of the warp, beam, and spool threads and the to-and-fro movement of the bobbin threads, first on one side and then on the other side of the warp threads, are taken up by the front point bar extending the entire width of the machine. The front point bar dips, and the points take up the twists of the warp and bobbin threads and the loops formed by the throw of the spool threads, and hold them to the edge of a plain metal bar, called the facing bar, where they are permanently fixed to the work previously made. The guide bars which hold the warp and spool threads are returned to their original positions, when no longer affected by the cams, by means of powerful springs, the carriages return to the back comb bar, and simultaneously the back point bar dips and takes up the return loop of the spool threads. As the point bars gather the completed twists and loops, the roller, around which the finished work is wound, revolves through the action of ratchet or worm gearing. The speed at which the roller is revolved controls the quality of the fabric; the slower the roller revolves the more motions of the machine in 3 inches of the material and therefore the better or finer is the quality. This cycle of movements is repeated indefinitely. It will be observed that the plain fabric is made by the action of the cams which govern the warp and spool guide bars, by the intertwisting of these threads with the bobbin threads, the pattern being produced by the interposition or abstention of the points of the jacks, which may prevent the spool threads from throwing 4 gaits and reduce the throw to 3 or 2 gaits or to twisting with the combined bobbin and warp threads, a motion known as "pillaring." As the spool bar throws over four bobbins, adjacent spool threads, if not jacked, overlap each other and an object in the pattern is composed of spool threads which are superimposed, and the resultant fabric is thicker and heavier. In the style of work known as "double-action", two kinds of spool work, 4 gait and 2 gait, can be produced simultaneously by working two jacquards each with a separate pack of cards, one for the 4-gait throw of the spools and the other for the 2-gait, and working the jacks twice in each full motion of the machine, each jack having two harness strings attached to it.

When not required the second jacquard is ungeared. The jacquards are "tied up" in different ways, that known as the "universal tie-up" producing curtains in any width which is an aliquot part of half the width of the machine. If the fabric which is required is double-action, combination, both jacquards are used; the combination jacquard operates once for the full revolution of the machine, and the other jacquard operates at double speed, and one string from each jacquard is connected with each jack. While one jacquard moves the jacks entirely clear of the spool threads where they have to be traversed, the other jacquard moves the jacks only sufficient distance to clear the warp threads which have to be traversed. Some lace-curtain machines have at the side a small jacquard of the same nature as the top-bar jacquard of the Levers lace machine; this is utilized to put a purl on the edge of curtain laces, and to make detached figures which can be clipped.

The number of jacquards used and their operation, for the classes of work which are quoted in the wage tables, is shown in table 22.

TABLE 22.—*Use of jacquards in producing articles on the Nottingham lace-curtain machine, as listed in the wage book of the Chartered Society of Amalgamated Lace Operatives of America*

Style of work	Number of jacquards	Action
Single action, 3-gait	1	Normal.
Double action, 3-gait	2	Do.
Single action, 4-gait	1	Do.
Double action, 4-gait	2	Do.
Double action, 1 jacquard, 3-gait	1	Double speed.
Double action, 1 jacquard, 4-gait	1	Do.
Single action, Madras, 3-gait	1	Normal.
Double action, Madras, 3-gait	2	Do.
Single action, Madras, 4-gait	1	Do.
Double action, Madras, 4-gait	2	Do.
Madras, 1 jacquard, 3-gait	1	Single action normal.
Madras, 1 jacquard, 4-gait	1	Double action, double speed.
Single action, square ground, 3-gait	1	Normal.
Double action, square ground, 3-gait	2	Do.
Single action, square ground, 4-gait	1	Do.
Double action, square ground, 4-gait	2	Do.
Single action, Swiss Madras, 3-gait	1	Do.
Double action, Swiss Madras, 3-gait	2	Do.
Single action, Swiss Madras, 4-gait	1	Do.
Double action, Swiss Madras, 4-gait	2	Do.
Swiss	2	Do.
Swiss fish net	2	Do.
Double action Swiss, 2- and 3-gait	2	1 normal, 1 double speed.
Combination	2	Normal.
Swiss and combination	2	1 normal, 1 double speed.
Double action, combination	2	Do.
Single and double tie, combination	2	Normal.

Although 2 jacquards is the usual number operated, 1 firm has installed 4 jacquards on 12-, 14-, and 16-point machines; this gives a very elaborate tie-up, and allows the making of a variety of widths other than the usual standardized single division widths. This meets the demand for curtains of the same design in different widths.

Nottingham lace-curtain machines have been furnished with numerous patented attachments, and at various times the fabrics have been double-faced and made reversible by having spool threads work on both sides of the foundation fabric of warp and bobbin. Those in this style include English patents 9643 of 1893 and 550745 of 1895 by E. Cope; 5378 of 1894 by T. I. Birkin and T. S. Birkin; and a later patent 1631886 [12] of 1927 by S. Pepper.

[12] United States patent number.

The machines are driven by leather belts from pulleys on a revolving power shaft, or by individual motors of 5 or 6 horsepower.

Finishing processes

The lengths of curtains or nets as taken from the machine contain defects caused by the accidental breaking of threads during the operation of the machine. These defects are mended by sewing machines which reproduce the missing parts with great fidelity.

Nottingham lace curtains are bleached by the continuous or Scottish system of joining together a large number of webs. By this method a long piece consisting of several shorter webs is bleached instead of a number of short pieces. This long piece passes in a continuous length over revolving cylinders and through a series of porcelain eyes as it is immersed and washed in the different liquids.

Curtains may be made together the full width of the machine, or if this be too wide for the dressing frame, they may be made individually, side by side, the full width of the machine, and dressed after bleaching, on a stenter. This process differs from that used for dressing Levers laces. To avoid loss in length or width and produce a finish which will not deteriorate with storage or use, care must be taken to maintain the pattern in an undistorted condition.

The piece is passed through a solution of starch, and if weighting materials are required, calcium sulphate or French chalk is used. To remove the surplus moisture, this material while wet is pressed between two heavy, flannel-covered rollers. It is then passed to the stenter, which produces four effects: Recovery of the width, reestablishment of a proportionate pattern, drying by means of heat while in a stretched condition, and production of a smooth surface. The stenter consists of two horizontal bars lined with clips, and polished metal rollers. The clips are attached to endless traveling belts and grip the curtain fabric at the selvedges. The bars are adjustable in distance from each other, and when the material to be dressed enters between them the shrunken piece is narrower than the required finished width, but when it is released from the clips the width has been increased to the necessary dimension. The extension in dressing, however, does not, as in bobbinet, exceed the width of the lace made on the machine. The material now passes over and under a series of highly polished metal rollers, which are heated by steam, with the result that by the time the last roller is reached the material is dry, firm, and glossy. A mechanical apparatus folds it into a basket, and it is ready for final treatment.

After the lengths are again inspected for defects caused by the processing, they are cut into individual curtain lengths, and these are overlocked by a machine which cuts out the scallops and at the same time binds several threads on the edge into a firm taped appearance. They are then folded and pressed and are ready for the market.

CHAPTER II

FANCY LACE MADE ON THE LEVERS LACE MACHINE

PART I.—THE DOMESTIC INDUSTRY

I. DESCRIPTION AND USES

Laces made on the Levers or Levers go-through lace machine, as compared with lace curtains made on the Nottingham lace-curtain machine, are mainly narrow fancy laces for the ornamentation of women's wearing apparel; some are used in the ornamentation or construction of window curtains and for upholstery and other purposes. These fancy laces are made of various textile fibers—cotton, linen, ramie, silk, worsted, mohair, rayon, and metal threads, used singly or in combination. The products of the Levers or Levers go-through lace machine may be classified as follows:

Edging.—Narrow lace, especially designed for trimming frills and parts of dresses, usually made with the upper edge straight and the lower indented or scalloped.

Inserting or insertion.—Narrow lace, specially made for inserting in a plain fabric, made with both edges straight, and strengthened by having several threads running side by side for use in sewing to the fabric.

Galloon.—Narrow lace having both edges scaloped or the whole article serpentine in form.

The widths of edgings, insertions, and galloons range from half an inch to about 12 inches; edgings and insertions are usually made in sets of various widths, each set embodying a distinctive design; there may be as many as 10 widths in a set, 7 edgings, and 3 insertions. They are used for trimming dresses, underwear, hats, and other articles of feminine apparel. The same garment may carry different widths of edgings and insertings of the same pattern. The heavier and more durable styles are used for trimming furniture, bedhangings, and curtains.

Flouncing.—Wide lace with a straight top and a scalloped front, the same as edging, made in widths varying from 12 to 54 inches, and used to form deep ruffles or flouncings gathered or pleated at the top and loose at the bottom, the gathered edge being sewed to the garment.

Ties or streamers.—Galloons, 6 or 8 inches in width and having, as a rule, a repeated object which can be scalloped to form a perfect end. Ties and streamers are also cut out of all-over nets specially designed to permit their use for dual purposes. The ties are cut to definite, required lengths.

Veiling.—Light, fancy, open nets, sometimes ornamented with a design on the bottom border. They are used for face veils and for decorative purposes on women's hats; a veil is a particular length of veiling.

Motifs.—The decorative figures of the pattern which, when they consist of butterflies, ribbon-knots, etc., can be cut out and used, detached, in the ornamentation of garments.

All-over net.—Lace made without top or scallop and with a pattern of a definite width and length, which is repeated to the full width of the machine and indefinitely in length. The piece is cut into any required length and into breadths varying from 18 to 72 inches, according to the purpose for which the material is desired—yokes, flounces, sleeves, etc.; the heavier varieties are used for bedspreads, table runners, and window curtains. Other distinctive articles are handkerchiefs, doilies, lamp-shades, and small squares of lace fabric carrying names used for advertising purposes. These specialties are usually made to order; the demand for them is limited, and the production of them is confined to a few manufacturers, as the expenses of the preparatory processes of the pattern are heavy, and the articles are not such as are suitable for mass production.

II. THE DEVELOPMENT OF THE DOMESTIC LEVERS LACE INDUSTRY

1. Historical

The first attempt to manufacture fancy lace on the Levers lace machine in the United States was made in the year 1866. During the seventies a Brooklyn firm imported a number of second-hand machines which had formed a part of the plant of Heartshorn, of Nottingham. Before the close of the nineteenth century, two other mills were opened, one in Jersey City and the other in Pawtucket, R.I. In 1900 a lace plant employing imported Levers and Nottingham lace-curtain machines was founded at Zion, Ill.; upon the collapse of this venture some of the lace experts started a new plant at Elyria, Ohio. At the beginning of 1909, the year in which Congress passed tariff legislation which resulted in an enormous expansion of the industry, there were about 100 Levers lace machines in the country.

The Tariff Act of 1883 assessed duties of 40 percent ad valorem on cotton laces, embroideries, etc., of cotton; 30 percent on the same articles of flax; 50 percent on laces of silk; and 25 percent on lace of gold, silver, or other metal.

The Tariff Act of 1890 raised the duties on laces, etc., made of cotton and all other vegetable fibers to 60 percent; made of wool, 60 percent plus 60 cents a pound, and of silk to 60 percent ad valorem.

The Tariff Act of 1894 lowered duties upon laces and lace articles of all materials to 50 percent ad valorem, but the Tariff Act of 1897 restored the 60 percent ad valorem duties upon all laces, lace articles, etc., of all materials, with 50 cents per pound specific duty in addition upon laces made of wool.

After 1890, the Levers lace industry began slowly and laboriously to be transplanted to the United States. Its progress was impeded by the initial cost of establishing factories equipped with heavy and expensive imported machines, the difficulties of obtaining skilled designers, draftsmen, twisthands, and foremen from abroad, the reluctance of the public to accept the domestic product, and the overwhelming competition of well-established foreign industries. By the year 1909 only about 100 Levers lace machines were in operation in this country.

The Tariff Act of 1909 gave an exceedingly great impetus to the domestic manufacture of Levers lace. This act not only raised the tariff on such laces to 70 percent ad valorem but provided for the free entry of Levers lace machines for 17 months (from Aug. 6, 1909,

to Dec. 31,1910). As these very expensive machines were not (and are not) made in this country and as the normal duty upon imported Levers machines was 45 percent, the provision for their free importation resulted in a rapid expansion of the industry. Existing Levers lace mills increased their capacity; firms engaged in producing other textiles, such as Nottingham lace curtains, added Levers machines to their equipment; and new mills were inaugurated. By January 1, 1911, 26 firms had arranged to manufacture Levers laces and about 400 additional Levers lace machines of a value of $2, 946,919 [1] had been imported and established largely in the States of Rhode Island and Pennsylvania.

The difficulties in the domestic Levers lace industry did not cease, however, with the generous provisions of the act of 1909. Difficulties in obtaining skilled workers from abroad were accentuated, and foreign competition continued unabated. However, the great popularity of lace during the years preceding the war provided prosperity leading to increased production in the domestic industry as well as increased importations.

In the Tariff Act of 1913, the duty on Levers laces was reduced to 60 percent ad valorem, but the war beginning in 1914 caused a curtailment of imports. The disorganized state of the French industry during the war and its inability to originate styles, designs, and fashions served, however, to effect a serious decline in the domestic demand for laces.

The end of the war brought a large increase in domestic consumption and production of Levers laces. In fact, the years 1919 and 1920 were the most prosperous that the domestic industry has known. Production was at its peak in spite of a large volume of imports.

The depression of 1921, the increasing competition of imports from the reestablished foreign industries, and the decline of the vogue for lace caused a severe slump in the domestic lace industry. The Tariff Act of 1922 provided, therefore, a 90-percent duty on imported laces. The rate was continued in the act of 1930.

2. Present extent of domestic Levers lace industry

The domestic Levers lace industry is centered in the textile States of New England and the middle Atlantic region. Forty-seven percent of the machines employed by the entire industry are located in the State of Rhode Island. The first up-to-date factory was erected at Pawtucket, R.I., later a Calais firm transferred its business to the same city, and when the influx of new machinery took place under the free entry of 1909–10 so many new plants were started at Pawtucket and vicinity that it commenced to be known as the "Nottingham of America."

According to information furnished by the American Lace Manufacturers Association there were 40 mills operating 590 machines in 1933, distributed as follows: Rhode Island, 282; Pennsylvania, 80; Connecticut, 70; New Jersey, 60; New York, 65; Ohio, 31; and Massachusetts, 2. Most of the factories are located in small towns where land values are low and taxation is relatively light. Further, the Levers lace mills are comparatively small, much smaller than the Nottingham lace-curtain mills. Twenty mills operate fewer than 10 machines (2 of these mills operate only 2 machines each). Eight

[1] The figures given in Commerce and Navigation of the United States total $3,120,865 but represent embroidery machines as well as Levers lace machines.

firms operate between 10 and 20 machines, 7 firms operate between 20 and 30, and the 5 largest firms operate 30, 31, 42, 43, and 65 machines, respectively. The smallest number of machines which can be operated economically is about 10, and there are indications that the system of small holdings of machinery, which is so prevalent in England and France, is obtaining a foothold in the United States, and the system is not unattended with danger; there is not, at present, any expansion of the domestic industry. Among producers of Levers laces the United States ranks third, France and England ranking first and second, respectively. Proprietorship of domestic lace mills is American with the exception of one mill in Rhode Island owned by a French firm with other factories in Calais and Lyons. A complete list of the firms producing Levers laces and the number of machines owned by each is found in the appendix.

3. Machinery and equipment

The machinery and appliances required in a Levers lace factory include all that is necessary for the preparation of the yarn for the machine, the preparation of the pattern, and the making, mending, and finishing of the lace. The apparatus may be listed as follows:

Lace machines, including bobbins and carriages, comb and point molds, warp beams, and small beams.
Lathes and repairing equipment.
Yarn preparation:
- Yarn-testing machines.
- Slip-winding machines.
- Warping mills and brasses.
- Drums.
- Brass-bobbin winding machines.
- Threading machines.
- Hydraulic bobbin-press and small pressing frames.
- Ovens.
- Stripping machines.
- Jacking-off machines, and knotters.

Pattern preparation:
- Power piano punching press and card nippers.
- Card lacing machines.

Finishing:
- Bleaching and dyeing plant.
- Dressing frames.
- Calenders.
- Clipping machines.
- Jennys.

Some factories have eliminated certain processes, such as drumming and jacking-off, as being nonessential or uneconomical, and have dispensed with the machinery used for these purposes.

In some factories threading machines are not in use and the carriages for each machine are threaded at a table in the "alley", as the space between the machines is termed; also clipping is done by hand.

III. LEVERS AND LEVERS GO-THROUGH LACE MACHINES

There are two kinds of fancy Levers lace machines, the Levers lace machine and the Levers go-through lace machine. In the go-through machine the carriages pass through the combs without the assistance of landing bars. The system is now chiefly adopted because of its greater speed. The machines in domestic mills are chiefly of the go-

through type and are quite as efficient as any used anywhere in the world.[2]

The gage of a Levers lace machine is expressed by the number of carriages working in half an inch of metal, as compared with the gage of a Nottingham lace-curtain machine which is measured by the number of carriages working in an inch; according to its gage the machine is designated as 9-point, 10-point, etc. It is considered advisable to have machines of a variety of gages in the same plant in order that different kinds of lace may be made to supply the demand as affected by rapid changes in fashion. Machines coarser than 8-point are usually purchased for specific purposes and are not adapted to a range of styles.

The size of lace machines is stated in terms of a quarter of a yard, the size referring only to the part of the machine where the lace is actually made; a machine is spoken of as 16 quarters, 20 quarters, or 25 quarters. The quarterage of the domestic machines in 1933 aggregated 13,355. The following table shows the gages and the width of the machines included in the investigation by the Tariff Commission in 1924.

TABLE 23.—*Gages and widths of Levers lace machines in the domestic industry, 1924*

Gage	Machines	Percent of total	Minimum width	Maximum width	Gage	Machines	Percent of total	Minimum width	Maximum width
8	10	2.10	224	225	11	10	2.10	-------	184
8½	14	2.94	172	224	12	55	11.53	172	224
9	6	1.26	-------	224	13	1	.21	-------	224
9½	106	22.22	172	225	14	7	1.47	174	222
10	174	36.47	164	224					
10½	49	10.27	170	224	Total	477	100.00	-------	-------
	45	9.43	182	224					

Thirteen percent of the total were 12-, 13-, and 14-point machines available for making the finer class of Valencienes laces. The many styles of Levers lace make varying demands upon the capacity of the bars of the machine. These demands extend from the few bars requisite to the making of a plain veiling to the many bars required in the making of a wide thick-threaded bobbin-fining lace. The range of top bars of machines in the domestic industry is from 100 to 210, 46 of the machines having 200 or more bars each. The capacity of the top bar jacquard was doubled by the invention and adoption of the principle known as bottom bars whereby all the warp threads can be independently manipulated by a smaller jacquard. Twenty-five of the machines had bottom-bar jacquards, the most usual size having capacity for 400 bars, some of them, however, having a capacity for 600 bars.

All domestic Levers lace machines are imported and practically all imported from England. The United States Tariff Commission's investigation of the lace industry in 1923 and 1924 included 477 machines, or 85 percent of the machines in the domestic industry at that time; 243, or 51 percent, were purchased from a single English firm.[3]

[2] Inasmuch as most of the machines used in the domestic industry are of the go-through type future references to the Levers lace machine will signify the go-through machine.

[3] The principal builders of the Levers lace machine are John Jardine, Ltd., F. W. Burton, Joseph Cooper, Hollingsworth, William Hooton, Humphrey and Wyer, Longmire, N. G. Pearse & Co., Ltd., Wallis & Longden, all of Nottingham, England; Jules Quillet, Calais, France; and Maschinenfabrik Kappel, A. G., David Richter, A. G., Schubert and Salzer, A. G., all of Chemnitz, Kappel, Germany.

No Levers lace machines are made in the United States for the same reasons that no Nottingham lace-curtain machines are made in this country: The intricacy and complexity of the machine, the very restricted demand for such machines, because of the limited demand for their products, the exceedingly long life of the machine itself, and the excellence of the product supplied by the long-established machine builders in Nottingham, Calais, and Chemnitz. The development of the machine has been marked by gradual progress rather than by radical changes. As a matter of fact, the domestic lace industry has not materially increased its capacity since 1910 and imports since that date have consisted of parts, accessories, and a few replacements. Inasmuch, therefore, as the tariff duties on imported lace machines have never stimulated domestic production they have served only to increase the cost to domestic lace manufacturers.[4]

Various types of auxiliary equipment requisite for the operation of a Levers mill are necessarily imported, there being no production in this country: Brass-bobbin winding machines, threading machines (patented), hydraulic bobbin presses, jacking-off machines. Attempts have been made to manufacture some of these smaller pieces of equipment in this country, but owing to the limited demand and the expense of manufacturing, these attempts were not successful. Under the Tariff Act of 1930 imported auxiliary machines are subject to a duty of 40 percent ad valorem.

The price of a new Levers lace machine is high, but the first cost is of less importance than the machine's durability. Prices vary with size, gage, and capabilities, and quotations are for a complete machine with indispensable accessories. The following table demonstrates pre-war and post-war prices quoted by a Nottingham machine builder for a 10-point Levers, go-through lace machine 184 inches wide with 160 top bars. The figures quoted are f.o.b. factory, Nottingham.

TABLE 24.—*Foreign value and duty on a 10-point, 184-inch, Levers lace machine, 1914–32*

Year	Foreign value	Rate of exchange of £ sterling	United States value	Duty	Value plus duty	Ratio of value plus duty, 1914 taken as 100
						Percent
1914	£920	$4.8665	$4,477	$1,119	$5,596	100
1923	1,465	4.5748	6,702	2,011	8,713	156
1932	1,485	3.5038	5,203	1,561	6,764	121

To these figures must be added the cost of ocean and domestic freight, insurance, consular fees, and costs of erection.

IV. YARNS USED IN MAKING LEVERS LACES

The wide range of styles in which Levers laces are made dictates the use of yarns made of many different raw materials: Cotton, silk, spun silk, rayon, worsted, linen, ramie, mohair, and metal threads.

[4] Under the Tariff Act of 1897 lace machines were dutiable at 45 percent ad valorem; the Tariff Act of 1909 admitted these machines free of duty from Aug. 6, 1909, to Dec. 31, 1910, after which date the duty reverted to 45 percent ad valorem; the act of 1913 reduced the duty to 25 percent, and the acts of 1922 and 1930 maintained it at 30 percent ad valorem.

The use of linen, ramie, and mohair is uncommon and can be disregarded but the others will be discussed in the order named.[5]

Prior to 1925 domestic Levers lace production was chiefly of cotton yarn; in fact, so great was the predominance of cotton laces that official production statistics recorded laces made of other materials together with cotton laces. Statistics for the censuses of 1927, 1929, and 1931, however, record production of Levers laces made of the various materials separately, and for all three censuses show a higher value for laces made of silk, rayon, and other fibers than for cotton laces.

1. Cotton yarns [6]

Lace yarn has become a trade term denoting a high, possibly the highest, grade of cotton yarn manufactured. The twisting process, essential to lacemaking, subjects the yarns to an abnormal strain which demands a much higher grade of yarn than is necessary for knitting or weaving. The cotton used in making lace yarns is predominantly Egyptian; American is employed in the lower counts and Sea Island in the finest.

Upon arrival at the lace mill cotton yarn is tested for its tensile strength and the accuracy of the yarn count by means of stretching and weighing 120-yard leas on machines especially made for the purpose. It is not customary to test yarns of the coarser counts or yarns of three ply. There are variable factors in cotton yarns which preclude any definite ratio between the breaking strength and the yarn count, among which may be mentioned the staple and grade of the cotton and the turns of twist per inch imparted to the yarn in spinning and in doubling. The average turns of twist per inch in 2-ply lace yarns and the breaking strength of the finer and usually tested counts of yarn are shown in the following table:

TABLE 25.—*Average breaking strength and turns of twist per inch of fine Levers lace yarn*

	Yarn count	Strength of 120-yard lea	Turns of twist per inch in doubled yarns
		Pounds	
Domestic	40/2 plain right		24–26
Do	50/2 plain right		28–30
Imported Egyptian	60/2 plain prepared right	85	30–32
Do	70/2 plain prepared right	80	34–36
Do	80/2 plain prepared right	70	36
Do	100/2 gassed prepared right	60	38
Do	120/2 gassed prepared reverse	46	40
Do	120/2 gassed prepared right	48	40
Do	140/2 gassed prepared reverse	42	42
Do	140/2 gassed prepared right	44	42
Imported Sea Island	160/2 plain prepared right	36	42
Do	180/2 plain prepared right	34	42
Do	200/2 plain prepared right	32	42
Do	220/2 plain prepared right	30	42

The yardage per pound of yarns is calculated by multiplying the number of the yarn count by 840 and dividing by the ply. Example: To find the number of yards per pound in 220/2: $\frac{220 \times 840}{2} = 92{,}400$.

[5] Yarns of fancy type, such as ratiné, are used occasionally; ratiné is made by twisting together two threads of different tensions with the result that the slacker strand spirals around the tighter strand.

[6] In no instance is any yarn used in Levers mills spun on the premises.

TABLE 26.—*Yards, per pound, of cotton yarns used in the Levers lace industry*

Yarn count	Yards per pound	Yarn count	Yards per pound	Yarn count	Yards per pound
60/1	50, 400	36/2	15, 120	180/2	75, 600
70/1	58, 800	40/2	16, 800	200/2	84, 000
80/1	67, 200	48/2	20, 160	220/2	92, 400
90/1	75, 600	50/2	21, 000	260/2	109, 200
100/1	84, 000	58/2	24, 360	18/3	5, 040
5/2	2, 100	60/2	25, 200	20/3	5, 600
6/2	2, 520	68/2	28, 560	24/3	6, 720
8/2	3, 360	70/2	29, 400	28/3	7, 840
10/2	4, 200	78/2	32, 760	30/3	8, 400
18/2	7, 560	80/2	33, 600	36/3	10, 080
20/2	8, 400	98/2	41, 160	40/3	11, 200
24/2	10, 080	100/2	42, 000	60/3	16, 800
26/2	10, 920	120/2	50, 400	80/3	22, 400
28/2	11, 760	140/2	58, 800	100/3	28, 000
30/2	12, 600	160/2	67, 200	120/3	33, 600

In making laces on the Levers machine, yarns are used for four different purposes: For brass bobbins, warps, gimps, and outlining threads. The counts used depend upon the gage of the producing machine, the quality, and other factors; the usual range is from 20/2 to 260/2.

The coarser counts are chiefly of domestic manufacture, but counts higher than 80/2 are usually imported. In making most types of Levers laces, unbleached yarn is used, but fine-gage and fine-quality Normandie and other laces are sometimes made of bleached yarn, the advantage being that the lace after coming from the machine does not require such drastic treatment before it is dressed; bleached yarns, however, have not the strength of unbleached yarns and require greater care while the lace is being made.

(*a*) *Brass-bobbin yarns.*—Brass-bobbin yarns embody the supreme art of the cotton doubler. The cotton from which they are made ranges from a supercarded ordinary Egyptian to a supercombed Sea Island. Brass-bobbin yarns must be smooth, uniform, of long-staple cotton, and carefully spun and doubled in order to possess the strength to withstand abnormal strain as they are pulled from the brass bobbins by the action of the point bars and the drag of the work roller. Strength, evenness, regularity of twist, and compactness are all necessary properties. It is essential that the count be true to number, otherwise the loss of yarn caused by stripping the wide bobbins entails a serious waste. Brass-bobbin yarns are "prepared" in the same manner and for the same reasons as the brass-bobbin yarns used in the making of Nottingham lace curtains.

Brass-bobbin yarns used in domestic mills range from 80/2 to 260/2 in count and are usually 2-ply; the choice of count is governed by the style of lace and the gage of the machine in which it is used. For example, the heavier styles of lace, such as Cluny, which is made of coarse-count yarns, require a stronger and heavier bobbin thread than the lighter styles, especially the bobbin threads upon which the lacers catch, which are liable to crack when the piece is stretched to the full width.

The domestic lace industry is entirely dependent upon English spinning mills for its supply of brass-bobbin yarns. As stated in the previous chapter, domestic manufacturers, even with the aid of the tariff, have never been able to make these brass-bobbin yarns of equal quality at a competitive price. An American thread company once accepted an order for brass-bobbin yarn but experienced so much difficulty in its manufacture that it refused to duplicate the order.

Imported cotton yarns are dutiable under paragraph 901 of the Tariff Act of 1930:

PAR. 901 (a). Cotton yarn, including warps, in any form, not bleached, dyed, colored, combed, or plied, of numbers not exceeding number 90, 5 per centum ad valorem and, in addition thereto, for each number, three-tenths of 1 per centum ad valorem; exceeding number 90, 32 per centum ad valorem.

(b) Cotton yarn, including warps, in any form, bleached, dyed, colored, combed, or plied, of numbers not exceeding number 90, 10 per centum ad valorem and, in addition thereto, for each number, three-tenths of 1 per centum ad valorem; exceeding number 90, 37 per centum ad valorem.

(c) * * *.

Imports of cotton yarn for use in making Levers lace was curtailed by necessity during the war; whereas 56 counts were imported in 1914, only 30 were imported in 1918, and imports, by weight, in 1918 were only 74 percent of those in 1914. Some of these imperative changes have been retained by choice when such changes have proved satisfactory.

(*g*) *Domestic and foreign usage of cotton yarns compared.*—The chief difference between the yarn counts used in the domestic and foreign industries is to be found in the utilization abroad of singles brass-bobbin yarn, which cannot be used advantageously in the United States on account of the climate. Because of the dryness of the American climate, domestic manufacturers are obliged to use 2-ply yarns in the brass bobbins.

The attempts to use singles yarn in the United States have not proved successful, on account of frequent breakages of the bobbin thread, with resulting damage to lace and increased mending costs. Thus French and English manufacturers use 70/1 and 90/1 combed Sakel, gassed, prepared, double spun yarns for the bobbins, while domestic mills use 140/2 and 180/2, the yardage and twists (42 to the inch) being equivalent in each case. An examination of 25 domestic samples and of 21 foreign samples selected as typical and representative showed that only 2 of the domestic laces contained singles yarn, whereas 16 of the foreign laces contained singles.

The second difference between foreign and domestic use of cotton yarns is the substitution by the domestic industry of 2-ply yarn for the foreign 3-ply of the same yardage. French and English mills use 60/3 and 30/3, whereas domestic mills use 40/2 and 20/2 as equivalents. In strength and freedom in working, the advantage is thus with the foreign mills and the articles have a firmness and cleanness in appearance which is sometimes lacking in domestic laces of the same styles.

Other differences are the tendency in France to use finer yarns for making Valenciennes laces,[7] and in England, the tendency to use coarser warps for making bobbin-fining laces and coarser beam yarns for making Cluny laces.

[7] The French or half-metric system of nomenclature indicates the count of yarn by the number of 1,000-meter hanks that weigh 500 grams. The numbers of the principal yarns used in the French lace trade according to the 2 systems are as follows:

French system	English system
68/2	80/2
102/2	120/2
118/2	140/2
152/2	180/2
186/2	220/2

(*h*) *Cotton yarns used in making specific styles of lace.*—Manufacturers disagree as to the counts of yarn furnishing the best results. The appearance of the article is the paramount consideration in choosing yarns for making bobbin-fining laces, as the pattern is made from the brass-bobbin yarn. The vogue of shadow laces, of some years ago, defied and overturned all previous conceptions of fitness in yarn counts, as the requirement of "sheerness" demanded bobbin yarn of such fineness as to be incompatible with the standard of usage previously employed for machines of definite gages. Independent beam laces, on the other hand, do not show the bobbin yarn at all, and the finer the yarn used, compatible with strength, the greater will be the economy in manufacturing, for the reason that the set of bobbins will not require changing so often, and more lace will be made for the labor cost of winding the set of bobbins, a process which also entails a certain proportion of waste.

The various styles of cotton laces are briefly discussed in the following paragraphs, and the counts of yarn commonly used for their manufacture are shown in table 29.

Bobbin-fining laces and all-overs include Normandie laces, plain and thick-threaded, imitations of Alençon, Duchesse, Carrick-ma-Crosse, Baby Irish, Point de Paris, Bruges, and filet. Two warps are used in making these laces, a right-twist and a reverse-twist warp; it is the usual custom for the reverse-twist warp, which is subject to less strain, to be 20 numbers finer in yarn count than the right twist. Independent beam laces are mostly made with yarn counts of the same weight for the net, the gimps, and the outline threads, with stronger yarn on the beams which supply the yarn for making the fronts, back edges, and lacers. Some styles of cotton lace are extensively subdivided and have qualifying names which are indicative of distinctive meshes of net. The best illustration of this is the style known as "Valenciennes," which embraces French Vals of diamond mesh, German Vals, of round mesh, Point Binche, Point de Paris, filet, and the patterns of mixed type, partaking of the nature of a Val, a Maltese, or a Cluny lace.

TABLE 29.—*Counts of yarn used for different styles of lace according to gage*

Style	Gage of machine (point)	Right-twist warp	Reverse-twist warp	Brass bobbins	Beams	Purls, lacers, etc.
Bobbin fining	8	80/2	100/2	120/2, 60/1	20/2, 30/3	60/3
Do	9, 9½	100/2	120/2	120/2, 60/1	20/2, 30/3	60/3
Do	10	120/2	140/2	140/2, 70/1	20/2, 30/3	80/3
Do	10½	140/2	160/2	160/2, 180/2, 90/1	20/2, 30/3	80/3
Do	12	180/2, 200/2	200/2, 220/2	200/2, 220/2	40/2, 60/3	100/3
Malines	12	160/2		180/2	100/3	100/3
Valenciennes and Alençon laces	9½, 10			140/2, 70/1	80/2, 90/2	80/3
	12			160/2, 180/2, 90/1	120/2, 140/2	100/3
Do	12			180/2, 200/2, 90/1	160/2, 180/2	100/3
	14			220/2, 260/2	200/2	120/3
Ensor net	9, 9½, 10			140/2, 70/1	90/2	80/3
Torchon	9, 9½, 10			140/2, 70/1	80/2, 90/2	80/3
Cluny	7, 8, 9, 9½			120/2, 140/2 60/1, 70/1	20/2, 24/2 40/2	20/2, 24/2 40/2

2. Silk yarns

There has always been a substantial use of silk as material for Levers laces. Raw silk is a continuous thread, hundreds of yards in length, made by reeling into 1 thread 3 to 12 cocoon filaments held together by the natural gum or sericin of the silk itself. The silk used in the lace industry is chiefly extra classical Italian and is imported duty-free under paragraph 1763 of the Tariff Act of 1930.

Counts of silk yarn are numbered according to the denier system;[8] this differs from the cotton system in having higher numbers indicate coarser yarns.

Raw silk is now almost universally numbered according to the legal denier standard adopted by the International Congress for the Unification of Yarn Numbering, which met at Paris in 1900. According to that standard, the "count" of raw silk is the weight in deniers of a skein 450 meters in length. As this system is based upon the weight of an arbitrary fixed length, the finer the silk the smaller is the count. This is the reverse of the system used in numbering yarns of cotton and wool. A denier is 5 centigrams, equal to 0.771618 grain, and 450 meters is equal to 492.125 yards; therefore, the constant 4,464,528 [9] divided by the denierage will give the yards per pound.[10]

Therefore, the yardage of 30/32 denier silk (the most commonly used number in the domestic lace industry) is obtained by the following formula:

$$\frac{4,464,528}{31} = 144,017 \text{ yards per pound.}$$

The counts of silk used in the domestic Levers lace industry are 16/18, 24/26, 26/28, 28/30, 30/32, 34/36, 38/40, 40/42, 40/44, and 44/48 deniers.

Thrown silk of the type known as "organzine" is sometimes used for the brass-bobbin yarn; it is made by doubling threads which have been well twisted as singles and giving them a firm twisting in the opposite direction. The standard organzine twist for 13/15 deniers is 16 turns to the inch in the single, and 14 turns in the ply. The yardage per pound of organzine may be obtained by multiplying the denierage by the ply and then proceeding as for raw silk.

The silk used for warps contains the gum, but the silk for brass bobbins is degummed by a boil-off process before use; otherwise, when the bobbins are steamed after pressing, the whole yarn would be cemented together and would be unworkable. The loss in weight occasioned by degumming is from 20 to 25 percent and the yarn loses slightly in strength.

For warps and brass-bobbin yarns in most silk laces, such as Spanish and Chantilly, and in veilings, silk is the chief material used; radium laces are made entirely of silk. Of the number of Levers lace mills, investigated by the Tariff Commission in 1924, 15 used silk yarns, but not all of them kept records of the value and quantity; the records of 7 mills, however, showed the use of 23,940 pounds which cost $220,733. The largest quantity used by any of these 7 firms was 8,422 pounds, of the value of $72,421, and the average value per pound was $9.19. Four of the large mills lacked records of the weight, or value, or both, and 1 of these used considerably more silk than the 7 firms furnishing figures in detail.

[8] Silk yarns are sometimes numbered according to the dram system which is based on the weight in drams of 1,000 yards of yarn. For example, a 2-dram silk means that a length of 1,000 yards of yarn weighs 2 drams.
[9] Obtained by dividing 7,000 (grains per pound) by 0.771618 and multiplying by 492.125, the 4,464,528 thus obtained being the yards per pound corresponding to 1 denier.
[10] Broad Silk Manufacture and the Tariff, U.S. Tariff Commission, 1926, p. 52.

Spun silk.—Spun silk or schappe silk is a yarn made from silk waste—silk that cannot be reeled—by processes of degumming, dressing, drawing, and spinning. Spun silk is numbered under a dual system; on the Continent of Europe the count indicates the number of kilometers per kilogram and is based on single yarn; in the English system, the count indicates the number of 840-yard hanks in a pound. The latter is the same as the cotton numbering system as far as singles are concerned, but is different for ply yarns, where cotton is based on the single and spun silk on the finer yarn. Thus, 30/2 spun silk is made of 2 single 60s, and 30/3 spun silk is made of 3 single 90s; in each case there are 25,200 yards to the pound, and the number is obtained by multiplying 840 by the count, irrespective of the ply; the yardage per pound is the same as for 60/2 or 90/3 cotton.

At the present time spun silk is not used to any great extent in the lace industry, as the superior luster of rayon has brought about its almost universal substitution for the heavier counts of the duller spun silk. Spun silk is obtainable from domestic sources, but the finest counts are imported. Such counts are dutiable under paragraph 1202 of the Tariff Act of 1930, at 40 percent ad valorem, or 50 percent if bleached, dyed, colored, or plied.

Spun silk is used for the outline threads of Spanish and Chantilly laces, the finer counts for the double gimps of Spanish, and the finest counts for the front and center gimps of Chantilly laces. A small amount is used in the domestic industry, but quantity and value are negligible.

3. Rayon yarns

Rayon or artificial silk, the use of which has become universal in textile industries, is used in ever-growing quantities in the lace industry. It is the first synthetic fiber to be produced on a commercial scale by chemical and technical processes. It is now made by 4 distinct processes, 1 of which yields a product, acetate-cellulose, which has a different affinity for dyes from that of the other 3. The United States produces more rayon yarn than any country in the world; the yarn used in the domestic lace industry is obtained entirely from domestic sources.

The numbering system of the yarn is the same as that used for silk, the weight of a 450-meter length expressed in deniers. The yardage per pound is obtained by multiplying the yarn number by the ply and dividing into the silk constant—4,464,528. Therefore, 150/2 denier rayon has 14,882 yards to the pound, according to the formula

$$\frac{4,464,528}{150 \times 2} = 14,882.$$

In strength, durability, and elasticity, rayon is inferior to cotton; it absorbs moisture freely and loses strength when in a wet state. For a time the use of rayon for Levers laces was not satisfactory for the reason that when the piece was extended in its damp state to its full dimensions, on the dressing frame, the hard twisted silk warp and bobbin threads cut through single threads of the rayon, but this difficulty has been to a large extent overcome.

Rayon is used in the production of Levers laces for gimps and outline threads of Spanish laces, both full gage and half gage, for Margot and Bohemian laces, and in conjunction with cotton in Normandie

laces. The single yarns used are mainly 150 and 300 deniers; 2-ply yarns in these sizes, as well as in counts finer than 100 deniers, are also employed, together with some 3-ply 300 denier yarn. Fifteen of the Levers lace mills investigated by the Tariff Commission used rayon, and 8 of these had complete records of quantity and value. The total amount used by these 8 mills in a year was 221,058 pounds, valued at $628,256. The largest amount used by any of them was 81,138 pounds, valued at $231,933. The average value of the total was $2.84 per pound.

4. Worsted threads

Wool was used for making lace on Levers lace machines as long ago as 1848, but its use has been sporadic. Recently, however, there has been a small production of lace fabrics which can be used for dresses, sport coats, and the covering of handbags; this has sometimes led to the use of cotton, rayon, worsted, and metal threads in the same piece. The system of numbering worsted yarns is according to the number of hanks of 560 yards to the pound. Therefore, 26/2 worsted has 7,280 yards to the pound, the result being arrived at by multiplying the count by 560 and dividing by the ply—

$$\frac{26\times 560}{2}=7{,}280.$$

Worsted yarn is obtainable from domestic sources. Four firms reported the use of a negligible amount in 1923 of 26/2, 35/2, and 40/2.

5. Metal threads

Two varieties of metal threads are used in Levers lace machines, tinsel and laminette (also called lame or lahn). They are made with a 2-thread cotton core, around which is wound a flat copper or brass wire coated with gold or silver. The metal is wound around the cotton core in the opposite direction from the twist of the yarn; the cotton is right twist and the metal thread is wound onto the core, reverse twist with 36 or 38 turns to the inch for tinsel wire and laminette, respectively.

No rule can be given for calculating the number of yards to the pound. A leading domestic manufacturer supplied the information contained in table 30.

TABLE 30.—*Measurement of metal threads per kilogram and per pound*

Type	Number	Meters per kilogram	Yards per pound
Tinsel	7	8,000	3,629
	8	12,000	5,443
	10	17,000	7,711
	12	25,000	11,340
	14	30/33,000	13,608–14,969
	16	55/60,000	24,948–27,216
Laminette [1]	4	4,000	1,814
	9	9,000	4,082
	10/11	10/11,000	4,536–4,990
	13	13,000	5,897
	17/18	17/18,000	7,711–8,165
	22/23	22/23,000	9,979–10,433

[1] Laminettes are called by the number of meters per kilogram.

Domestic production is small, imports from France and Germany supplying the greater part of the domestic consumption. Metal threads are dutiable under paragraph 385 of the Tariff Act of 1930 as follows:

PAR. 385. * * * Metal threads made wholly or in chief value of tinsel wire, lame or lahn, 6 cents per pound and 35 per centum ad valorum.

Tinsel thread is used in the brass bobbins of Levers lace machines, and for gimp threads; laminette is used for gimps and for outlining threads; the warp is always either of cotton or silk. (The use of metal threads has a tendency to wear the inside parts of the Levers lace machine, as it cuts the steel bars; on the other hand, the steel bars cut worsted threads.) Twelve firms of Levers lace manufacturers used metal threads; 6 of them showed records of the amount and value used in a year. The total amount used by these 6 firms was 6,634 pounds, valued at $55,736.22. This shows an average value of $8.40 per pound. The largest amount used by any one firm was 2,256 pounds, having a value of $13,467.

It is doubtful if any linen yarn is used on Levers lace machines at the present time as it has been superseded by mercerized cotton.

6. Natural moisture contained by different lace fibers, in their normal condition

The free utilization of yarns requires that they contain a certain amount of moisture. If thoroughly dry, they are tender and will not stand the abnormal strain of lace weaving.

Silk is a very hygrometric substance; it is easily overloaded with moisture, and this adds in an illicit manner to the weight. In order to put an end to the difficulties which this practice entailed and to stabilize conditions of sale, the city of Turin, in Italy, in 1750 established a "conditioning house." Others followed at Milan, Italy; Lyons, Saint-Etienne, Saint-Chamond, and Calais in France; Basel in Switzerland, and Crefeld in Germany. The silk is stored in these conditioning houses at a determined temperature in order to arrive at the desired degree of desiccation. When the silk is sold, the conditioning house issues a certificate of guarantee of the degree of moisture in it.

Yarn rooms in domestic lace mills are not provided with standard systems of humidifying, but in some mills there are open spouts through which exhaust steam escapes into the room, and the temperature and humidity are recorded by a hygrometer. The standard amount of moisture in the principal raw materials used in Levers lace machines is shown in table 31.

TABLE 31.—*Hygrometric standard for Levers lace yarns* [1]

Material	Percentage of moisture	Weight of moisture per pound	Material	Percentage of moisture	Weight of moisture per pound
		Oz. Drams			*Oz. Drams*
Cotton	8½	1 4	Rayon	[2] 11	1 9¼
Linen	12	1 11¾	Worsted	18¼	2 7½
Silk	11	1 9¼			

[1] Littauer, Ludwig: Parallel Yarn Tables and Equivalents, p. 3.
[2] Bureau of Standards Preliminary Report of Investigation, p. 5.

7. Yarn numbering systems and equivalents

In calculating costs of production, it is sometimes necessary (when a material is changed in a pattern and it is essential to know the amount used of the substituted material, or for the purpose of mentally judging the effect a new material will give in a pattern), to know the equivalent in size and length of yardage of different materials and their ratio to each other. Yarn numbering systems of different materials used in making Levers laces and the methods of obtaining equivalent counts in the English cotton yarn numbering system are shown in tables 32 and 33.

TABLE 32.—*Yarn numbering systems and equivalents*

Material	Yarn count is number of—	Method of obtaining cotton yarn equivalent
Cotton	840-yard hanks to the pound	×1.
Linen	300-yard leas to the pound	×0.357.
Raw silk	Deniers to 450 meters	5,315÷deniers.
Thrown silk	Drams to 1,000 yards	304.76÷drams.
Spun silk	840-yard hanks to the pound	× 1.
Rayon	Deniers to 450 meters	5,315÷deniers.
Worsted	560-yard hanks to the pound	2/3.

TABLE 33.—*Equivalent cotton counts of specific numbers of different lace yarns*

Material	Count	Method	Equivalent cotton count	Cotton, yards per pound	Other material, yards per pound
Cotton	80/2	×1	80/2	33,600	
Linen	100 lea	×0.357	36/1 or 72/2	30,240	30,000
Raw silk	30/32 denier	5,315÷31	171/1 or 342/2	143,640	144,017
Thrown silk	2 drams	304.76÷2	152/1 or 304/2	127,680	128,000
Spun silk	60/2	×1	120/2	50,400	50,400
Rayon	150/1	5,315÷150	35/1 or 70/2	29,400	29,763
Worsted	45/2	×2/3	30/2	12,600	12,600

The proof of the accuracy of these findings is to be found in the comparison of the yardage per pound for the respective yarns.

A general rule to find equivalent counts of yarn from one system to another is as follows:

Multiply the given count of yarn by its standard length and divide by the standard length in the system desired.

The following examples prove this statement:

What count of worsted is equal to 100 lea linen?

$$\frac{100\times300}{560}=54 \text{ worsted}$$

What count of linen is equal to 54 worsted yarn?

$$\frac{54\times560}{300}=100 \text{ linen}$$

What count of spun silk is equal to 100 linen?

$$\frac{100\times300}{840}=36 \text{ spun silk}$$

What count of linen is equal to 36 spun silk?

$$\frac{36\times840}{300}=100 \text{ linen}$$

Rayon, like raw silk, is numbered on the weight of a definite length of yarn, instead of the length of a definite weight of yarn as with cotton, linen, spun silk, or worsted.

In order, therefore, to convert deniers to other material counts, use is made of the formula:

$$\frac{4,464,528}{\text{Denier}\times\text{system measurement}}$$

Examples: What count of worsted is equal to 150/1 deniers?

$$\frac{4,464,528}{150\times560}=53 \text{ worsted}$$

The proof is found in the facts that in 1 pound of 150 denier rayon there are 29,763 yards, and that in 1 pound of 53 worsted there are 29,680 yards.

To find the denierage of rayon or silk equivalent to a given yarn, divide the yardage per pound of one denier silk by the yardage per pound of the given yarn. Examples: What denier of rayon is equivalent to 53 worsted?

$$\frac{4,464,528}{53\times560}=150 \text{ deniers}$$

What denierage of rayon is equal to 70/2 cotton?

$$\frac{4,464,528}{70\div2\times840}=150 \text{ deniers}$$

Denier counts of silk can be brought to dram counts by dividing the deniers by 17.44, this constant being obtained by dividing 4,464,528 (the yardage of 1 pound of 1 denier silk), by 256,000 (the yardage of 1 pound of 1 dram silk). Two-thread organzine of 13/15 deniers silk, therefore, is proved to be 1.60 drams by the formula:

$$\frac{14\times2}{17.44}=1.60$$

Fourteen is the mean denierage of 13/15 silk and is multiplied by 2, because the organzine is 2-ply.

V. QUALITIES OF LACES

The quality of laces of different styles depends upon mechanical and material factors, such as the gage of the machines, the yarn count, and also the price at which it is desired to produce any specific article. Table 34 shows the gages of the machines on which the various styles of domestic laces are usually made, also the usual width and qualities, and in every case reference is made to the rack of 1920 single motions.

TABLE 34.—*Machine gage and quality of different styles of lace*

Style	Gage of machine	Width of lace	Quality of lace
	Points	*Inches*	*Inches to the rack*
Vraie Valenciennes or fil passé laces	12, 14, 16	6/16–1½	3
French Valenciennes laces	10	3/5–1½	16–18
Do	12	1/2–2	10–16
Do	14	1/2–1½	8–14
Cluny laces	7, 8, 9	1/2–6	20–60
Torchon laces	9, 10	1–3	12–24
Ensor net laces (independent beams)	9, 10	1–4	24
Bobbin-fining laces	8, 9	1–8	15–36
Do	10, 10½	1–8	10–24
Do	12, 14	1–6	8–12
Malines	12	1/2–1⅓	12
Ensor net laces (warps)	10	1–6	18–24
Half-gage Spanish and metal thread laces	9, 10, 10½		24–36
Chantilly laces	10, 12	1–6	18–24
Radium laces	10		20–36

This list, which is by no means exhaustive, is indicative of the qualities at which these styles, with the exception of Vraie Valenciennes, are made in domestic mills.

VI. GLOSSARY

TABLE 35.—*Glossary of Levers machine-made laces*

Style [1]	Description	Technical process [2]
Alençon	Independent beam, single-warp bobbin-fining, and double-warp bobbin-fining laces, made to imitate the products of the French bobbinet-jacquard machines. The name was applied in 1879 to a narrow lace, from 1 to 4 inches in width, which was made on the Levers lace machine. The mesh was Ensor net, and for the height of an inch on the pattern the net threads were worked in independent bars, for the purpose of allowing fancy meshes to be introduced into the front of the pattern. The remainder of the net was made by 8 bars; the objects were small and filled with gimping or fancy meshes, and were outlined with very thick threads which were sometimes worked in pairs.	2, 3
Armenian	Narrow cotton laces of needle-work type, made with independent beams and used for trimming handkerchiefs and other articles.	2
Binche	The name applied to cotton laces containing a distinctive fancy net or ground. It is made by independent beams in narrow widths, as a variant of Valenciennes, or in wider widths as a thick-threaded bobbin-fining lace.	2, 3
Blonde	Natural colored silk laces of light texture, made on an Ensor net ground.	4
Bohemian	Cotton or silk laces made with warps, in which the pattern consists of tapelike shapes.	3
Bourdon	Silk laces in which the pattern is outlined with very coarse threads; also called Margot lace.	3, 4
Brabant	Cotton laces in which the ground work and the filling of the objects, which are outlined with thick threads, are made by the warp; also called loop laces.	3
Carrick-ma-crosse	Cotton bobbin-fining laces, made in 2 varieties, solid outlined objects on a net ground or on a guipure ground with cast-off purls.	3
Chantilly	Fine quality silk laces, with the objects outlined by spun silk or cotton thick threads.	3, 4
Cluny	Cotton lace of coarse texture, made by independent beams and largely used for trimming furniture and upholstery articles.	2
Craquelé	Cotton laces containing an irregular shaped net, having the outline of a coffin and sometimes termed coffin net.	3
Duchesse	Cotton machine-made imitation of Brussels and Honiton lace; bobbin-fining lace made with brides and tapelike effects, with the objects outlined with thick threads.	3

[1] The names given to Levers laces are principally the names of the localities at which the different styles originated as hand-made laces and do not in any case indicate geographical source of origin. Some of them are excellent imitations of the hand-made articles of the same name but can be distinguished from the hand-made or similar Barmen laces by the presence of the bobbin threads.

[2] *See* description of processes at end of chapter.

TABLE 35.—*Glossary of Levers machine-made laces*—Continued

Style	Description	Technical process
English Antique	Cotton laces made by independent beams or bobbin-fining systems, the net contains square effects known as guipure d'art.	2, 3
Everlasting	Narrow cotton trimmings of the French banded style; the name is applied to them because of their durable wearing qualities.	1
Filet	Cotton laces distinguished by a square mesh. Made by independent beams as a variant of Valenciennes laces or on a bobbin-fining set-out.	2, 3
Guipure	Cotton laces which are distinguished by brides covered with purls, occasionally made of silk, by independent beams.	2
Hamburgh	Cotton independent beam laces, made with a solid ground to imitate cloth.	2
Irish point	Cotton laces, sometimes called Irish crochet or baby Irish, made by independent beams or bobbin-fining set-outs and with heavy purls.	2, 3
Malines	Cotton laces made with a single warp, fine front gimps, and outlining threads for the objects of the pattern. (40 years ago laces made of silk warp and bobbins with fine mesh net and cotton gimps and outlining threads were called Malines and Fedora laces.)	3
Maltese	Cotton laces, made on the independent beam system with bands and crosses similar to those which are characteristic of the hand-made silk articles of the same name, further distinguished by a beautiful arrangement known as "crown front."	2
Mirecourt	Cotton laces made on a bobbin-fining set-out, and distinguished by a fine-woven net known as "half fining."	3
Normandie	Cotton laces made on a bobbin-fining set-out, plain or outlined with thick threads, made as wide as 8 inches with various characteristic meshes, diamond, round hole, Point de Paris, or filet. The plain style laces were at one time known as "Platt Valenciennes", the same laces are also made with a warp and back and front gimps.	3
Paraguay	Cotton laces made by independent beams with wheel designs similar to Teneriffe laces, with fine, drawn-thread effects of spider-web texture.	2
Point d'Esprit	Cotton laces made by independent beams on an Ensor net set-out with fine spots on the net.	4
Point de Paris	Cotton laces made by independent beam or bobbin-fining systems, the distinguishing feature of which is an octagonal net ground.	2, 3
Russian Point	Cotton laces made by independent beams, having a pattern composed of tapelike bands with a very heavy cord running down the center.	2
Spanish	Silk laces of heavy texture, the designs consisting of large objects, roses and leaves made on a warp ground, Ensor net system with back and front gimps or center gimps.	4
Torchon	Cotton laces made by independent beams of the Cluny style, of fine yarns and of narrow widths.	2
Tuck laces	Tuck nets are ornamented with parallel rows of tucks, arranged either close together and covering the surface, or in clusters with spaces between, which may be of plain Ensor net or of fancy nets, made by independent beams.	2
Valenciennes	Cotton laces made by independent beams, Calais Vals, Vraie Valenciennes or fil passé, an imitation of hand-made Belgian Valenciennes laces.	1
	French Vals, diamond mesh	2
	German Vals, round hole mesh, made half gage, the objects and details full gage.	2
	Filet Mesh Vals, square mesh	2
	Val laces also contain objects of the Cluny, Maltese, and Torchon styles.	2
	Ensor net Vals	2
Veilings	Silk laces of fancy meshes for use as face veils or on hats	4
Venetian	Cotton lace made on a bobbin-fining set-out and characterized by specially shaped objects with fancy nets, the connecting stems being of a broad, braided style, and joined by brides.	3
Yak	Cotton or wool laces made by independent beams, half gage. So called from the fact that these laces were made by hand of wool spun from the fiber of the yak. Used for trimming furniture and for other upholstery purposes.	2

VII. STATISTICAL AND ANALYTICAL REVIEW OF DOMESTIC PRODUCTION AND FOREIGN TRADE IN LEVERS LACES

1. Domestic production

The first separate statistics regarding domestic Levers lace production appeared in 1914; prior to that time they were included with products of the Nottingham lace-curtain machines under the heading Lace and Lace Curtains, the latter constituting the chief value.

From 1914 to 1925, inclusive, Levers laces of all materials made in lace mills were included in the census reports under the title "Levers Laces"; these figures, however, did not include the considerable amount of silk laces, nets, veils, and veilings produced incidentally by silk mills and reported separately by value. The census reports of 1927, 1929, and 1931 are the most satisfactory, as they classify the total of Levers lace production according to the material of which it is made and according to the type of article manufactured; unfortunately, however, these figures show production only by value and not by quantity. Obviously, then, comparisons of the details of production from 1914 to 1931 are difficult, if not impossible. Although table 36, which appears below, is entitled "Products of the Levers Cotton Lace Industry", it includes laces of all other materials made in Levers lace mills (the production of laces of other materials was fairly small), but does not include silk laces, nets, veils, and veilings made in silk mills.

TABLE 36.—*Products of the domestic Levers cotton-lace industry (includes laces of other materials made in lace mills but excludes lace products made in silk mills), 1914–25*

Year	Square yards	Value	Unit value	Percent of total value, produced in Rhode Island
1914	7,236,934	$3,681,042	$0.5086	49
1919	11,629,123	6,607,546	.5682	59
1921	4,452,625	3,988,120	.8957	35
1923	10,523,517	8,029,404	.7630	47
1925	8,981,824	6,547,830	.7290	45

The rise in unit value in 1921 over that of 1919 was due to the turning of the industry to the production of laces of material other than cotton. The Bureau of Labor Statistics wholesale price index for all commodities increased during the period 1914 to 1925, 61.8 percent; the price index of domestic cotton laces increased 43.3 percent.

Silk laces, nets, veils, and veilings produced incidentally by the domestic silk industry from 1914 to 1925, reported only by value are shown in table below.

TABLE 37.—*Silk laces, nets, veils, and veilings produced incidentally by domestic silk industry, 1914–25* [1]

	1914	1919	1921 [2]	1923 [2]	1925 [2]
New York	$652,189	$2,416,329	$1,864,997	$1,147,882	$932,085
New Jersey	650,634	2,031,122	470,528	863,607	
All other States	26,110	1,377,908	509,377	881,323	393,532
Total domestic production	1,328,933	5,825,359	2,844,902	2,892,812	1,325,617

[1] All these products, except minor quantities of nets and nettings made on the bobbinet machine, are made on Levers machines.
[2] Inclusive of embroideries.

The total production of Levers laces by States, as reported by the Census Bureau for the years 1927, 1929, and 1931, is shown in table 38; production is reported only by value.

TABLE 38.—*Total value of domestic production of Levers laces, by States, census years 1927, 1929, and 1931*

State	1927	1929	1931
Rhode Island	$2,641,834	$3,855,665	(1)
New York	959,468	1,311,704	(1)
Pennsylvania	908,640	1,114,834	(1)
All other States	1,752,989	2,473,769	(1)
Total value domestic Levers lace production	6,262,931	8,755,972	$7,305,089

[1] Not available.

Combining the value figures of table 36 with those of table 37 and adding table 38 data for later years gives table 39, showing the total value of domestic Levers lace production from 1914 to 1931.

TABLE 39.—*Total value of domestic production of Levers laces of all materials, 1914–31*

Year	Value	Year	Value
1914	$5,009,975	1925	$7,873,447
1919	12,432,905	1927	6,262,931
1921	6,833,022	1929	8,755,972
1923	10,922,216	1931	7,305,089

TABLE 40.—*Domestic production of lace goods by material and type, 1927, 1929, and 1931, with percentage analysis*

Material and type	1927		1929		1931	
	Value	Percent of total	Value	Percent of total	Value	Percent of total
All-overs:						
Cotton	$555,484	22.49	$1,460,686	33.45	$1,131,565	23.65
Silk	116,600	4.72	(1)		233,003	4.87
Rayon	220,222	8.92	420,588	9.63	283,039	5.92
Mixed fibers	1,577,293	63.87	2,486,115	56.92	3,136,988	65.56
Total	2,469,599	100.00	4,367,389	100.00	4,784,595	100.00
Edgings, insertions, galloons, and flouncings:						
Cotton	2,173,503	57.30	2,018,980	46.01	1,469,260	58.29
Silk	51,487	1.36	89,593	2.04	210,215	8.34
Rayon	279,912	7.38	780,655	17.79	85,640	3.40
Mixed fibers	1,288,430	33.96	1,499,355	34.16	755,379	29.97
Total	3,793,332	100.00	4,388,583	100.00	2,520,494	100.00
Total laces:						
Cotton	2,728,987	43.57	3,479,666	39.74	2,600,825	35.60
Silk	168,087	2.68	89,593	1.02	443,218	6.07
Rayon	500,134	7.99	1,201,243	13.72	368,679	5.05
Mixed fibers	2,865,723	45.76	3,985,470	45.52	3,892,367	53.28
Total Levers laces	6,262,931	100.00	8,755,972	100.00	7,305,089	100.00
Total all-overs		39.43		49.88		65.50
Total edgings, etc		60.57		50.12		34.50
		100.00		100.00		100.00

[1] Included in mixed fibers.

The census reports of 1927, 1929, and 1931 furnish much more detailed and satisfactory information regarding the domestic production of Levers laces than reports prior to 1927. Recent census reports, as shown in table 40, separate the statistics according to constituent materials and according to type of lace product. The chief reason for changing the mode of statistical representation was the radical decline about 1925 in the production of cotton laces which previously constituted the greater part of domestic production and the correspondingly rapid rise in the production of laces made of silk, spun silk, rayon, metal threads, and mixed fibers. This change in production was due to the dictates of fashion.

As shown in table 40, cotton laces had in 1927 fallen to 43.57 percent of total domestic production; by 1931 they had fallen to only 35.60 percent of the total. The ratio of the value of production in 1931 to that of 1914 showed an increase of 45.81 percent.

2. Imports

Laces made on the Levers (including the Levers go-through) lace machine were separately recorded only under the Tariff Acts of 1909 and 1930, and the classifications were quite different under the two acts. Table 41 shows imports of Levers machine-made laces, also lace articles, classified according to constituent materials, under the act of 1909.

TABLE 41.—*Levers laces, and articles wholly or in chief value thereof: Imports for consumption under the Tariff Act of 1909*

Levers laces	Fiscal years 1910 [1]	1911	1912	1913	1914 [2]	Total	Percent of total
Cotton:							
Embroideries,[3] including edgings, insertings, and galloons	(4)	(4)	$294,787	$222,956	$48,782	$566,525	
Laces, including lace edgings, insertings, and galloons	$7,002,802	$6,666,694	4,008,910	8,034,166	1,794,007	27,506,579	
Nets and nettings	(4)	(4)	169,833	104,932	32,604	307,369	
Veils	(4)	(4)	18,720	6,931	3,396	29,047	
Flouncings and trimmings	(4)	(4)	3,141,646	257,164	4,945	3,403,755	
Annual average						7,639,373	38.53
Flax, etc.:							
Embroideries,[3] including edgings, insertings, and galloons	(4)	(4)	399	1,472	248	2,119	
Laces, including lace edgings, insertings, and galloons	16,482	26,870	17,030	48,110	9,951	118,443	
Nets and nettings	(4)	(4)	[5] 1,009	1		1,010	
Flouncings and trimmings	(4)	(4)	16,426	849	187	17,462	
Annual average						33,386	.39
Silk:							
Embroideries,[3] including edgings, insertings, and galloons	(4)	(4)	24,662	14,268	1,488	40,418	
Laces, including lace edgings, insertings, and galloons	978,054	1,133,097	124,096	226,780	49,771	2,511,798	
Nets and nettings	(4)	(4)	378,526	655,566	154,206	1,188,298	
Veils	(4)	(4)	28,933	53,555	14,605	97,093	
Flouncings and trimmings	(4)	(4)	61,547	35,695	6,844	104,086	
Annual average						946,525	10.97

Footnotes at end of table.

TABLE 41.—*Levers laces, and articles wholly or in chief value thereof: Imports for consumption under the Tariff Act of 1909*—Continued

Levers laces	Fiscal years 1910 [1]	1911	1912	1913	1914 [2]	Total	Percent of total
Artificial silk: Laces, embroideries, edgings, etc.	$10,069	$1,795	$28,229	$290		$40,383	
Annual average						9,697	0.11
Total laces	8,007,407	7,828,456	8,314,753	9,662,735	$2,121,034	35,934,385	
Annual average						8,628,981	100.00
Cotton:							
Handkerchiefs, wholly or in chief value of lace, etc.	5,220	404	425	7,383	2,780	16,212	
Corsets, wholly or in chief value of lace, etc.	200	541	1	7,649	499	8,890	
Wearing apparel, made wholly or in chief value of lace, etc.	5,717	22,404	3,533	63,788	20,492	115,934	
Flax, etc.:							
Handkerchiefs	3,958	6,353	6,538	12,025	7,712	36,586	
Wearing apparel	32	33	132	476	298	971	
Silk:							
Handkerchiefs	13,190	816	223	31	40	14,300	
Ready-made clothing, etc.	9,733	12,728	12,843	30,400	10,415	76,119	
Total lace articles	38,050	43,279	23,695	121,752	42,236	269,012	
Grand total, lace and lace articles	8,045,457	7,871,735	8,338,448	9,784,487	2,163,270	36,203,397	

[1] Aug. 6, 1909, to June 30, 1910.
[2] July 1, to Oct. 3, 1913.
[3] Embroidery, which implies fancy stitching on a preexistant fabric, is not made on a Levers or go-through lace machine, and it is surmised that the embroideries recorded in the table were laces with prominent brodeurs or thick threads which gave the laces the appearance of being embellished by hand or other machine than the Levers machine, after the fashion of Lyons Alençon lace.
[4] Included in laces, etc.
[5] Includes veils.

Table 42 shows imports of Levers laces, classified according to constituent materials, under the Tariff Act of 1930 to the end of the calendar year 1933.

TABLE 42.—*Levers machine-made laces: Imports for consumption under the Tariff Act of 1930*

Description	1930 [1]	1931	1932	1933	Total
Cotton:					
Veils and veilings	$450	$2,078	$1,694	$395	$4,617
Other	1,237,016	4,085,168	2,679,456	3,045,871	11,047,511
Silk:					
Veils and veilings	10,264	30,442	97,596	78,904	217,206
Other	110,721	359,924	60,008	39,368	570,021
Rayon: Laces	3,187	44,524	45,450	32,634	125,795
Metal thread: Laces	3,534	4,757	11,067	1,633	20,991
Total	1,365,172	4,526,893	2,895,271	3,198,805	11,986,141

[1] June 18 to Dec. 31, 1930.

Levers laces of materials other than those shown in table 42 are not segregated in import statistics under the Tariff Act of 1930, but imports of machine-made laces of flax, etc., and imports of wool lace and lace articles are shown as recorded in table 43.

TABLE 43.—*Other machine-made laces: Imports for consumption under the Tariff Act of 1930*

Description	1930 [1]	1931	1932	1933	Total
Flax: Machine-made	$4,797	$3,647	$870	$1,297	$10,611
Wool: Laces and lace articles, etc.	11,521	12,351	13,602	11,611	49,085
Total	16,318	15,998	14,472	12,908	59,696

[1] June 18 to Dec. 31, 1930.

The value of imports of Levers laces in 1933 exceeded by 10.48 percent those of 1932 but was only 37.07 percent of the annual average of imports of Levers laces under the Tariff Act of 1909.

Under the Tariff Acts of 1913 and 1922, imports of Levers laces were not separately recorded, but those made of cotton and silk constituted the bulk of the imports listed as "machine-made laces", a classification which also included other types of laces, such as Lyons Alençon, and Barmen, and lace imitations made on the knitting machine. Recorded imports were as follows:

TABLE 44.—*Levers and other machine-made laces of cotton, flax, and silk: Imports for consumption under the Tariff Acts of 1913 and 1922*

Year	Value				Total
	Cotton [1]	Flax, etc. [1]	Silk	Silk veils and veilings	
Fiscal					
1914 (Oct. 4–Dec. 31)	$12,692,769	$544,358	$379,291	$811,529	$14,427,947
1915	11,852,772	394,103	403,398	697,792	13,148,065
1916	10,895,059	247,546	479,883	1,313,101	12,935,589
1917	8,506,537	105,038	266,986	1,242,938	10,121,499
1918	5,143,495	76,025	113,139	834,278	6,166,937
1918 (July 1–Dec. 31)	2,686,920	13,296	81,980	545,824	3,328,020
Calendar					
1919	7,773,818	32,187	426,917	2,257,489	10,490,411
1920	10,752,993	58,562	850,809	2,276,135	13,938,499
1921	9,697,472	114,537	1,126,158	1,848,556	12,786,723
1922 (Jan. 1–Sept. 21)	4,213,671	74,173	413,761	1,192,082	5,893,687
Total (3,275 days, act of 1913)	84,015,506	1,659,825	4,542,322	13,019,724	103,237,377
Annual average (Act of 1913)	9,363,560	184,988	506,244	1,451,053	11,505,845
1922 (Sept. 22–Dec. 31)	1,641,075	145,909	150,220	148,510	2,085,714
1923	9,018,528	623,005	1,013,643	692,492	11,347,668
1924	11,693,201	107,990	1,054,308	355,177	13,200,676
1925	7,903,793	73,243	781,351	71,215	8,834,602
1926	5,355,854	98,797	631,488	60,272	6,146,411
1927	4,900,073	95,315	825,231	66,481	5,887,100
1923	4,551,528	63,452	1,036,470	121,070	5,772,520
1929	5,213,745	37,383	991,099	58,490	6,300,717
1930 (Jan. 1–June 17)	2,288,142	10,803	510,007	10,218	2,819,170
Total (2,826 days, act of 1922)	52,580,939	1,255,897	6,993,817	1,583,925	62,394,578
Annual average (act of 1922)	6,788,656	162,209	903,306	204,576	8,058,747

[1] Imports of veils and veilings of cotton and flax, etc., were small and are excluded, being combined in chapter III with imports of nets and nettings.

Imports of laces made of wool, rayon, and metal threads are given in table 45. These figures include, in addition to Levers laces, however, other items, such as embroideries and braids; further, they include hand-made as well as machine-made lace.

TABLE 45.—*Laces, etc., of wool, artificial silk, artificial horsehair, and of tinsel wire, lame, bullions, or metal threads: Imports for consumption, 1910–30*

Year	Wool	Artificial silk	Metal threads	Total
Fiscal				
1910 (Aug. 6, 1909–June 30, 1910)		$772,526		$772,526
1911		1,125,228		1,125,228
1912		995,295		995,295
1913		882,412		882,412
1914 (July 1–Oct. 3, 1913)		300,446		300,446
Total (1,520 days, act of 1909)		4,075,907		4,075,907
Annual average (act of 1909)		978,754		978,754
1914 (Oct. 4, 1913–Jan. 30, 1914)	$49,094	229,067	$92,261	370,422
1915	36,349	123,177	121,850	281,376
1916	48,372	94,806	265,585	408,763
1917	115,649	99,913	572,003	787,565
1918	76,015	38,300	402,661	516,976
1918 (July 1–Dec. 31)	24,645	19,040	85,770	129,455
Calendar				
1919	68,516	78,015	479,286	625,817
1920	106,853	461,595	503,367	1,071,815
1921	152,884	436,406	362,585	1,001,875
1922 (Jan. 1–Sept. 21)	187,439	1,007,464	379,466	1,574,369
Total (3,275 days, act of 1913)	865,816	2,637,783	3,264,834	6,768,433
Annual average (act of 1913)	99,191	293,982	363,867	757,040
1922 (Sept. 22–Dec. 31)	17,999	67,117	150,199	235,315
1923	25,135	157,138	889,519	1,071,792
1924	33,056	115,894	920,748	1,069,698
1925	46,535	150,706	1,027,732	1,224,973
1926	39,853	228,222	712,207	980,282
1927	43,117	273,562	420,025	736,704
1928	34,841	271,246	280,192	586,279
1929	30,363	273,522	153,339	457,224
1930 (Jan. 1–June 17)	4,620	139,596	53,432	197,648
Total (2,826 days, act of 1922)	275,519	1,677,003	4,607,393	6,559,915
Annual average (act of 1922)	35,585	216,598	595,081	847,264

The value of the average annual imports of metal-thread laces under the act of 1922 was 63.54 percent higher than under the act of 1913 and is indicative of the trend of fashion.

The values of the imports of machine-made laces shown in table 44 for about 17 years, were as follows: Cotton, $136,576,445 (82.46 percent of total); flax, etc., $2,915,722 (1.76 percent); silk, $11,536,139 (6.96 percent); silk veilings, $14,603,649 (8.82 percent); total, $165,631,955. The value of the average annual imports of laces under the act of 1922 gave the following percentage of increase over or decrease from those under the act of 1913: Cotton, −27.50; flax, −12.31; silk, +78.43; veilings, −85.90; total, −29.96.

In estimating influences which caused the changes, the total of which shows a decrease of about 30 percent, the demand for the articles as influenced by fashion is strikingly illustrated by the value of the imports of veilings, which in 1919 was more than five times the total of the value of imports of other silk laces, and in 1930 was 2 percent of the value of silk laces. Another sign of fashion change is to be seen in the decrease of the annual average of imports of cotton laces and the increase in that of silk laces.

Sources of imports.—The only statistics available regarding the sources of domestic imports of Levers laces are General Imports as

recorded in Foreign Commerce and Navigation of the United States under Machine-made Laces of Cotton. These figures, which include machine-made laces of several methods of construction, are confined to cotton laces, and thus are unsatisfactory, but are presented in table 46. Although the figures for France and the United Kingdom to the end of the Tariff Act of 1922 represented almost entirely Levers laces, those for Switzerland and Germany represent almost entirely other types (embroidered laces, burnt-out laces, Barmen laces, etc.), for there are no Levers machines in Switzerland and exports of Levers laces from Germany are known to be negligible. Commencing with 1930 general imports of nets and nettings are recorded with other machine-made laces, which accounts for the increase in value of imports from Great Britain.

TABLE 46.—*Machine-made laces of cotton: General imports by countries, 1922–33*

Calendar year	France	United Kingdom	Germany	Switzerland	All other countries	Total
1922	$3,066,531	$711,413	$1,146,190	$381,016	$380,959	$5,686,109
1923	4,821,589	842,174	2,918,032	411,198	266,369	9,259,362
1924	7,251,283	1,442,170	2,571,754	492,395	193,625	11,951,227
1925	4,339,661	1,175,626	1,646,766	265,329	185,171	7,612,553
1926	3,112,280	605,746	1,036,739	145,395	174,408	5,074,568
1927	3,019,857	439,814	1,095,852	98,505	270,532	4,924,560
1928	2,828,249	282,657	951,947	90,443	278,492	4,431,788
1929	3,713,048	299,608	915,806	95,339	246,751	5,270,552
1930 [1]	3,359,296	1,176,171	542,165	61,160	105,084	5,243,876
1931 [1]	4,753,412	1,096,819	428,476	20,522	11,506	6,310,735
1932 [1]	2,886,783	916,175	155,191	11,188	5,213	3,974,550
1933 [1]	3,120,294	1,053,778	50,989	7,680	4,355	4,237,096
Total	46,272,283	10,042,151	13,459,907	2,080,170	2,122,465	73,976,976

[1] Includes nets and nettings.

Imports of silk veils and veilings are shown in table 47.

TABLE 47.—*Veils and veilings of silk: General imports by countries, 1918–29*

Calendar year	France	United Kingdom	All other countries	Total	Calendar year	France	United Kingdom	All other countries	Total
1918	$543,389	$1,508	$101	$544,998	1925	$52,663	$2,931	$8,513	$64,107
1919	2,218,598	77,841	2,627	2,299,066	1926	52,976	4,249	1,966	59,191
1920	2,194,105	159,847	7,967	2,361,919	1927	59,345	1,864	4,496	65,705
1921	1,734,458	61,248	4,753	1,800,459	1928	112,221	3,021	2,274	117,516
1922 [1]	134,855	7,987	3,467	146,309	1929	55,600	3,237	1,962	60,799
1923	688,568	30,227	12,591	731,386					
1924	331,594	5,745	8,464	345,803	Total	8,178,372	359,705	59,181	8,597,258

[1] Sept. 22 to Dec. 31.

3. Domestic production and imports analyzed and compared

Statistics concerning domestic production and imports of Levers laces can be compared only with certain reservations. In the first place, quantity statistics are not available and comparisons must be made on the basis of value; secondly, as statistics for domestic production and for imports are not consistent in comprehensiveness, either individually or in their mutual relationship, they must be considered only in a very general manner; thirdly, there is no information regarding production and importation by styles. Inasmuch, therefore, as there are certain styles in the production of which domestic and foreign industries each excel, and inasmuch as the style of lace worn is decreed by fashion, the relation of imports to domestic production expressed in figures loses much of its significance. In the tables to follow imports are expressed in terms of foreign value; it is possible to convert to landed duty-paid value by adding 7½ percent transportation and landing charges plus 60 percent duty prior to 1922 and 90 percent since that date.

TABLE 48.—*Domestic production of Levers laces of all materials compared with imports of machine-made laces of all materials, 1914–31*

Year	Domestic production [1]	Imports [2] (foreign value)	Year	Domestic production [1]	Imports [2] foreign value)
1914	$5,009,975	$21,299,294	1925	$7,873,447	$9,986,332
1919	12,432,905	11,084,041	1927	6,262,931	6,528,489
1921	6,833,022	13,674,061	1929	8,755,972	6,720,558
1923	10,922,216	11,796,455	1931	7,305,089	4,539,244

[1] Figures up through and including 1925 include minor quantities of nets and nettings and embroideries.
[2] Figures up through and including 1929 include, in addition to Levers laces, all other imported machine-made laces, such as minor quantities of Barmen laces and considerable quantities of Lyons-Alençon laces; further, they include minor quantities of braids, embroideries, etc., of wool and metal threads, but do not include machine-made lace, of flax, etc. The 1931 figures, which include only Levers machine-made laces, reflect their segregation from other machine-made laces.

TABLE 49.—*Domestic production of Levers laces of all materials compared with imports of machine-made and Levers laces in 1927, 1929, and 1931. Foreign value used for imports (import figures for 1927 and 1929 represent all machine-made laces, while those for 1931 represent only Levers machine-made laces)*

Year and material	Domestic production	Imports (foreign value)
1927		
Cotton	$2,728,987	$4,900,073
Silk	168,087	[1] 891,712
Rayon	500,134	273,562
Mixed fibers	2,865,723	[2] 463,142
Total	6,262,931	6,528,489
1929		
Cotton	3,479,666	5,213,745
Silk	89,593	[1] 1,049,589
Rayon	1,201,243	273,522
Mixed fibers	3,985,470	[2] 183,702
Total	8,755,972	6,720,558
1931		
Cotton	2,600,825	[3] 4,087,246
Silk	443,218	[1] [3] 390,366
Rayon	368,679	[3] 44,524
Mixed fibers	3,892,367	[4] 17,108
Total	7,305,089	4,539,244

[1] Includes veils and veilings of silk.
[2] Includes "laces and lace articles" of wool, laces, fringes, galloons, trimmings, and ornaments of tinsel, wire, etc. (T.D. 40180).
[3] Levers machine-made laces.
[4] Includes "lace and lace articles" of wool, and Levers machine-made lace of decorative metal threads.

Beginning with the census of 1927, domestic production of Levers lace has been classified with regard to constituent material, permitting comparison in a general fashion with imports, which are classified in the same manner. Table 49 compares these figures for the years 1927, 1929, and 1931. It must be emphasized, however, that the import statistics for 1927 and 1929 include all imported machine-made laces, while those for 1931 are restricted to Levers machine-made laces.

4. Relation of domestic production to consumption

Data are not available for quantitative comparison of domestic production, imports for consumption, and exports of Levers laces; comparison, therefore, must be on the basis of value. Consumption is shown as consisting of domestic production of Levers laces minus domestic exports of cotton laces and embroideries, plus landed value of imports for consumption of machine-made laces, landed value being taken as foreign dutiable value plus duty and 7½ percent landing charges.

Domestic production of Levers laces was first separately recorded in 1914, and from that date until 1925 was so predominantly of cotton that the Bureau of the Census published details of production of the lace industry as products of the cotton lace industry; the figures shown include the smaller production of Levers laces of other materials. Census data concerning production of silk laces, embroideries, nets, veilings, etc., made in silk mills of which the predominant ouptut consisted of other articles or fabrics of silk are included up to and through the year 1925.

TABLE 50.—*Consumption of machine-made laces, and percentages supplied by domestic production of Levers laces and imports for consumption of machine-made laces, landed value, 1914–1925*

Year	Domestic production	Domestic exports [1]	Landed value imports for consumption	Apparent consumption [2]	Ratio to consumption	
					Domestic production [3]	Imports
					Percent	*Percent*
1914	$5,009,975	$232,457	[4] $35,887,448	$40,664,966	11.75	88.25
1919	12,432,905	1,731,675	[5] 18,565,769	29,266,999	36.56	63.44
1921	6,833,022	611,506	[6] 22,904,052	29,125,568	21.36	78.64
1923	10,922,216	319,454	[6] 23,297,999	33,900,761	31.28	68.72
1925	7,873,447	245,057	[6] 19,723,006	27,351,396	27.89	72.11
Total	43,071,565	3,140,149	120,378,274	160,309,690	24.91	75.09

[1] Cotton laces and embroideries.
[2] Domestic production minus exports plus landed value of imports for consumption.
[3] Domestic production minus exports.
[4] Foreign value plus $12,992,133, about 61.00 percent ad valorem duty, and 7½ percent landing charges. (Part of the imports for 1914 were dutiable at 70 percent ad valorem.)
[5] Foreign value plus 60 percent ad valorem duty and 7½ percent landing charges.
[6] Foreign value plus 90 percent ad valorem duty and 7½ percent landing charges.

The difficulties of production and delivery experienced by France and England during the war afforded an opportunity to domestic manufacturers to extend their production with the result that the ratio of imports to consumption was reduced in percentage.

TABLE 51.—*Consumption of Levers laces of all recorded materials and percentages supplied by domestic production and imports for consumption of machine-made laces landed value, 1927, 1929, and 1931*

	Domestic production	Exports	Landed value imports for consumption [1]	Apparent consumption [2]	Ratio to consumption	
					Domestic production [3]	Imports
1927					*Percent*	*Percent*
Cotton	$2,728,987	[4] $216,155	[5] $9,677,644	$12,190,476	20.61	79.39
Silk	168,087		[6] 1,761,131	1,929,218	8.71	91.29
Rayon	500,134		540,285	1,040,419	48.07	51.93
Mixed fibers	2,865,723		[7] 914,705	3,780,428	75.80	24.20
Total	6,262,931	216,155	12,893,765	18,940,541	31.93	68.07
1929						
Cotton	3,479,666	[4] 215,750	[5] 10,297,146	13,561,062	24.07	75.93
Silk	89,593		[6] 2,072,939	2,162,532	4.14	95.86
Rayon	1,201,243		540,206	1,741,449	68.98	31.02
Mixed fibers	3,9.5,470		[7] 362,811	4,348,281	91.66	8.34
Total	8,755,972	215,750	13,273,102	21,815,324	39.15	60.85
1931						
Cotton	2,600,825	[4] 86,249	[8] 8,072,311	10,586,887	23.75	76.25
Silk	443,218		[6] 770,973	1,214,191	36.50	63.50
Rayon	368,679		[8] 87,935	456,614	80.74	19.26
Mixed fibers	3,892,367		[9] 33,788	3,926,155	99.14	.86
Total	7,305,089	86,249	8,965,007	16,183,847	44.61	55.39

[1] Foreign value plus 90 percent ad valorum duty and 7½ percent landing charges.
[2] Domestic production, minus exports, plus landed value of imports for consumption.
[3] Domestic production, minus exports.
[4] Cotton laces, embroideries, and lace window curtains.
[5] Cotton machine-made laces.
[6] Machine-made laces and veils and veilings of silk.
[7] Laces and lace articles, etc., of wool; laces, fringes, galloons, trimmings, and ornaments of tinsel wire, etc. (T.D. 40180).
[8] Levers machine-made laces, including veils and veilings.
[9] Laces and lace articles, etc., of wool; Levers machine-made laces, etc., of decorative metals.

5. Production by styles in domestic lace mills in 1924

Inasmuch as the lace industry is obliged to meet the demands for laces according to fluctuations in fashion a certain number of lace factories are equipped with machines of all gages to produce a wide range of styles, though at any given time they concentrate upon the production of a few styles. Some few firms are equipped to produce only certain staple styles for which the demand is more or less constant. The production by styles of 13 domestic mills investigated by the Tariff Commission in 1924 is shown in table 52. It is not possible to show any data of production by styles which can be accepted as a standard, but table 52 shows the condition in domestic mills in 1924.

These 13 mills contained 363 Levers lace machines; the yearly average per machine was 4,143 racks and the weekly average was 80. Five of the mills had a weekly average of 100 racks or more per machine; the plant producing the largest amount gave a yearly output per machine of 8,900 racks, a weekly average of 171; the plant with the smallest production gave a yearly output per machine of 1,745 racks or a weekly average of 34. On a basis of 300 racks per week, the first mill produced 59 percent of capacity, the last mill 11 percent, and the total industry 27 percent. The production of Vals. of 12-point gage and finer, such as formed the largest part of imports of cotton lace at that time, was small; the bulk of domestic rackage of this style was produced by a single firm. The 13 firms for which returns are tabulated have 39 machines of 12-point and finer, and the average weekly production of fine Vals. was 25 racks per machine.

TABLE 52.—*Percentages of the production in racks, according to styles of lace, made in domestic mills investigated by the Tariff Commission, 1924*

Mill no.	Cotton					Silk, rayon, metal, etc.							Total	
	Bobbin-fining	Cluny	Vals. (12-point and finer)	Coarse Vals.	All other	Veiling	Chantilly	Spanish	Radium	Net	Metal	All other		
													Racks	*Percent*
1	4.56	4.30			2.26			86.94	1.86		0.08		182,283	100
2	9.95	51.72	0.07		7.14			8.29			4.23	18.60	90,579	100
3		15.32						68.34	.17	2.10		14.07	152,128	100
4	3.22	.59		42.05	6.98			30.43			5.26	11.47	157,045	100
6	5.66			93.86				.48					83,327	100
7		100.00											266,991	100
13	1.11		40.62	58.26					.01				114,060	100
14						28.57		62.05			9.38		34,932	100
17		7.25						83.68	9.07				165,447	100
19	33.10	6.32	5.21	21.19	20.68			12.17				1.33	74,991	100
20	8.12	59.18	.92		1.58		3.76	23.97				2.47	111,101	100
25		.04				13.26		74.49	4.70		3.96	3.55	53,412	100
28							10.64	10.88	63.94	10.84	3.70		17,452	100
Racks	62,219	428,421	51,329	226,592	38,812	17,061	6,035	555,703	32,333	5,089	18,272	61,882	1,503,748	
Percent of total [1]	4.14	28.49	3.41	15.07	2.58	1.13	0.40	36.95	2.15	0.34	1.22	4.12		100

[1] Fractions are eliminated, causing the detail not to add to the total.

6. Exports of domestic laces

Prior to 1913 exports of domestic cotton laces were included in "all other manufactures" of cotton, without separate record. The values of domestic exports of "cotton laces and embroideries" are shown for 1913 and subsequent years but without separating laces from embroideries and from 1926 onward lace window curtains were included.

Table 53 shows exports of cotton "laces and embroideries" from 1913 to 1933. As may be seen from a glance, exports reached their peak in 1919, from which they have declined steadily to an almost negligible figure in 1933, when lace curtains were also included. The table shows also that Canada is by far the largest importer of American laces and that the remainder of the exports go chiefly to Latin America.

Exports of silk laces, veils, nets, and embroideries were first separately listed in 1922 but were discontinued after 1924. These exports amounted to $191,107 in value in the 3 years during which they were recorded; of the total Canada imported 49 percent.

TABLE 53.—*Exports of domestic cotton laces and embroideries, 1913–33*

Exported to—	Fiscal year							Calendar year				
	1913	1914	1915	1916	1917	1918	1918 [1]	1919	1920	1921	1922	1923
Canada	$139,787	$147,111	$267,725	$375,413	$447,218	$509,415	$356,408	$819,163	$678,872	$360,525	$190,849	$117,215
Cuba	5,942	37,084	32,409	36,608	76,471	226,302	95,175	125,516	207,539	20,978	31,473	48,692
Panama	4,445	4,781	6,398	12,692	10,533	22,879	15,540	12,292	12,353	6,629	1,060	5,096
Dominican Republic	1,579	1,523	4,541	13,444	57,168	63,399	19,294	15,486	103,767	25,728	15,858	15,446
Mexico	649	587	1,524	10,797	272,515	418,334	125,151	282,818	209,567	118,958	50,419	34,950
United Kingdom	384	10,518	10,508	22,030	10,869	7,540		1,895	7,963	527	3,524	3,289
Philippine Islands	260	224	3,472	10,052	29,481	137,218	49,259	69,986	72,051	11,292	8,273	26,411
Australia	72		669	7,163	13,378	31,993	11,214	22,955	19,021	11,587	13,752	17,374
All other countries	10,537	30,629	17,796	68,407	176,495	203,414	184,072	381,564	318,276	55,282	44,426	50,981
Total	163,655	232,457	345,042	556,606	1,094,128	1,620,494	856,113	1,731,675	1,629,409	611,506	359,634	319,454

Exported to—	Calendar year											
	1924	1925	1926 [2]	1927 [2]	1928 [2]	1929 [2]	1930 [2]	1931 [2]	1932 [2]	1933 [2]	Total	Percent of total
Canada	$99,175	$104,958	$132,859	$88,247	$67,562	$91,328	$55,375	$32,129	$15,197	$12,917	$5,109,448	45.65
Cuba	11,497	9,604	15,253	25,414	8,429	11,572	5,142	762	482	527	1,032,871	9.24
Panama	1,056	1,809	758	5,792	1,287	4,490	13,206	7,065	3,003	1,918	155,082	1.38
Dominican Republic	5,307	11,083	6,816	9,499	4,716	3,790	1,146	1,340	2,213	1,981	385,124	3.44
Mexico	21,704	24,387	13,994	10,419	14,346	12,305	6,520	3,149	2,009	1,141	1,636,243	14.62
United Kingdom		4,589	1,873	1,690	3,728	6,077	4,343	459		228	102,034	.91
Philippine Islands	25,422	50,151	23,982	43,191	68,038	46,011	12,106	21,729	16,319	24,564	749,292	6.09
Australia	9,047	11,058	9,633	5,011	5,394	6,458	4,776	4,441	5,175	1,846	212,017	1.89
All other countries	31,880	27,418	52,694	26,892	37,320	33,719	24,546	15,175	3,451	16,085	1,811,059	16.18
Total	205,088	245,057	257,862	216,155	210,820	215,750	127,160	86,249	47,849	61,207	11,193,170	100.00

[1] July 1 to Dec. 31, 1918.
[2] Includes lace window curtains.

7. Exports of foreign laces

The most complete figures available regarding exports from the United States of foreign laces are shown in table 54. These figures do not include exports of foreign hand-made laces, lace window curtains and nets and netting; exports of such articles are shown in the several chapters dealing therewith.

TABLE 54.—*Exports of Levers and other laces and lace articles of foreign origin, 1913–33* [1]

	Cotton		Flax	Silk	Total
	Laces and lace articles	Veils and veilings	Laces and embroideries	Laces and embroideries	
Fiscal year:					
1913	$43,639	$85	$26,908	$3,320	$74,002
1914	52,000	3,127	28,792	6,060	89,979
1915	106,749	44	46,871	3,299	152,893
1916	27,939	36	18,384	14,743	61,102
1917	39,793	118	8,791	10,372	59,074
1918	56,671	82	3,215	1,369	61,337
1918 (July 1–Dec. 31)	63,078	52	5,667	9,789	78,586
	34,447	1,397	9,663	1,657	47,164
Calendar year:					
1919	27,908	439	12,018	2,981	43,396
1920	77,939		23,224	19,841	120,804
1921	554,619		64,368	66,926	686,913
1922	[2] 195,516			[2] 78,938	[2] 274,454
1923	166,177			90,399	256,576
1924	97,691			12,607	110,298
1925	91,423			14,674	106,097
1926	59,140			20,380	79,520
1927	90,353			19,784	110,137
1928	99,041			14,155	113,196
1929	70,336			11,167	81,503
1930	61,288			6,277	67,565
1931	44,403			5,968	50,371
1932	43,856			5,610	49,466
1933	17,173			3,628	20,801
Total	2,115,249	5,430	249,901	423,674	2,794,254

[1] Figures include exports of Levers laces not separately recorded.
[2] From 1922 these figures comprise cotton laces and lace articles and silk laces, veils, nets, and embroideries.

About 70 percent of the total exports shown were of cotton. In the years 1921 and 1932 exports of foreign laces, etc., exceeded exports of laces of domestic manufacture. In 1921 the year of largest exports, European countries, including the Azores, received 69.23 percent of the total, Asiatic countries, 25.92 percent and the Americas 4.85 percent. The United Kingdom was the largest recipient with about one-third of the total.

VIII. ANALYSIS OF DOMESTIC PRODUCTION AND TRADE IN FOREIGN LEVERS LACES

In order to interpret the statistics presented in the preceding pages it is necessary to emphasize certain facts relating to the production and consumption of fancy laces.

In the first place, there are certain imported laces with which the domestic industry, for various reasons, cannot compete, even under the present tariff; indeed, in regard to these laces a higher tariff might cut down consumption and importation but could scarcely stimulate production in this country.

These laces consist of:

1. Laces made on machines of finer gage than those found in the United States: There are few Levers machines in the United States of 12-point or finer gage. In France there are 16- and 18-point machines, and in England 16-point machines, upon which are made extremely fine clipped Vals., independent beam laces, etc. The demand for these laces in the United States is limited, and they are necessarily imported.

2. Laces so difficult to draft and make as may be beyond the capability of draftsmen and twisthands in the United States—for example, the drafting of the style of Calais Vals. known as "fil passé" is so difficult technically that production is practically the monopoly of a few Calais manufacturers. Further, the weighting or adjustment of the tension of the beams and the running in of the carriages in various parts of each breadth of lace require such extreme care that it is doubtful if the twisthands in the domestic industry would produce these laces up to the French standard. These laces are produced so slowly, owing to fineness of quality, that they cannot be the subject of mass production; the demand for them is limited and the price high. Two exquisite patterns made at the close of the last century, perfect imitations of hand-made lace, are still imported.

3. Laces in the production of which the cost of specific labor processes is high in relation to total cost. These laces fall into three groups: (*a*) Certain styles of cotton laces, notably the cotton Alençon, and silk Chantilly which require a great amount of hand clipping, scalloping, and finishing after the machine production is completed, the proportion of finishing cost to total cost running quite high. The prices paid in the United States for hand clipping are much higher than those paid in France and England where this work is done by women and girls as incidental home work at low remuneration. Although some clipping is done as home work in the United States, domestic producers are placed at a serious disadvantage in the manufacture of laces in which clipping costs amount to a large percentage of total cost. (*b*) Silk Chantilly flounces, particularly those of fine quality made cross-band with bottom bars and with independent pattern to the top, requiring an inordinate length of time to draft, read off, and punch. The cost of these processes is so great that no attempt is made by domestic manufacturers to produce them, particularly as the demand is limited. These laces are all imported and there are indications that orders do not repeat. There is no technical reason why Chantilly laces cannot be made in this country, but the volume of sales would never warrant the requisite outlay. (*c*) The staple Valenciennes, the most important group of cotton laces, fairly difficult to make but sold in large quantities at a low price; in these the labor costs are high in relation to material and overhead. These groups, together with silk veils and veilings, constitute the bulk of European production and of American importation. The production of Valenciennes laces is the backbone of the French machine-made lace industry; even with the 90 percent tariff, the United States has been unable to compete in the production of the finer grades of these laces. In recent years, however, the trend toward more tailored clothes for women and children has reduced demand and cut down importations sharply, and fashion has dictated the popularity of styles of lace in the manufacture of which the domestic industry is more able to compete.

4. Laces of any style or type produced abroad which present a novel and beautiful design, or combinations of materials. These laces are imported regardless of price until such time as the domestic industry succeeds in producing a similar style and design at a lower price.

The second fact is that there are certain styles of lace of certain materials which the domestic industry with the aid of the tariff has been able to produce and sell effectively in this country. In general, these laces consist of styles in which the labor costs, in proportion to total costs, are low and material costs high; wider and coarser laces which may be produced in large quantities, such as "all-overs" which are sold to the cutting-up trade for dresses or laces for upholstery purposes. These consist of Spanish, both full and half gage, Cluny, torchon, Ensor net laces, and coarse Vals.

The third fact to be emphasized is that fashion dictates whether fine or coarse laces are to be worn, which styles are to be in vogue, of what materials the laces are to be made, and how much lace is to be worn. Thus fashion finally determines the total domestic consumption of lace, as well as the proportion of domestic production to importation. For example, the growing vogue since 1920 for heavier laces made of rayon, metal threads, wool, etc., and the declining vogue for narrow and fine cotton laces, have been greatly to the advantage of the domestic industry and have affected greatly the relation of domestic production to imports, which have declined considerably. The vogue for Alençon laces from 1927 onward revived the lagging cotton-lace industry, but at the present time the demand for that lace also has declined.

Changes in fashion

Between 1910 and 1914, the first years of enlarged production in the United States following the Tariff Act of 1909, the laces in vogue were chiefly cotton laces, such as Clunys, Normandies, torchons, Valenciennes, bobbin-finings, and Ensor net. Although domestic production increased steadily during these years, laces were so fashionable and in such great demand that imports also increased steadily. The domestic industry produced the coarser grades of all these styles and thus shared the domestic market with the foreign producers.

During the war the lace industries in France and England, being disorganized and suffering from labor shortage, were forced to curtail drastically both production and export. In the circumstances, the domestic lace industry should have increased its production tremendously, but as a matter of fact the demand for lace declined when the French were not active in setting styles and creating designs. In 1919 and 1920, however, the lace industry staged a most successful comeback. Laces were in great demand and in spite of large and increasing importations from abroad, the domestic industry, working at capacity, reached the peak of its production in 1919.

At the end of the war the United States found itself practically in control of the domestic market for the ordinary and staple qualities of Cluny, bobbin-fining, and Ensor laces; although the popularity of these styles has declined considerably, the domestic demand has been filled from domestic sources. Normandie and torchon disappeared altogether shortly after the war. Inasmuch as Nottingham had been famous for its torchons, Clunys, and Normandies, the changes of fashion and the increasing domestic production operated to cut down largely American imports of Levers laces from England.

There was a severe slump, both in the production and importation of laces, during the autumn of 1920 and 1921, but there was a revival by 1923. About this time the general vogue for heavier laces of silk, rayon, wool, metal threads, and other fibers was growing and was exploited by the domestic industry to the fullest. During the years 1920 to 1925, the bulk of imports were Valenciennes laces (French Vals., of 12-point gage or finer, and "fil passé") and elaborate silk Chantilly laces. The domestic manufacturers could not compete in the production of these laces but concentrated upon and controlled the market in the Spanish style laces of rayon and other fibers, and in Clunys, silk radiums, and some coarse Vals., and bobbin-finings.

From 1927 onward Alençon, which is a type of wider Vals., became the fashion in cotton laces; the vogue for Spanish style laces of rayon, metal threads, wool, and other fibers grew steadily also. The finer Alençon is practically all imported, while the Spanish laces of artificial silk fibers are practically all supplied by the domestic producers. The Alençon is a Levers machine imitation of machine-made Lyons Alençon lace made on the bobbinet-jacquard machine. This Alençon lace served to compensate for the decline in consumption of ordinary Valenciennes laces and to a certain extent replaced other styles of wider Vals. Domestic manufacturers cannot compete in the production of the finer Alençon laces, just as they cannot compete in the production of the finer Valenciennes.

Fashion has dictated the increasing use of heavier laces made of rayon, worsted, metal threads, etc. In fact, this vogue has grown to such an extent that ever since 1925 domestic production of laces made of these materials has exceeded the domestic production of cotton laces. The United States has been able to supply the market with these laces because labor costs, in proportion to total costs, are low and material costs are high. This has resulted in an increasing control of the domestic market by domestic producers.

At the present time the demand is for cotton Alençon laces and for Spanish, Bourdon, and Margot laces made of fibers other than cotton. In these styles, only specific patterns of unusual design are imported. Domestic production predominates in rayon laces, also in coarse cotton Vals., and is gaining in silk laces. Imports include reduced quantities of Valenciennes, Alençon, and silk Chantilly laces, also particularly attractive patterns of Cluny, bobbin-fining, and other laces of extremely fine quality.

IX. LABOR

1. Types of employees

The types of employees in a Levers lace mill are practically identical with those in a Nottingham lace-curtain factory. A list of them appears below.

TYPES OF EMPLOYEES IN A LEVERS LACE MILL

Pattern preparation:
- Designer.
- Draftsmen, and junior help to read off and correct patterns.
- Card puncher and lacer.

Yarn preparation:
- Slip winders.
- Warpers.
- Brass-bobbin winders.
- Threaders.
- A man to press, look over, and strip bobbins.

Lacemaking:
- Twisthands.
- A foreman, who should be a first-rate inside man, for setting the points and other mechanical adjustments necessary for making different kinds of lace. In France this man is known as "le metteur en oeuvre" and "le regleur", denominations for which there are no adequate English equivalents.

Repair department:
- Mechanics and lathe hands.
- A repairer for bobbins and carriages.

Finishing:
- Lace menders.
- Bleacher and dyer.
- Lace dresser.
- Girls for drawing, clipping, scalloping, jennying, and finishing, one of whom should be an experienced sample girl who mounts samples of the laces for display in an attractive manner.

The designers, draftsmen, card punchers, twisthands, foreman and dresser are highly skilled workers, most of whom are born and trained in England or France and who are imported for the purpose of carrying on their work in domestic lace factories. The function of each of these types is analogous with that performed by the same type n a Nottingham lace-curtain factory.

For the same reasons as those outlined in the previous chapter, namely, long apprenticeship at low remuneration,[11] the confinement of the work,[12] the varying degrees of prosperity in the industry, etc., American-born labor shuns the expert positions in the lace factory; thus, as in the Nottingham lace-curtain factory, labor turnover is low and length of service and average age of the employees is high.[13] Mechanics, bleachers, and dyers are American-born, drafted in from other businesses which utilize similar processes, while the remaining workers (the auxiliary), unskilled and semiskilled workers, are absorbed from the native population, and taught readily their various duties.

The employees in Levers lace mills are organized in two of the three branches of the Amalgamated Lace Operatives Society of America. As stated in the previous chapter the three branches are the Nottingham lace-curtain section (for lace-curtain twisthands), the Levers section (for Levers twisthands), and the auxiliary section (for the auxiliary workers in both branches).

In view of the existence of an official Department of Labor bulletin, Labor Relations in the Lace and Lace-Curtain Industries in the United States,[14] detailing the history of labor problems in the lace industry, there is no necessity for further discussion of the subject in this survey; however, it may be stated that Levers twisthands

[11] The proportion of minors allowed is limited by the union to 1 for every 7 qualified twisthands, and the term of apprenticeship is 3 years; during the first year the minor is paid 60 percent of the full rack price, during the second year 75 percent, and during the third year, 90 percent, on half the racks made by the machine, and the remainder is equally divided between the twisthand who works with the minor and the firm; under these conditions the twisthand is held responsible for all work made by the machine.

[12] The 18-hour day is worked on two systems, the usual plan being for the first shift to commence at 5 a.m. and run until 2 p.m.; the second shift commencing at 2 p.m. and running until 11 p.m.; the twisthand who takes the first shift one week, takes the second shift the next week. But some foreign twisthands prefer the old style of four shorter shifts, in which case the shifts run from 5 a.m. to 9 a.m.; from 9 a.m. to 1 p.m.; from 1 p.m. to 6 p.m.; and from 6 p.m. to 11 p.m., one twisthand taking the first and third shifts, and the other twisthand taking the second and fourth shifts, changing the order of the shifts in alternate weeks. In one factory, following a strike, the two systems ran concurrently, to accommodate certain French workers.

[13] In 1917 a booklet was issued showing that there were 579 Levers lace machines in the country, employing 750 men; this was 408 short of the number required in order that each machine should be double-handed; this was a shortage of about one-third. In 1933 at an official public hearing an officer of the twisthands union gave the number in the industry as 520, of whom 469 were members of the union, while the speakers for the manufacturers' associations claimed there were 759.

[14] Gladys Louise Palmer, Bulletin of the United States Bureau of Labor Statistics No. 399, 1925.

have not been as successful as Nottingham lace-curtain twisthands in enforcing the closed shop.

2. Trade organizations

Practically all American lace manufacturers except manufacturers of Nottingham lace-curtain machine products, are members of the American Lace Manufacturers' Association. This association includes manufacturers operating Levers machines, bobbinet machines, Mechlin machines, and Barmen lace machines. These firms contribute to the funds of the association on the basis of their quarterage of Levers or bobbinet machines, and of the spindles of Barmen machines operated by them. The management is vested in a board of directors and of officers, who are ex-officio directors, all elected annually from the executives of the firms which are members of the association.

The association at all times seeks to provide for the greatest prosperity and security of the trade; for example, an agreement exists which seeks to prevent the copying of a pattern made by another member or the soliciting of labor employed by another member. Further, the association has in the past been successful in preventing obsolete machinery of bankrupt firms from falling into irresponsible hands. In several cases such obsolete machinery has been purchased by the association and destroyed. The association makes official appearance at tariff hearings before the Committee on Ways and Means of the House of Representatives and the Finance Committee of the Senate, and at other governmental proceedings which affect the status of the trade.

Many of the importing firms and wholesale houses are members of the Lace & Embroidery Association of America, Inc., the constitution of which is similar to that of the American Lace Manufacturers' Association; a member represents the association upon the National Council of American Importers and Traders and appears before the different Government agencies which collect evidence in the enactment of tariff legislation.

PART II.—FOREIGN PRODUCTION

Just as the lace-curtain industry is identified with England (Nottingham) and Scotland, the Levers lace industry is identified with France (Calais) and England (Nottingham). In spite of the fact that the Levers lace and Levers go-through lace machines were invented in Nottingham, that the great majority of Levers machines are still produced there, that Great Britain has continued to produce substantial quantities of Levers laces, the Levers lace industry in France, transplanted in Calais from Nottingham during the first quarter of the nineteenth century, has acquired, for special reasons to be disclosed in this section, an undisputed preeminence. This preeminence lies not only in the larger numbers of machines operated but in the quality, beauty, and originality of the laces produced.

Great Britain ranks second to France in the production of Levers laces, and the United States third. During the last 50 years, moreover, the industry has been disseminated throughout Europe. There are Levers lace machines in Leipzig, Dresden, Plauen, and other cities in Germany; in Vienna, Moscow, Warsaw, in Milan and Turin, and in Barcelona. England and France are the only countries having any substantial export trade in Levers laces, however, and are the only countries exporting those products to the United States. Occasional shipments of Levers laces enter the United States from Germany and Austria but these are rare; imports of machine-made laces from Germany are chiefly of Barmen laces or of nets and nettings, or embroidered laces.

I. THE LEVERS LACE INDUSTRY IN FRANCE

The facile adaptation of the Levers lace industry, a foreign industry, in France, the rapidity with which it overcame the obstacles to growth, and the acquisition of an undisputed supremacy in the manufacture of Levers laces offer ample evidence of the rich endowments of the French people for artistic creation, particularly of objects appealing to feminine taste. This superiority in the creation of tapestries, of silk fabrics, in designing, in originating fashions, further attest the same endowment.

Although the Levers lace industry is largely associated with the city of Calais and its environs, the principle of "the division of labor" operates even within France to dictate different centers of the production of various types of Levers laces. Calais is celebrated as the center of the Levers lace industry because of its production of the staple Valenciennes laces, laces which have a large world demand that is more or less constant.

Caudry, in the Department du Nord, is famous as a center for the production of silk Chantilly laces and other fancy laces, although it has a considerable production of tulle.

Lyons, in the Department de la Loire, is noted as the center of the silk and silk-fabric industry; here also is centered the production of silk veilings made on the Levers machine. Its products are largely noncompetitive with those of either Calais or Caudry.

1. The Calais lace industry

The Levers lace industry was transplanted to and developed in Calais in spite of numerous French and English legal obstacles. An English law dating from 1695 forbade the exportation of various kinds of machinery, and extensions of this act forbade the exportation of engines, tools, and materials used in constructing textile machinery, and applied heavy penalties to anyone inducing skilled artificers to leave the kingdom.[15] Thus the lace industry was started in Calais in 1816 by smuggling the dismantled parts of a machine, mixed with old iron, from England. The machine thus surreptitiously introduced was a bobbinet machine, the Heathcoat patent. The machine was erected in the small town of St. Pierre to the south of Calais. Skilled operators were also smuggled across the Channel and, appropriately enough, the ship which carried them was called *The Smuggler*. But French laws also were inimical to the prosperity of the lace industry in France. Although French spinners made no high-grade cotton yarn, the importation of English yarn was forbidden; it was therefore smuggled into France. Only in 1834 was this embargo raised and even then was replaced by a high rate of duty on imported cotton yarn. A further obstacle to the extension of the industry was in 1832 when the citizens of Calais objecting to the noise of the machinery protested against its operation at night. By municipal decree

[15] After 1815 these laws were relaxed somewhat, and machinery was allowed to be exported by special permit; in 1825 that part of the law which prohibited the emigration of skilled workers was repealed, and in 1841 the law forbidding the exportation of machinery was finally annulled.

night work was forbidden, the hours of operation were restricted from 5 a.m to 10 p.m.; thereupon many of the machines were removed to the adjoining suburb, St. Pierre des Calais.[16]

The lace industry grew rapidly in Calais. For information regarding its growth, we are indebted to the standard work of Henri Hénon, L'Industrie des Tulles et Dentelles Mécaniques dans le Pas-de-Calais, 1815–1900. Table 55, taken from M. Hénon's book, shows the rapid development of the industry between 1844 and 1892; the machines prior to 1841, the year of Hooton Deverell's adaptation of the jacquard to the Levers machine, were not such as produce fancy lace; the list, therefore, commences after that date. In 1844 there were 258 machines operating in the Calais region. In 1877 there were 389 manufacturers operating 1,634 machines; in 1882, in St. Pierre alone there were 367 manufacturers operating 1,674 machines in 52 factories, employing in addition 18 dressing factories, 17 dyers and bleachers, and 3 machine builders; 7,160 men were employed, 3,218 women, with 2,209 apprentices. In adjacent villages, from 7,000 to 8,000 people were employed in supplementary occupations.

Between 1905 and 1908 the increase in machines in Calais amounted to more than 40 percent and in factories to 60 percent; in these 4 years 748 machines were erected, more than the entire number in the United States. This increase was due largely to the great popularity of lace, particularly in the United States. There seems to be little doubt that there was overexpansion of the industry during this period, an overexpansion which made it extremely vulnerable during the postwar period when the vogue for lace was declining.

In 1924 there were 2,646 Levers machines in operation in Calais. It will be noted that this figure represents only two more machines than were operating in 1910; the number of manufacturers, however, had declined by 1924 from 569 in 1910 to 409. This was due to the elimination of some of the smaller manufacturers and façonniers during the war and during the postwar depression.

About 10 percent of the machines are run by manufacturers of English nationality. In 1933 the largest firm operated 61 machines and several firms operated only 2 machines each; the usual number was 10.

According to a consular report from Calais in 1931 there were 350 lace manufacturers in 113 mills operating 2,900 Levers machines; 54,000 people were employed directly in the lace industry in Calais and the surrounding country; 75 percent of the 70,000 population of Calais city proper, were supported directly and indirectly by the lace trade and in addition 8,000 to 10,000 people were employed in the surrounding region. More than three quarters of the Levers machines in Calais are of English build. Some few of those used in the Calais lace industry are of the finest gage in the world, 18-point, that is, 36 carriages to the inch.

[16] The cities of Calais and of St.-Pierre-des-Calais were united under the name of Calais by a law of Dec. 29, 1884, St. Pierre at that time having twice as many inhabitants as Calais.

TABLE 55.—*Levers lace machines in France, 1844–1931*

Year	Locality	Machines		Details
1844	Calais	66		
	St. Pierre	190	258	
	Other	2		
1851	Calais	35		
	St. Pierre	285	321	
	Other	1		
1854	St. Pierre	374		
1860	do	660		475 power machines, 185 hand machines.
1861	St. Pierre and Calais	645		
1870	St. Pierre	902		
	Calais	37	1,222[1]	Machines making cotton laces 461; silk, 478.
	Other	283		Machines making cotton laces 513; silk, 709.
1877	St. Pierre	1,594	1,634	
	Calais	40		389 manufacturers.
1879	St. Pierre and Calais	1,550		
1880	do	1,650		
1881	do	1,750		
1882	St. Pierre	1,674	1,850	St. Pierre: Machines making cotton laces 324, silk, 1,350; 52 factories, 3,625 horsepower; 367 manufacturers, 18 dressing factories, 17 dyers and bleachers, 3 machine builders; 7,160 men employed, 3,218 women, 2,209 apprentices; 7,000 to 8,000 people employed in adjacent villages.
	Calais	176		
1883	St. Pierre and Calais	1,929		
1884	St. Pierre	1,886		469 manufacturers.
1889	St. Pierre and Calais	1,916		
1890	do	1,899		
1891	do	1,866		
1892	do	1,829		
1905	Calais	1,367		365 manufacturers.
1906	do	2,227		Do.
1907	do	2,367		500 manufacturers.
1908	do	2,615		584 manufacturers.
1910	do	2,644		*Machines* 1 large proprietary factory 60 10 individual factories containing 166 360 small finishing manufacturers owning 2,000 569 371 "fabricants finisseurs" owning 2,226 198 "fabricants façonniers" 418 569 manufacturers owning 2,644 321 "fabricants finisseurs" (Located in 88 "fabricants façonniers" 110 mills.
1924	do	2,646		409 total manufacturers. Auxiliary machines: 118 embroidery[2] machines, 179 bobbin machines, 300 Cornely machines, and a number of circular and needle machines.
1931	do	2,900		

[1] Includes Pusher machines.

[2] Embroidery in Calais is, for the most part, not an independent industry, but supplementary to the making of the lace novelties. For instance, the shadowed design in black veilings made on the Levers machine are sometimes heavily outlined on the Schiffli embroidery machines to enhance the effect. This particular style, however, usually made in silk, is more normally a Lyons than a Calais product. One Lyons Levers lace manufacturer makes fancy silk nets and uses the material so produced to make fancy veilings by embroidering the edge.

As has been stated previously, the reputation of Calais as a lace center was built chiefly upon the production of cotton laces, particularly of cotton Valenciennes laces; however, the declining vogue of Valenciennes laces since the war and the increasing popularity of other styles of laces made of fiber other than cotton has dictated the manufacture of an increasing proportion of silk-, rayon-, and metal-thread laces, novelties, etc. As the demand for Valenciennes laces declined, Alençon laces subsequent to 1927 became very popular, their production exceeding that of Valenciennes. At the commencement of the year 1932 approximately half of the output of laces in Calais were of cotton and from 60 to 75 percent of this amount con-

sisted of Valenciennes and Alençon laces. The decline in the demand for Valenciennes laces is readily seen in the statistics regarding the number of firms engaged exclusively in the manufacture of laces of this style (which include grades known as "Vals.," "fine Vals.," "lingerie Vals.," "fancy Vals.," and "semifine Vals."). L'Annuaire de la Dentelle de Calais, published in 1921, listed 228 firms as being manufacturers of Valenciennes laces; the same publication in 1924 listed 217. "Notice sur l'industrie des tulles et dentelles de Calais," published by Jean Basset, the Secretary of the Chambre Syndicale des Fabricants des Tulles et Dentelles de Calais, in 1929 listed 107 manufacturers of Valenciennes laces, while the list published by the U.S. Department of Commerce, in May 1933, showed 90. Although these statistics are not strictly accurate, certain firms well known for their manufacture of certain types of Valenciennes not being included, they serve to show a distinct trend.

(*a*) *Factory organization.*[17]—The lace industry, having been introduced into France by Englishmen, followed exclusively the manufacturing system prevalent in England during the early years—the division of production between the machine holder and the finisher. In 1863, however, the French machine holders began to be aware of the benefits which would accrue if the 2 sections were included in the same factory, and since that time the completed manufacture in 1 mill has been common in Calais, although the smaller manufacturers even now continue to sell their lace in the brown to a finisher. The manufacturers thus are divided into 2 classes, "fabricants finisseurs" and "fabricants façonniers", those who manufacture and finish and those who manufacture only, selling their lace in the brown to a finisher, or other manufacturer.

The façonniers, like the "Lohnsticker" of the Swiss and Saxon embroidery industries, consist chiefly of thrifty workmen who buy one or more machines by making the first payment and paying the remainder in installments. There are several English firms of lace-machine builders which, like the German manufacturers of embroidery machines, have made a practice of selling on installments. The banks of Calais, as well as private individuals, sometimes find it to their interest to lend money to skillful and industrious workmen wishing to become façonniers. Necessarily these businesses are small and sometimes factors such as the utilization of the labor of wife and children, compensate for comparative lack of economy. The façonniers, as do the small finisseurs, rent standings in factories which are known in England as "tenement factories." The rental for a standing includes heat but does not now include power, as was the case with pre-war rental. Originally all the machines in a factory were propelled from a single source of power, a shaft connecting with the individual machines by leather belts. This method was quite wasteful, however, as the machines stop frequently, the shaft running continuously. Since the war, the machines in these tenement factories have been run by individual motors supplied with current by the large electric company in the neighboring city of Bethune. The change has resulted in great economies.

The façonnier performs only the function of manufacturing. His materials, already prepared, are furnished, and his product in the brown is purchased by a large lace manufacturer. Even the designing, drafting, and preparation of the jacquard cards are furnished. The price charged the manufacturer by the façonnier is generally calculated at double the rack price for making the particular class of goods, with an extra 50 to 70 centimes per rack for the cost of winding, warping, brass-bobbin winding, etc. Without other capital than that invested in the machine, without other expenses than the rent and the cost of changing patterns, the façonnier receives for each rack the same sum as the wages of the two twisthands who work the machine. He is paid by the manufacturer on Saturday morning and pays his employees in the evening. He thus avoids the worry and risk of finishing his product and selling it piecemeal. The more ambitious of the façonniers eventually become finisseurs. The larger manufacturers, of course, carry out the complete process of lace production under one roof.

[17] The domestic lace factories are, as a rule, more spacious, loftier, better lighted and better ventilated than those in England and France. The plan for a system of laying out a lace factory, as practiced in France, is shown in plate VII of Consular Report No. XXXVII, issued by the Department of Commerce in 1905.

Before the war there seems to have been frequent disagreements as to policy between the fabricants finisseurs and the fabricants façonniers. In an article published in "La Science Sociale" in 1910, M. Paul Vanuxem complains of the unfair methods employed by the façonniers, charging them with underselling, imitation of designs, producing inferior products, and bringing about a chaotic overproduction. In more recent years, however, the entire trade in Calais has been very closely organized in trade associations, and unfair practices appear to have been reduced to a minimum.

Another distinctive feature of the Calais industry and, indeed, of the whole French industry, a feature which is an important factor in the ability of the French to produce fine laces at such low cost, concerns the finishing processes, particularly the process of "clipping." Many of the finishing processes must be performed in the factory, and in this work Calais enjoys the advantage of an abundance of cheap female labor. However, many types of laces require hand-clipping, which consists in the removal of the loose threads carried by the machine from one part of the design to another. Alençon and Chantilly laces, in particular, require a great amount of hand-clipping, the cost of this process mounting high in relation to total cost. In Calais the manufactured laces are turned over to clipping entrepreneurs, who distribute them among, and later collect the finished article from the women and girls in the homes in Calais and in the surrounding country toward Dunkirk, even into Belgium. This work is done as "housework which the wives and daughters of lace makers continue to do largely because they are used to doing it", as one consular report from Calais describes it. Although remuneration is low, it adds appreciably to the family income and utilizes the spare time of the womenfolk. Of course, the wages paid for this work are much lower than those paid for similar work in the United States.

(*b*) *Yarns used in French laces.*—The cost of yarn is, and always has been, one of the chief disadvantages of the Calais and Caudry lace manufacturers in competing with other countries, though in recent years this disadvantage has been somewhat minimized through the establishment in France of a branch factory, of 50,000 spindles, of the British Fine Spinners' Association, and also through the increased facilities for buying the finer counts of cotton yarn through establishments at Lille and in the neighborhood. At the present time Lille

supplies from 60 to 75 percent of the cotton yarn used at Calais, 80 percent of this amount consisting of counts between 60s and 200s. Mulhaus, in the Department of the Haut Rhin, supplies about 2 percent of mercerized cotton; the remainder is imported from Manchester, England, mainly ply yarns in counts ranging between 200s and 300s. About 50 percent of the silk used is obtained from French sources, the remainder coming from Italy; artificial silk or rayon and metal threads are produced in France.

A controversy of long standing exists between French spinning interests and the manufacturers of lace and embroidery, who, before the war, paid from 12 to 18 percent more than Nottingham manufacturers for lace yarns, and who protested against the imposition of a coefficient of 5 percent on French cotton yarn duties after the war. It is argued that the higher counts of singles yarn, double spun—those above 90—are not produced in France and that the increased duty on the British product is therefore no protection to French spinning interests; that, even for the lower counts, English yarns are greatly preferable for use in the brass bobbins, and that the high duties on both double-spun and 2-ply yarns is disadvantageous to the interests of the French lace manufacturer. It is claimed in rebuttal that in spite of the duty and the fact that the French ply yarns, numbers 40 to 140, are preferred to the British, the British spinners are able to undersell the French on these counts in the Calais market; in opposition to this claim it is said that Roubaix undersells Lancashire in France on the highest and lowest counts of 2-ply yarns, numbers 180 to 260 and numbers 4 to 50.

A drawback of 60 percent of the import duties on cotton yarns contained in lace is allowed by the French Government upon the exportation of the lace. The manufacturers claim, however, that the benefit of this drawback never accrues to them, but to the commission houses and the buyers. British, French, and Italian spinners maintain yarn commission houses in Calais from which the lace manufacturers purchase their yarns.

(c) *Methods of distribution to foreign countries.*—Foreign sales of Calais laces are made chiefly through the medium of commission houses, of which there are upward of 100. Some of the largest American importers from New York, Chicago, Philadelphia, and St. Louis maintain their own houses in Calais and purchase directly from the manufacturers. Commission houses collect samples of the season's new patterns for the inspection of visiting buyers, take orders, and ship the lace to the firms making the purchase. Samples of narrow laces are supplied by the manufacturers free of charge, but a charge of half the value is made for samples of wide and expensive lace flouncings, and the charge is passed on to the customers by the commission houses. The charge made by the commission houses for their services is 5 percent of the value of the purchase.

At times buyers are offered the opportunity of purchasing the entire first production of a new pattern provided they will take a large volume, which for narrow cotton goods is usually 500 boxes, averaging about 36 dozens each, thus giving the purchaser a monopoly of the pattern in his own market, provided the pattern be not copied locally. A monopoly of the pattern of a more expensive lace may be had by purchasing smaller quantities.

Certain minor expenses are borne by the importer. Such expenses are the cost of wooden cases and metal bands, which items are included on the invoice and are dutiable. The costs of these items plus legalization averages a little over 1 percent of the value of the laces as declared at the Calais consulate. When shipping goods to the United States the Calais commission houses and manufacturers almost invariably make use of special services via Southampton provided by the Cunard and White Star Lines.

"Le Phare", a Calais newspaper, in the issue dated September 23, 1929, stated that the National Office of Foreign Commerce of France had requested M. Landriau, a counselor of French foreign commerce. to furnish replies to various questions touching the exportation of Calais laces and nets, with a view to having the information incorporated in a report intended for the use of French commerical attaché, in various foreign countries. The chief interest of the report lies is the enumeration of the countries which import Calais laces and thn various styles imported by each; the enumeration is here epitomizede

TABLE 56.—*Countries importing Calais laces and the styles imported by each*

Country	Styles
Europe:	
England	Silk nets, Bretonnes, Chantilly flounces, blonde flounces, artificial silk or rayon flounces, veilings, and all high class novelty articles.
English colonies:	
Australia	Cotton laces, Valenciennes, etc.
Canada	Valenciennes, platts, silk flounces.
India	Metal laces, colored flounces.
Sweden and Norway	High class novelty laces, Chantilly, blondes, artificial silk or rayon laces, all cotton laces.
Holland	Cotton laces, Valenciennes, Bretonnes
Belgium	Imitation Valenciennes, Bruges, Malines, etc.
Germany	Cheap Valenciennes for making up, Chantilly flounces, and artificial silk or rayon laces.
Austria, Hungary, and Rumania	All kinds of laces.
Poland	Valenciennes, cheap Chantilly laces, platts.
Yugoslavia and Czechoslovakia	Artificial silk or rayon flounces, blondes, a few Valenciennes.
Italy	Cotton laces, a few novelty laces, torchons.
Spain, Portugal	Silk nets, Spanish, Chantilly, Valenciennes, veils.
Greece	Cotton laces.
Other	The remainder of Europe purchases a few laces: Russia was, before the war, one of the largest outlets for Calais laces.
Africa:	
Egypt	Valenciennes, Greek nets, and a few novelty laces.
Transvaal	Valenciennes, a few novelty laces.
French colonies	Supplied direct or through commission houses in Paris.
Asia:	
Syria	A little cotton lace and silk lace, and cheap cotton laces in fancy colors.
Japan	Chantilly flounces, blondes, and artificial silk or rayon laces.
Indies	Supplied through London.
South America:	
Brazil	Cotton and artificial silk or rayon laces.
Argentina and Peru	Less important. These nations generally purchase "Assortments, by boxes, containing small yardages of 10, 15, 20, or 24 different designs."
West Indies: Cuba	Chantilly flounces, artificial silk or rayon flounces, blonde flounces, Valenciennes and cotton laces, metal laces.
North America:	
Mexico	Silk nets, Spanish, Chantilly, Valenciennes, veils.
United States	The United States is the largest client of Calais. All kinds of French laces are sold in the United States, and all of the large American importing houses have their buying offices or commission agents at Calais. Once, twice, or three times a year Americans visit the French market. The styles purchased include cotton Alençon, Cluny, Greek nets, Picot, platts, plissé, and Valenciennes laces, allovers and plain net, rayon allovers and flouncings, silk "application", Chantilly and novelty laces, allovers and flouncings, tinsel all-overs and flouncings.
Philippine Islands	Cotton Valenciennes and plain nets, rayon veils, silk novelties, net and shawls, tinsel, all-overs and flouncings.

(*d*) *Prices and profits in Calais and in the United States.*—Profits made on Calais laces by the French manufacturer and the American importer and retailer vary with the popularity of the style and pattern. Larger profits are made on laces of special designs in order to compensate for small profits made and losses sustained upon stocks of popular laces. Normally, however, the average profit made by the manufacturer on popular designs of cotton laces is from 15 to 20 percent on laces sold in the French market and from 10 to 15 percent on laces sold in the American market. The French manufacturers justify the 5 to 10 percent differential in domestic and foreign selling prices by the fact that from 50 to 90 percent of their production is sold in the United States and that the volume justifies lower prices.

The lower prices quoted to the United States as compared with those for France and other markets resulted in 1933 in the assessment of duty on a 15 percent higher value. Importers protested that some of the laces which they purchased were confined to them exclusively and had no selling price in the French market. A further objection was that in some cases the prices in France were in the nature of retail prices, inasmuch as the sale consisted of small quantities to Parisian couturiers and was not in the usual wholesale quantities. As a result of the protests of domestic importers the additional 15 percent has been reduced to 8 percent.

In depression periods, such as in 1921 and since 1930, French manufacturers have been obliged to sell with very small profits and even at losses in order to liquidate stocks and to keep their factories running.

Profits on high grade, silk dress and novelty laces normally may range from 50 to 100 percent, although since 1930 these laces have been sold on very close margins.

The price paid by American importers for lace purchased in the Calais market represents the manufacturer's selling price plus the following:[18] Local buying commission, 5 percent; forwarding, freight, and landing incidentals, etc., 5 percent; and import duty, 90 percent.

This means that the cost of the merchandise landed in the United States is approximately double the price paid to the Calais manufacturer. In addition, in normal times the American retailer pays from 25 to 50 percent more than the import price of the lace; the consumer pays from 33⅓ to 50 percent more than the wholesale price paid by the retailer. Thus, for lace costing 30 francs in Calais the American consumer would pay approximately 120 francs, or practically four times the original cost price at Calais.

Narrow cotton Valenciennes laces are in such regular demand that they form the "bread and butter" of the lace industry. This fact is so generally recognized that in 1919 a standard price was arrived at for the four narrow widths, which never vary in some of the factors of technical construction. These widths are 8, 10, 12, and 16 holes, a hole being the equivalent of two carriages. On these widths the price was fixed at 1½ centimes per hole, per meter, equal to 12, 15, 18, and 24 centimes, respectively. This is altered periodically by the addition of a "majoration", which has varied widely since its introduction, according to the external value of the franc, the cost of raw materials, labor charges, and other relevant factors. There is no available list of the successive changes in the majoration applied to prices.

[18] As already indicated, some of the largest importing houses maintain branch establishments in Calais, France, and thus avoid paying the 5 percent commission stated. One very large firm gives landing charges for laces as 5 percent. The landing charges, therefore, in the tables, are placed between the two rates, namely, 7½ percent.

(*e*) *Advantages and disadvantages of specialization in Calais.*—The city of Calais and the surrounding region are almost entirely dependent for a livelihood upon the manufacture of lace; the number of people directly and indirectly employed in the trade in the Calais region is between 65,000 and 70,000. Calais depends for the support of its population much more completely upon the lace trade than does Nottingham. This complete devotion to one industry for more than a century has resulted in the building up of an organization with an atmosphere which has induced rare perfection in artistic creation as well as economy in production. Such extreme specialization in the production of an article whose consumption is determined by fashion has, however, serious disadvantages, such as disastrous conditions of unemployment during periods of depression, which conditions of unemployment might to a certain extent be modified by a diversification of industry. Eighty-five percent of the lace production of Calais is exported, only 15 percent being retained for the domestic market; of this 85 percent, from 50 to 90 percent is regularly exported to the United States. Thus the fortunes of the population of the Calais region are affected not only by the whims of fashion but by general trade depression and by trade barriers. The immediate post-war boom brought great prosperity to Calais, whereas the severe depression of 1920 to 1921 plunged it into poverty. The outlook at that time was darkened by the apparent permanent loss of three great European markets, Germany, Austria, and Russia, which before the war had been good customers for Calais laces. As foreign orders ceased unemployment rose to 70 per cent. The situation was relieved only by the resumption of large-scale buying by the United States and Great Britain about the middle of 1921. Similarly, the Calais population has suffered great hardships during the recent world depression. Since 1930, although American imports of Calais laces have considerably diminished, they have constituted 90 percent of Calais exportations, other foreign markets having fallen away drastically.

Although exports of Calais laces to foreign markets other than the United States are in relatively small quantities, they are shipped to practically all countries of the world.

2. The Caudry lace industry

The second largest Levers lace-making center in France is at Caudry in the Department du Nord. Caudry is the center of the cotton tulle or bobbinet industry in France and makes Levers laces incidentally. The Caudry industry does not compete with Calais on the production of narrow Valenciennes, but specializes in the manufacture of fancy laces of metal threads and silk, particularly of Chantilly. Although the tulle and bobbinet industries were established in Caudry in 1829, Levers laces were not produced until 1869. Prior to the war, in 1914, there were 746 Levers lace machines in Caudry and vicinity; most of these were destroyed during the German occupation of Caudry. Many of them have been replaced and in 1930 numbered 350, of gages from 9 to 18 points. The patterns of lace made in Caudry are extremely elaborate. It is not uncommon for the drafting of a single pattern to occupy a draftsman 6 months. These designs are first offered to Parisian houses and, if successful,

are then shown to buyers from the United States. The products of the Caudry industry are, in the main, expensive, luxury articles.

3. The Lyons lace industry

Lyons, in the Department of the Loire, is noted as the center of the French trade in silk and silk fabrics; it was not unnatural, therefore, that it should become the center of production of silk veils and veilings made on the Levers machine. There is evidence that lace was produced there about 1820 and that silk net was made there on the bobbinet machine in 1825. This net was made with silk thread called grenadine, doubled and twisted to provide greater elasticity, and the same name was given to the fabric. The tulle produced in Lyons, however, was at first somewhat thick, and shortly there was produced a much finer net called "illusion." Later tulle Bruxelles was made with equal success, the system of twisting being known as "hank net." In 1841 a patent was taken out for applying outlining threads to the objects made on the bobbinet machine.

Until the end of the nineteenth century silk veils and veilings were produced chiefly in Nottingham and were shipped to Lyons to be "chenilled," but during the first 5 years of the twentieth century Lyons commenced to make them and rapidly superseded Nottingham as the chief source of production and is now the main source of silk veils and veilings. In 1929 France supplied over 90 percent of the total United States imports of silk veils and veilings. Obviously the Levers lace products of Lyons compete with neither those of Caudry nor Calais.

There are some Levers mills in and around the city of Lyons, but for the most part they are located in small towns in the surrounding country. It is estimated that there are in the district about 1,000 machines of all kinds, Levers, bobbinet, Mechlin, and bobbinet-jacquard.

4. Statistical review of French foreign trade in lace products

French statistics regarding foreign trade in lace products are quite complete; they are shown for the last 21 years, 1913–33, in tables 57 and 58. Most French lace products are those of the Levers lace machine, although exports of silk and cotton net are considerable. Inasmuch as no figures for French exports and imports are provided elsewhere in this report they are shown here for nets and lace curtains, as well as for Levers laces of all materials. Figures for trade in laces and nets of artificial silk appear for the first time in 1925.

Table 59 shows the rise in unit values of "cotton" and "all other" laces during the war, and the decline in unit values in 1920 and 1921; it shows further the serious decline in unit value of cotton laces in 1922 accompanied, however, by a corresponding rise in the unit value of "all other" laces. Silk, rayon, worsted, and metal threads came into vogue in this year, and the reduced demand for cotton laces caused a price decline, which was aided further by some trend toward heavier laces. The 1933 figures, of course, reveal the effects of the depression.

Table 60 compares in greater detail the unit values of all sorts of laces in 1913 with those of 1933.

Table 61 reveals the percentage of total French lace exports represented by the various lace products.

TABLE 57.—*Imports of lace, net, and lace curtains into France, 1913–33—Value in French francs*

Year	Net			Lace and curtains, cotton			
				Lace		Curtains	
	Silk	Artificial silk	Cotton	Hand-made	Machine-made	Lace	Embroidered
1913	844,030	----------	1,045,800	5,571,520	5,945,400	6,000	19,200
1914	463,760	----------	491,400	3,034,680	3,547,800	1,000	4,800
1915	257,400	----------	3,600,000	572,040	1,223,100	122,000	----------
1916	465,450	----------	14,091,000	1,377,950	2,295,000	626,000	----------
1917	363,165	----------	13,177,500	1,167,360	1,980,000	805,200	----------
1918	709,750	----------	8,848,500	1,147,200	3,240,000	1,087,800	----------
1919	1,500,840	----------	22,284,000	7,503,000	6,480,000	2,859,000	9,500
1920	1,039,440	----------	21,346,000	8,078,000	4,040,000	11,332,200	24,000
1921	721,200	----------	540,000	4,156,900	828,000	1,410,000	12,000
1922	496,000	----------	240,000	5,995,000	1,444,000	296,000	18,000
1923	334,000	----------	80,000	3,992,000	1,560,000	7,000	----------
1924	480,000	----------	120,000	9,576,000	2,590,000	7,000	----------
1925	576,000	73,000	96,000	12,508,000	2,100,000	----------	70,000
1926	804,000	100,000	111,000	5,850,000	1,792,000	----------	----------
1927	378,000	101,000	240,000	5,996,000	972,000	70,000	50,000
1928	796,000	70,000	180,000	7,354,000	1,440,000	369,000	60,000
1929	628,000	190,000	106,000	4,289,000	2,255,000	465,000	23,000
1930	502,000	283,000	292,000	4,430,000	1,952,000	126,000	12,000
1931	230,000	110,000	220,000	5,517,000	1,118,000	71,000	4,000
1932	111,000	23,000	103,000	2,937,000	660,000	56,000	7,000
1933	100,000	40,000	121,000	3,771,000	349,000	63,000	7,000

Year	Lace of other material than cotton					Grand total—francs	Rate of exchange	Value in United States currency
	Linen, etc.	Wool	Silk and spun silk	Artificial silk	Metal threads			
1913	210,000	----------	7,920	----------	175	13,650,045	$0.193	$2,634,459
1914	204,000	----------	3,960	----------	----------	7,751,400	.193	1,496,020
1915	----------	----------	3,740	----------	----------	5,778,280	.193	1,115,208
1916	27,000	----------	1,980	----------	----------	18,884,380	.193	3,644,685
1917	9,500	----------	690	----------	----------	17,503,415	.193	3,378,159
1918	----------	----------	1,250	----------	----------	15,034,500	.193	2,901,659
1919	576,000	----------	53,400	----------	14,700	41,280,440	.13682	5,647,990
1920	1,206,000	----------	62,300	----------	----------	47,127,940	.0704	3,317,807
1921	234,000	----------	96,600	----------	----------	7,998,700	.074554	596,335
1922	768,000	----------	13,000	----------	3,000	9,273,000	.082013	760,507
1923	525,000	----------	18,000	----------	----------	6,516,000	.060811	396,244
1924	225,000	----------	1,000	----------	1,000	13,000,000	.052368	680,784
1925	70,000	----------	1,000	202,000	----------	15,696,000	.047671	748,244
1926	801,000	----------	8,000	152,000	1,000	9,619,000	.032427	311,915
1927	70,000	----------	37,000	977,000	23,000	8,914,000	.039240	349,785
1928	----------	----------	12,000	506,000	4,000	10,791,000	.039210	423,115
1929	53,000	6,000	19,000	321,000	28,000	8,383,000	.039161	328,287
1930	90,000	----------	1,000	575,000	1,000	8,264,000	.039249	324,354
1931	90,000	2,000	133,000	189,000	7,000	7,691,000	.039200	301,487
1932	11,000	1,000	5,000	93,000	8,000	4,020,000	.039276	157,890
1933	19,000	----------	3,000	39,000	6,000	4,518,000	.050313	227,314

TABLE 58.—*Exports of lace, net, and lace curtains from France, 1913–33—Value in French francs*

Year	Net			Laces and curtains, cotton			
				Lace		Curtains	
	Silk	Artificial silk	Cotton	Hand-made	Machine-made	Lace	Embroidered
1913	3,224,255		16,742,700	4,289,780	60,574,800	986,400	1,752,000
1914	3,057,275		10,936,000	2,430,750	50,225,000	330,000	1,814,400
1915	14,418,240		1,078,000	1,583,750	57,607,800	42,000	230,400
1916	30,433,650		1,561,000	760,760	52,872,400	46,800	96,000
1917	20,774,000		2,400,000	1,434,480	39,193,000	27,720	346,500
1918	17,168,780		1,827,500	1,759,500	35,854,000	50,600	365,000
1919	44,870,240		6,156,000	2,704,900	50,996,000	544,500	1,750,000
1920	61,297,500		7,046,000	5,669,400	265,298,000	439,200	1,196,000
1921	47,292,000		5,640,000	13,845,600	144,970,000	138,600	637,000
1922	49,941,000		9,480,000	6,842,000	95,400,000	630,000	2,080,000
1923	61,802,000		25,347,000	10,138,000	115,940,000	2,340,000	2,520,000
1924	49,858,000		40,700,000	5,279,000	220,800,000	2,950,000	1,936,000
1925	23,782,000	122,000	75,492,000	5,873,000	245,700,000	4,952,000	1,958,000
1926	9,363,000	393,000	67,830,000	14,234,000	254,417,000	7,986,000	4,140,000
1927	7,442,000	253,000	54,696,000	9,398,000	213,756,000	7,273,000	1,960,000
1928	21,626,000	2,971,000	56,108,000	12,510,000	206,465,000	6,121,000	1,832,000
1929	16,556,000	12,013,000	43,914,000	5,938,000	182,350,000	7,452,000	2,284,000
1930	16,636,000	7,632,000	42,534,000	7,520,000	179,504,000	8,281,000	2,739,000
1931	9,721,000	4,006,000	28,588,000	6,752,000	166,356,000	6,506,000	942,000
1932	7,111,000	2,884,000	16,972,000	4,044,000	113,617,000	4,371,000	354,000
1933	5,729,000	3,702,000	10,973,000	1,421,000	86,389,000	1,964,000	184,000

Year	Lace of other material than cotton					Grand total—francs	Rate of exchange	Value in United States currency
	Linen, etc.	Wool	Silk and spun silk	Artificial silk	Metal threads			
1913	37,270		22,557,300		32,200	110,196,705	$0.193	$21,267,964
1914	15,300	2,000	19,938,100		30,450	88,779,275	.193	17,134,400
1915	19,000	4,000	6,528,000		54,600	61,565,790	.193	11,882,197
1916	161,330		11,798,100		225,500	97,955,540	.193	18,905,419
1917	366,000	8,000	9,159,920		4,209,840	77,918,460	.193	15,038,263
1918	313,000		2,283,420		1,853,440	61,475,240	.193	11,864,721
1919	129,000	15,000	4,867,650		11,849,250	123,882,540	.13682	16,949,609
1920	892,800	27,000	12,197,440		16,008,750	370,172,090	.0704	26,060,115
1921	111,700	9,000	22,021,120		6,008,250	240,673,270	.074554	17,943,155
1922	93,000	39,000	28,770,000		6,874,000	200,149,000	.082013	16,414,820
1923	54,000	109,000	57,751,000		7,548,000	283,549,000	.060811	17,242,898
1924	413,000	10,000	71,651,000		9,164,000	402,761,000	.052368	21,091,788
1925	234,000	14,000	52,625,000	2,632,000	15,612,000	428,996,000	.047671	20,450,668
1926	222,000	81,000	22,649,000	2,243,000	40,111,000	423,669,000	.032427	13,738,315
1927	187,000	88,000	17,744,000	1,834,000	44,632,000	359,263,000	.039240	14,097,480
1928	731,000	125,000	19,585,000	7,651,000	54,148,000	389,873,000	.039210	15,286,920
1929	607,000	152,000	31,630,000	8,124,000	40,720,000	351,740,000	.039161	13,774,490
1930	687,000	145,000	31,742,000	19,877,000	27,410,000	344,707,000	.039249	13,529,405
1931	1,000,000	400,000	40,382,000	17,890,000	4,665,000	287,208,000	.039200	11,258,554
1932	181,000	428,000	6,240,000	17,272,000	687,000	174,161,000	.039276	6,840,347
1933	104,000	66,000	3,359,000	16,640,000	98,000	130,629,000	.050313	6,572,337

TABLE 59.—*Total exports of lace, net, and curtains from France by weight, value, and unit value, 1913–33*

Year	Cotton		All other		Unit values per kilo			
	Weight	Value	Weight	Value	Cotton		All other	
	Kilos	*Francs*	*Kilos*	*Francs*	*Francs*	*Dollars*[1]	*Francs*	*Dollars*[1]
1913	1,337,217	84,345,680	256,521	25,851,025	63.08	12.17	100.78	19.45
1919	356,159	62,151,400	228,195	61,731,140	174.50	23.88	270.52	37.01
1920	1,344,554	279,748,600	311,452	90,423,490	208.06	14.65	290.33	20.44
1921	830,638	165,231,200	267,195	75,442,070	198.92	14.83	282.35	21.05
1922	1,142,602	114,432,000	249,370	85,717,000	100.15	8.21	343.73	28.19
1932	1,199,237	139,358,000	136,203	34,803,000	116.21	4.56	255.52	10.04
1933	921,378	89,958,000	122,568	40,671,000	97.63	4.91	331.82	16.69

[1] Converted according to annual average conversion rates published by the Federal Reserve bank.

TABLE 60.—*Unit value of imports into and exports from France, of net, lace curtains and laces, 1913 and 1933*

[Per kilo]

Type of lace	Imports				Exports			
	1913		1933		1913		1933	
	Francs	United States currency	Francs	United States currency	Francs	United States currency	Francs	United States currency
Net:								
Silk	110	$21.23	352	$17.71	115	$22.19	331	$16.65
Artificial silk			148	7.45			122	6.14
Cotton	42	8.11			39	7.53	47	2.36
Lace and curtains, cotton:								
Hand-made lace	320	61.76	156	7.85	340	65.62	386	19.42
Machine-made lace	81	15.63	175	8.80	78	15.05	138	6.94
Curtains, etc	10	1.93	158	7.95	12	2.32	37	1.86
Embroidered curtains	48	9.26			48	9.26	55	2.77
Lace of other material than cotton:								
Linen	60	11.58			14	2.70	130	6.54
Wool							330	16.60
Silk, spun silk	220	42.46	1,000	50.31	100	19.30	307	15.45
Artificial silk			217	9.06			266	13.38
Metal threads	175	33.78	400	20.13	175	33.78	244	12.28

TABLE 61.—*Percentage that quantity of each item constitutes of the total imports into and exports from France, of net, lace curtains, and laces, by materials, 1913 and 1933*

Type of lace	Imports		Exports	
	1913	1933	1913	1933
Net:	*Percent*	*Percent*	*Percent*	*Percent*
Silk	6.0	1.04	1.76	1.65
Artificial silk		.99		2.90
Cotton	19.47		26.94	22.59
Lace and curtains, cotton:				
Hand-made laces	13.61	88.33	.79	.35
Machine-made lace	57.38	7.32	48.73	59.93
Curtains, etc	.47	1.46	5.16	5.08
Embroidered curtains	.31		2.29	.32
Lace of other material than cotton:				
Linen	2.74		.17	.08
Wool				.02
Silk, spun silk	.02	.01	14.15	1.04
Artificial silk		.79		6.00
Metal threads		.06	.01	.04
Total	100.00	100.00	100.00	100.00

French statistics showing final destination of exported goods are presented only in terms of weight, which for obvious reasons is an inadequate measure for a product in which beauty, art, fashion, and many variable factors determine value. From consular reports, however, we know that the United States was in 1913 and remains in 1933 the market for the larger part of French lace production, that in 1913 Great Britain was second, but in 1933 has become insignificant as a market, with Holland and Belgium taking second and third places, respectively. Other French markets are world-wide though singly are quite unimportant.

5. Labor

Since the war even the Calais lace industry has suffered a dearth of trained twisthands, a dearth which is generally attributed to the diversion of these skilled workers into military service during the war from which they never returned to the trade and to the reluctance of young men to undertake the long apprenticeship, at low pay, necessary to become a twisthand, while higher wages are offered in other lines of activity. Prior to the war a twisthand averaged about 150 francs gold per week, whereas in recent years during a favorable season he has not averaged more than 300 to 400 francs per week (calculated on the post-war stabilized franc of one-fifth of its pre-war gold value). In depressed periods, particularly since 1929, by reason of part-time unemployment, caused by the decline in trade, he has averaged only about 250 francs per week, although some manufacturers provide older and more skilled twisthands with work sufficient to permit them to earn from 500 to 600 francs per week.

The average flat rate earned per rack in 1931 (a rack representing 1,920 motions of the machine) was 3 to 3.50 francs for cotton laces, 4 to 5 francs for silk laces, and 7 francs for metal or tinsel laces. A flat rate of 150 francs per week is paid for time spent in changing lace designs on the machines, but special arrangements sometimes are made with the employee by the employer fixing a price for the changing operation, although during a full season only 1 or 2 days may be required.

Clipping is performed partly in a clipping factory recently established at Calais but by far the larger part is still done by women in their homes. The pay for this work averages about 25 centimes per thousand threads clipped.

(*a*) *Working hours and conditions.*—The working week of employees in Calais lace mills is 48 hours, although it was agreed by the employers' and workers' commissions in November of 1928 that the working week should be 50 hours during certain periods when it was deemed necessary to compensate for time lost on account of holidays. Owing to a decline in the demand for lace, however, Calais lace mills generally operate only 2 shifts a day and even only 1 shift between seasons. Women workers terminate their 48-hour week at Saturday noon; they work 9 hours a day in order to be able to stop at noon on Saturday and are allowed to commence one-half hour later and finish one-half hour earlier on Monday in order not to exceed the legal week of 48 hours.

(*b*) *Labor unions and trade organizations.*—Between employers and employees throughout the Calais lace industry there is an extraordinarily cordial spirit. This may be attributed in large measure to the fact that practically the whole of the population in this locality

is in some way or other interested in the lace industry. The close cooperation essential throughout the varied processes of manufacture tends to provide close contact between employer and worker. Moreover, many of the lace manufacturing concerns are owned or operated by former twisthands who have saved or obtained sufficient capital to enable them to purchase a few lace machines.

The most important labor organization in the French lace industry is the "Union Française des Ouvriers Tullistes et Similaires" (French Union of Lace Makers and Other Lace Workers), which treats with the manufacturers' syndicate for the regulation of wage schedules. Other smaller labor organizations represent workers in the allied industries, such as dye works, card-punching factories, as well as designers, etc. Office employees, whether belonging to the lace manufacturing concerns or the local commission houses are represented by the "Syndicat des Employés de Commerce et de l'Industrie" (Syndicate of Commercial and Industrial Employees), which intercedes on matters concerning the salaries of its members. Grievances of the workers are usually settled by conferences of labor union representatives with the representatives of the manufacturers' syndicates. There is a tendency on the part of both the employees and the employer to avoid conflict, and strikes are now infrequent.

The lace manufacturers maintain two strong associations, the one known as "Chambre Syndicale des Fabricants de Tulles et Dentelles de Calais" (Syndicated Chamber of Calais Manufacturers of Laces and Nets) and the other known as "Association des Fabricants de Tulles et Dentelles" (Association of Lace and Net Manufacturers). The former group is very active in the protection of the commercial interests, both national and international, of the Calais lace industry as a whole, with particular reference to governmental action. The latter organization confines its activities to the protection of the interests of the lace manufacturers in their relations with the workers particularly as concerns wage schedules and working hours.

These two manufacturers' associations naturally are very closely identified with the Calais city administration and the local Chamber of Commerce and work together in defending the interests of the lace industry. The Calais city government, the manufacturers' syndicates, and the labor unions exert a peculiarly strong influence with the French Government in matters regarding the lace trade: commercial policy, trade promotion and commercial treaties, credit facilities, etc. The close links between the lace industry, the Calais city government, and the French Government are demonstrated by the fact that for a number of years past the president of the Syndicated Chamber of Calais Lace and Net Manufacturers has been the mayor of Calais, the owner of the most influential paper in the city, deputy in the French Chamber, and an influential member of the Chamber's tariff committee. His position is not unique. The president of the Syndicate of Silk Manufacturers in Lyons (including the manufacturers of silk veils and veilings), which organization works in the defense of their interests, which are similar to those of the lace manufacturers, is also a deputy in Paris, and chairman of the tariff committee of the Chamber of Deputies. These two men and many others representing "industries de luxe" in France exert a strong influence upon French policy, an influence that is due not only

to the importance of these industries to French economy but to the place which they occupy in the affections and traditions of the French people.

Most of the commission houses belong to the "Association des Maisons de Commissions de l'Achat de Tulles et Dentelles de Calais" (Association of the Commission Houses for the Purchase of Calais Laces and Nets), which protects the interests of its members with regard to prices charged by manufacturers and with regard to business practices.

6. The protection of designs

The importance to the prosperity of the lace industry, particularly to the French lace industry, of the continual presentation of new styles and designs has already been emphasized at various points in this report. It can scarcely be doubted that French leadership in the manufacture of lace is due in great measure to the ability of the French to create appealing styles and designs—an ability that is partly inherent and partly the result of experience and tradition. It is therefore important to obtain effective legal protection abroad for designs, particularly in view of the expense and length of time required to create a lace of new design.

The Syndicated Chamber of Calais Manufacturers of Laces and Nets has been active in its efforts to protect lace designs in France, partly by trade organization discipline and partly by seeing that the French law is enforced. The French system of design protection is exceedingly simple but is rather more efficacious, because its operation is more immediate, than the United States system. It consists of placing new designs in sealed envelops or samples of the lace in a small box and depositing with the French authorities who verify the date of the deposit. This constitutes sufficient evidence of priority in case of adjudication, penalties being applied according to French law in case of conviction for copying. The charge is small; 10 designs can be deposited at a cost of 2 francs plus a stamp tax of 50 centimes.

One of the chief complaints of the French lace manufacturers, however, is that their designs are consistently copied by foreign manufacturers, including those in the United States. Although the French manufacturer may apply for and receive a patent for his design according to United States patent law, he maintains that American procedure is too slow to provide adequate protection. The French Government, therefore, has attempted at various times, through diplomatic channels, to obtain more efficacious protection for French designs.[19] There is at present (1934) [20] pending in Congress, a bill which if enacted into law, might have the desired effect.

7. Competitive factors

The chief competitive advantages of the French lace industry are the unexcelled artistic sense of French designers and the superior workmanship of those who execute the designs. The French production of silk textiles, novelties, and laces of all materials is marked by distinguished taste, originality of design, and finished workmanship. These factors contribute to Parisian leadership in the world of fashion and that very leadership, in turn, assures to these industries distinct competitive economic advantages. Paris fashion selects a style because of its beauty, its novelty, and its appeal, and its acceptance creates a world demand. The close relationships of the French lace manufacturers and the Paris dictators of fashion, therefore, give the former a distinct advantage in world competition, an advantage possibly as great as the intrinsic appeal of the product; with advance information concerning the season's styles, the manufacturer is naturally in a better position to supply the world market.

[19] In St. Gall the protection of patterns is managed by a self-constituted tribunal of manufacturers. A defaulter failing to pay the fine imposed by the tribunal is expelled from the federation and may be compelled to give up business.

[20] See p. 181.

A second competitive advantage enjoyed by the French lace industry is the devotion of the French people to the "industries de luxe" and more specifically the concentration of the industry in centers devoted practically entirely to lace manufacture and its allied trades. There results a pride in the production of superior laces and, indeed, in the carrying out of processes which effect economy in operation.

There is in French lace-making centers an abundance of cheap female labor familiar in advance with the work of the lace mill; clipping is performed by the women and girls in the homes as homework at low remuneration.

The large number of small competing manufacturers constitutes to a certain degree a disadvantage to the French industry, a disadvantage which is mitigated, particularly as regards local and national trade policies, by the strength of the trade organizations. Although competitive strength in foreign markets would undoubtedly accrue from production economies resulting from the elimination of many of the smaller façonniers, the close supervision of production by the experienced manufacturer himself is an important element in the strength of the industry as a whole, and to organize the industry into large mass-production units would be, to a certain degree, to undermine this strength.

II. THE LEVERS LACE INDUSTRY IN GREAT BRITAIN

1. Development and present scope of the industry

The history of the lace industry in Great Britain is indissolubly associated with and dependent upon that of the invention and development of the various types of lace machines. The first lace-making machine, invented in 1764, was a modification, made by Strutt and Frost in Nottingham, of Lee's stocking frame. Inasmuch as the British hosiery industry, based upon Lee's invention, was established in Nottingham that city naturally became the center of the lace industry. Practically all subsequent improvements and adaptations of the lace-making machine were made by the machine operators and mechanics in the hosiery, lace, and other textile factories in Nottingham.[21] In 1813 John Levers (the modern spelling of the name Leavers) and other frame smiths, making improvements on John Heathcoat's bobbinet machine of 1809, perfected the machine which is the basis of the modern Levers machine. Hooton Deverill's application of the jacquard to the Levers machine in 1841 and Oldknow's addition in 1849 of thin steel bars for the guidance of threads in the machine completed the machine essentially in its present form. Thus Nottingham is the mother of the Levers lace industry, although the eldest daughter in Calais has grown in the past 30 years to overshadow the mother.

[21] Ferguson's later application of the jacquard apparatus to the bobbinet machine was carried out in France, owing to the insufficiency of protection afforded his invention in England. However, Ferguson was a Nottingham worker.

The British Levers lace industry is centered in the city of Nottingham. Machine holders have established their plants, however, chiefly in the suburban districts of Basford, Radford, Lenton, and Sneinton and rather more in small outlying towns, such as Beeston, Borrowash, Chilwell, Derby, Draycott, Heanor, Ilkeston, Kegworth, Long Eaton, Melbourne, Ruddington, Sandiacre, Sawley, Southwell, Spondon, and Stapleford, where local taxation (an item of importance) is lighter. Nevertheless the city of Nottingham proper remains the center of the finishing industry in a section of the city known as the "lace market", and practically all the laces and lace articles made in the United Kingdom, whether made in Scotland, Somerset, Devonshire, or Derbyshire, are marketed in Nottingham.

Prior to the expansion of the French lace industry in the years 1905 to 1908, the British industry operated by far a larger number of machines than did the French; in addition, British machines averaged about 50 inches more per machine in width than did French machines—thus their capacity for and active production of Levers laces was greater than that of the French. The 50 percent expansion of the French industry from 1905 to 1908 gave them more machines than the English; however, the greater productivity of the English machines and the popularity of the styles of laces for which Nottingham was famous enabled the English industry to hold its own. In 1912 Levers machines operating in Calais numbered 2,644 and elsewhere in France approximately 1,000, while in England there were only from 2,550 to 2,600; the British machines averaged 200 inches in width and the French 150; the gages of the former ranged from 4½ to 16 points, with in some instances as many as 220 top bars.

A consular report from Nottingham, dated August 31, 1923, gives the story of what happened to the British lace trade during and after the war: 168 firms had ceased operations, between 600 and 650 machines had disappeared (593 were scrapped or destroyed by fire and 79 were shipped to the United States—in addition, since 1914, 400 others had changed hands at liquidator's sales or were returned to the machine builders), while about 20,000 workers had left the trade. The number of machines in operation in 1923 was between 1,950 and 2,000. Since 1923 the English have maintained about 2,000 Levers machines, while the French have increased their number, the increase being coincident with the replacement of the machines destroyed in the war zone.

The British Census of 1930 showed the number of persons engaged in the English Levers lace industry as 15,037, of whom 55 percent were females, including 914 outworkers. This figure represents a decline of 60 percent from the number employed in the same industry before the war. British census reports showed the following numbers employed in the British lace industry during the years stated:

1907—36,840 employed in mills, plus 5,171 outworkers.
1912—35,914 employed in mills, plus 4,098 outworkers.
1924—19,017 employed in mills, plus 1,650 outworkers.
1930—14,123 employed in mills, plus 914 outworkers.

An analysis of the causes of this severe contraction of the British lace industry will be presented later in this section.

2. Distinctive features of the British industry

With the exception of a very few large firms, which undertake all the lace-making finishing processes in their own mills, and which undertake also the commercial distribution of their product, English Levers lace mills are relatively small, the average unit operating 11 machines. The operation of such a small number of machines renders impracticable the carrying out of all processes by the machine holder; generally speaking, the English lace trade is divided into four branches: making, bleaching and dyeing, dressing, and finishing. The machine holder possessing a small number of machines makes and sells his lace in the brown to the finisher who, curiously enough, is called the manufacturer. The finisher or manufacturer does not, as one might suppose, carry out all the finishing processes but only a few of them. He sends the lace to a special establishment for bleaching or dyeing and to yet another for dressing. The remaining processes—drawing, clipping, scalloping, winding, and boxing—are performed largely upon the premises of the finisher, although some of the work is given out as homework.

The merchandising of the finished goods is a further function of the finisher or manufacturer. Goods intended for the retail market are sold to wholesale houses for distribution; large sales are made directly to the "manufacturing trade" (large manufacturers of undergarments, etc.). As regards colonial or foreign markets, the finisher may sell directly through traveling salesmen or agents or he may sell to or through an English firm of lace exporters. Only one large English firm has a branch house in the United States—located in New York; this same firm maintains representatives in Toronto, Sydney, Melbourne, and Wellington.

It is here pertinent to point out that according to the English system several individual profits are made on the lace before it reaches the consumer: that of the maker, the bleacher, the dresser, the finisher, the wholesaler, and the retailer, whereas the American system requires only three and, in many cases, only two, the manufacturer, the wholesaler, and the retailer; in chain stores and large department stores the profit of the wholesaler may be eliminated.

Another distinctive feature of the English Levers lace industry is the tenement factory. Although it is practically unknown in the United States, the English lace industry shares it with the French. These tenement factories, which may be sometimes 5 or 6 stories in height or may be one-story buildings with overhead lighting, are constructed as real estate investments. The same factory may house many firms and there may be several on one floor, space being rented out in "shops" or "standings" to machine holders who pay an inclusive rent to the landlord for space, power, and heat. The rental for a standing for a 20-quarter machine approximates 17s. 6d. per week, $4.26 at par.

Trained lace workers may, and often do, acquire their own plants consisting of a very few machines upon a hire-purchase system. This system entails the payment of a deposit, perhaps £100 per machine, and the payment of the remainder with interest in installments. This system has given rise to a large number of independent machine holders operating no more than two or three machines. The system is criticized in many quarters, the complaint being that it has encouraged irresponsible production, has induced excessive competition, and in periods of trade depression has exerted a peculiarly strong pressure upon prices.

Some small holders have not the requisite accommodation, appliances, or staff to carry out the preparatory card-punching and yarn processes. In these cases the yarn is purchased ready-wound on spools and is delivered to a warper who makes a business of preparing warps or beams; public draftsmen are engaged to draft, read-off, punch, lace, and deliver the jacquard cards ready for use except correcting. A firm operating 8 or 9 machines, or more, usually has the necessary equipment and staff for carrying out these processes on its own premises. The entire lace trade in England is grouped into 6 machine holders' associations, 2 bleachers' associations, 2 finishing and export associations, and, in addition, draftsmen and "brown agents" are affiliated with these in the "Federation of Lace and Embroidery Employers Association." The principal labor organization is that known as the Amalgamated Society of Operative Lace Makers.

3. Statistical review of British production and foreign trade in Levers laces

British statistics regarding the production of Levers laces are incomplete and unsatisfactory. A British census was taken in 1907 and subsequently in 1912, 1924, and 1930. Inasmuch as the furnishing of information by the manufacturers apparently is not compulsory the production figures do not represent the entire industry but a variable proportion of it. Moreover most British lace manufacturers sell their goods "in the brown" to a finisher so that their figures do not represent the price of the finished product; others, consisting of a few large firms, sell their goods finished and their figures represent the finished product. Finally, the finishers do not separate their finishing costs of Levers laces from those of other lace products. Necessarily, therefore, the census figures contain serious omissions and duplications which must be taken into account in a consideration of the following production figures for British Levers laces.

TABLE 62.—*Production of Levers laces, British census data for the years 1907, 1912, 1924, and 1930*

Year	Cotton lace and articles thereof (made on machines other than net or curtain machines)	Silk lace and articles thereof (except embroidery)	Lace of other material than cotton or silk and articles thereof (except embroidery)	Total
1907 [1]	[2] £2,482,000	[3] £470,000	£27,000	£2,979,000
1912 [4]	2,028,000	311,000	132,000	2,471,000
1924 [5]	1,311,000	290,000	57,000	1,658,000
1930	346,000	123,000	485,000	957,000
PERCENTAGE OF INCREASE OR DECREASE FROM 1907				
1912	−18.29	−38.83	+388.89	−17.05
1924	−47.18	−38.30	+111.11	−44.34
1930	−86.06	−73.83	+1,696.30	−69.08

[1] These data represent the production of 71.3 percent of the total number of lace mills in Great Britain to whom application was made for returns; £2,051,000 of the total value represents returns from 2,147 machines and lace valued at £431,000 was made by firms who made no reports concerning machines. Assuming the smaller figure represents the use of machines in the same ratio as the larger, the total number of machines represented would be 2,598.

[2] Represents the value of the laces "in the brown."

[3] Includes silk Levers laces.

[4] The figures for 1912 are summarized in the census report of 1924.

[5] Represents the production of 1,404 machines.

NOTE.—The decreases in 1924 and 1930 were larger than appear, because of the general rise in prices between 1907 and 1924; it is not possible to say how large in the absence of a unit of quantity and of comparability of quality.

Any comparison of production and exports of British lace is rendered difficult by the fact that the data supplied by the census of production is for brown goods without any information as to the value added to these goods as a result of finishing; the exports on the other hand presumably consist predominantly of finished goods. It was, however, estimated in 1923 that 73 percent of the total lace made in the United Kingdom was exported.

(*a*) *British import and export trade in laces.*—In an analysis of British import and export trade in lace and in dealing with lace import and export statistics it is necessary to point out a unique feature of the British lace trade—the large entrepôt trade. The large British entrepôt trade in general has been built up with the aid of free trade, superior international banking, credit, and shipping facilities. The larger part of British imports of these laces, either for consumption or for exportation, come from France, whose manufacturers have not the scope for general trade of a large Nottingham finisher who buys laces of all styles on the open market and is thus enabled to cater to the requirements of his customers in any part of the world.

It will be remembered that the manufacturer in the British lace industry is, in fact, the finisher who purchases the laces in the brown, provides for the finishing processes, and acts further as a warehouseman and distributor. Thus he has purchased abroad, chiefly in France, laces in the production of which Nottingham machine-holders cannot compete, but which his customers demand, has housed them and shipped them abroad at a profit, or he has transmitted specific orders to the foreign source, reinvoiced them in England, and shipped them out to the buyers. The effects of the safeguarding duties of 1925 upon the entrepôt trade will be discussed later in this section.

The values of British general imports of lace, net, and articles thereof, except embroidery, appear in table 63. These import figures include considerable amounts of laces which were later exported. The figures for such re-exports appear in table 65. In order to calculate British imports for consumption, the figures in table 65 must be subtracted from those in table 63. Statistics for British exports of laces of British manufacture are given in table 64.

The smaller values of 1925 and subsequent years indicate the application of the safeguarding act, whereby foreign goods for export were passed through England under bond and did not enter into the records.

TABLE 63.—*General imports of lace and net and articles thereof (except embroidery) into Great Britain, 1913–33*

Year	Cotton	Silk [1]	Silk lace mixed with other materials if known as silks	Artificial silk [2]	Laces and articles [3] of other material than cotton, linen, and silk	Value in pounds	Rate of conversion	Value in United States currency
1913	£2, 292, 823	£384, 569	£44, 877	----------	£9, 556	£2, 731, 825	$4. 8665	$13, 294, 426
1914	1, 448, 970	299, 670	7, 546	----------	12, 695	1, 768, 881	4. 9054	8, 677, 069
1915	930, 879	14, 904	22, 767	----------	16, 937	985, 487	4. 7514	4, 682, 443
1916	813, 105	1, 544	19, 775	----------	9, 225	843, 649	4. 7588	4, 014, 757
1917	464, 297	3, 042	268	----------	2, 644	470, 251	4. 7542	2, 235, 667
1918	534, 255	----------	188	----------	12, 422	546, 865	4. 7547	2, 600, 179
1919	953, 222	6, 783	12, 391	----------	13, 597	985, 993	4. 4258	4, 363, 808
1920	[4] 242, 818	13, 735	5, 156	----------	36, 552	298, 261	3. 66427	1, 092, 909
1921	1, 293, 952	176, 909	168, 557	----------	20, 590	1, 660, 008	3. 849056	6, 389, 464
1922	1, 079, 582	224, 612	174, 417	----------	19, 700	1, 498, 311	4. 429165	6, 636, 287
1923	1, 570, 371	217, 032	194, 047	----------	35, 621	2, 017, 071	4. 574825	9, 227, 747
1924	1, 916, 049	141, 972	209, 319	----------	27, 890	2, 295, 230	4. 417064	10, 138, 178
1925	1, 060, 906	101, 131	143, 555	£23, 986	36, 523	1, 366, 101	4. 828944	6, 596, 826
1926	351, 745	36, 298	88, 425	71, 059	9, 580	557, 107	4. 858235	2, 706, 557
1927	372, 770	45, 115	86, 658	65, 824	12, 386	582, 753	4. 861	2, 832, 762
1928	329, 449	61, 350	121, 476	58, 580	9, 214	580, 069	4. 8662	2, 822, 732
1929	388, 983	55, 763	136, 548	75, 697	11, 337	668, 328	4. 8569	3, 246, 002
1930	262, 563	37, 937	146, 913	106, 981	16, 608	571, 002	4. 8621	2, 776, 269
1931	195, 893	12, 598	138, 247	88, 936	2, 267	437, 941	4. 5350	1, 986, 062
1932	92, 948	6, 231	59, 864	----------	----------	159, 043	3. 5061	557, 621
1933	107, 547	5, 989	49, 429	----------	----------	162, 965	4. 2368	690, 450

[1] Includes small quantities of hand-made lace.
[2] Value of laces of artificial silk subsequent to 1925 includes laces of artificial silk mixed with other materials.
[3] Includes mohair braids. Between 1920 and 1925 these figures contained recorded values of linen laces and embroideries, and after 1925 linen laces only.
[4] Figures for 1920 and subsequent years include small quantities of nets made on net machines and curtains made on curtain machines.

TABLE 64.—*Exports of lace and net, and articles thereof (except embroidery), of home manufacture, from Great Britain, 1913–33*

Year	Cotton			Silk	Silk mixed with other materials if known as silk
	Plain net	Curtains	Lace		
1913	----------	----------	£4, 108, 438	£22, 285	£11, 300
1914	----------	----------	3, 486, 723	61, 935	22, 076
1915	----------	----------	2, 655, 919	160, 050	36, 917
1916 [1]	----------	----------	4, 151, 881	316, 418	37, 340
1917	----------	----------	3, 689, 156	92, 692	19, 683
1918	----------	----------	4, 043, 875	77, 091	17, 431
1919	----------	----------	4, 688, 463	143, 420	19, 540
1920	£4, 366, 564	£872, 815	3, 224, 233	224, 859	68, 600
1921	1, 186, 438	523, 221	953, 959	68, 563	22, 921
1922	1, 134, 343	597, 080	1, 068, 462	58, 224	39, 869
1923	922, 346	463, 033	957, 693	43, 685	24, 038
1924	916, 302	457, 049	1, 124, 981	45, 758	31, 476
1925	839, 045	466, 014	944, 742	30, 821	32, 870
1926	668, 010	381, 797	642, 716	48, 047	18, 613
1927	747, 165	410, 459	515, 774	67, 966	22, 604
1928	703, 912	371, 222	463, 723	183, 439	37, 934
1929	683, 592	336, 003	406, 640	180, 836	44, 518
1930	596, 596	250, 627	290, 106	102, 285	37, 687
1931	445, 893	184, 968	185, 022	35, 217	45, 335
1932	600, 627	212, 251	239, 963	24, 355	57, 619
1933	644, 813	[2]	412, 067	37, 179	36, 429

[1] Lace prices began to rise radically from 1916 onward and the values shown represent, therefore, smaller quantities of laces. There are no quantity figures available from which unit values might be deduced.
[2] Included in lace.

TABLE 64.—*Exports of lace and net, and articles thereof (except embroidery), of home manufacture, from Great Britain, 1913–33*—Continued

Year	Artificial silk, and mixed with other materials	Other materials and articles thereof	Total	Rate of conversion	Value in United States currency
1913	----------	----------	£4, 142, 023	$4. 8665	$20, 157, 155
1914	----------	----------	3, 570, 734	4. 9054	17, 515, 879
1915	----------	----------	2, 852, 886	4. 7514	13, 555, 203
1916 [1]	----------	----------	4, 505, 639	4. 7588	21, 441, 435
1917	----------	----------	3, 801, 531	4. 7542	18, 073, 239
1918	----------	----------	4, 138, 397	4. 7547	19, 676, 836
1919	----------	----------	4, 851, 423	4. 4258	21, 471, 328
1920	----------	£29, 540	8, 786, 611	3. 66427	32, 196, 515
1921	----------	9, 304	2, 764, 406	3. 849056	10, 640, 354
1922	----------	13, 996	2, 911, 974	4. 429165	12, 897, 613
1923	----------	29, 485	2, 440, 280	4. 574825	11, 163, 854
1924	----------	40, 893	2, 616, 459	4. 417064	11, 557, 067
1925	£29, 810	35, 291	2, 378, 593	4. 828944	11, 486, 092
1926	181, 542	3, 599	1, 944, 324	4. 858235	9, 445, 983
1927	306, 686	7, 211	2, 077, 865	4. 861	10, 100, 502
1928	453, 544	2, 909	2, 216, 683	4. 8662	10, 786, 823
1929	517, 530	4, 361	2, 173, 480	4. 8569	10, 556, 375
1930	445, 229	3, 097	1, 725, 627	4. 8621	8, 390, 171
1931	283, 058	2, 172	1, 181, 665	4. 5350	5, 358, 851
1932	315, 850	797	1, 451, 462	3. 5061	5, 088, 100
1933	[3] 258, 588	[4]	1, 389, 076	4. 2368	5, 885, 237

[1] Lace prices began to rise radically from 1916 onward and the values shown represent, therefore, smaller quantities of laces. There are no quantity figures available from which unit values might be deduced.
[3] Lace manufactures.
[4] Not available.

TABLE 65.—*Exports of lace and net and articles thereof (except embroidery), of imported merchandise, from Great Britain 1913–33*

Year	Cotton	Silk	Silk mixed with other materials if known as silk	Lace of art silk and mixed with other materials	Lace of other materials and articles thereof	Total	Rate of conversion	Value in United States currency
1913	£1, 225, 910	£183, 851	£9, 955	----------	£7, 871	£1, 427, 587	$4. 8665	$6, 947, 352
1914	882, 483	170, 427	13, 554	----------	5, 397	1, 071, 861	4. 9054	5, 257, 907
1915	665, 898	21, 796	24, 383	----------	825	712, 902	4. 7514	3, 387, 283
1916	554, 519	28, 582	50, 998	----------	1, 738	635, 887	4. 7588	3, 026, 059
1917	374, 145	52, 130	14, 429	----------	960	441, 664	4. 7542	2, 099, 759
1918	404, 854	21, 887	10, 114	----------	930	437, 885	4. 7547	2, 082, 012
1919	743, 601	41, 127	31, 091	----------	4, 071	819, 890	4. 4258	3, 628, 536
1920	889, 539	135, 705	116, 023	----------	21, 180	1, 162, 447	3. 66427	4, 259, 520
1921	1, 158, 837	167, 538	75, 800	----------	14, 990	1, 417, 165	3. 849056	5, 454, 747
1922	888, 917	77, 875	37, 163	----------	17, 654	1, 021, 609	4. 429165	4, 524, 875
1923	1, 264, 329	25, 905	15, 985	----------	12, 827	1, 319, 046	4. 574825	5, 440, 462
1924	1, 709, 973	24, 750	22, 051	----------	27, 199	1, 783, 973	4. 417064	7, 879, 923
1925	717, 110	14, 409	6, 076	£458	66, 497	804, 550	4. 828944	3, 885, 127
1926	76, 331	2, 998	2, 509	6, 740	6, 694	95, 272	4. 858235	462, 854
1927	115, 170	4, 289	9, 185	6, 703	11, 681	147, 028	4. 861	714, 703
1928	96, 475	3, 965	8, 250	6, 550	5, 401	120, 641	4. 8662	587, 063
1929	70, 778	4, 096	12, 159	5, 890	11, 752	104, 675	4. 8569	508, 396
1930	61, 619	2, 791	11, 859	7, 979	9, 909	94, 157	4. 8621	457, 801
1931	21, 941	961	7, 961	4, 091	1, 269	36, 223	4. 5350	164, 271
1932	6, 053	517	3, 733	----------	----------	10, 303	3. 5061	36, 124
1933	9, 046	303	1, 119	----------	----------	10, 468	4. 2368	44, 351

The proportion of the total of British laces of home manufacture exported to the various sections of the world appears, expressed in percentages, in table 66 below. The striking fact revealed by this table is the progressively smaller percentages of British lace taken by the Continent of Europe, the United States, and South America, and the increase in British dependence for markets upon British

possessions. Generally speaking, this was due to a falling away of foreign markets rather than an increase in consumption by British possessions.

TABLE 66.—*Percentage of exports of lace goods of British manufacture to different parts of the world, 1913, 1922, and 1931*

Exported to—	1913	1922	1931
	Percent	*Percent*	*Percent*
The Continent of Europe	30.8	24.6	9.5
United States of America	31.2	15.6	18.0
Central and South America	13.2	12.8	2.8
British possessions	20.0	39.5	54.3
Elsewhere	4.8	7.5	15.4
Total	100.0	100.0	100.0

(*b*) *British exports of imported lace compared with exports of lace of British manufacture.*—Table 67 reveals in a striking manner the relative importance to Great Britain of the export trade in imported laces—it shows the percentages of exports of laces of British manufacture and of foreign manufacture. Owing to the war, exports of imported lace declined steadily from 1913 to 1918, inclusive. There was a pick-up in 1919 in the trade, a decline in 1920, owing to abnormal exports of laces of British manufacture, and then a very large increase in the importance of exports of imported lace lasting until 1925; this was due rather to a decline in exports of British lace than an increase in the exports of foreign lace. The safeguarding duties applied in 1925 account for the drastic decline in the percentages representing these exports. Certain groups in Great Britain complained that safeguarding duties killed the re-export trade, while others claim that it continues, but that the foreign goods are now entered under bond and thus do not reach official statistics as formerly.

TABLE 67.—*British exports of lace of British manufacture compared with exports of foreign merchandise, 1913–33*

Year	Exports		Year	Exports	
	British manufacture	Foreign manufacture		British manufacture	Foreign manufacture
	Percent	*Percent*		*Percent*	*Percent*
1913	74.37	25.63	1924	59.46	40.54
1914	76.91	23.09	1925	74.72	25.28
1915	80.01	19.99	1926	95.33	4.67
1916	87.63	12.37	1927	93.39	6.61
1917	89.59	10.41	1928	94.84	5.16
1918	90.43	9.57	1929	95.41	4.59
1919	85.54	14.46	1930	94.83	5.17
1920	88.32	11.68	1931	97.03	2.97
1921	66.11	33.89	1932	99.26	.74
1922	74.03	25.97	1933	99.25	.75
1923	76.44	23.56			

TABLE 68.—*Imports of foreign lace into and exports from Great Britain of net and laces of British manufacture, 1913 and 1933*

IMPORTS

Type	1913		1933	
	Value in pounds	Value in United States currency	Value in pounds	Value in United States Currency
Cotton lace	£2,292,823	$11,158,023	£107,547	$455,655
Silk lace	384,569	1,871,505	55,418	234,795
Silk and other materials	54,433	264,898		
Total	2,731,825	13,294,426	162,965	690,450

EXPORTS

Cotton lace Cotton net	£4,108,438	$19,993,714	£1,056,880	$4,477,789
Silk lace	22,285	108,450	37,179	157,520
Silk mixed with other materials	11,300	54,991	36,429	154,342
Artificial silk lace			258,588	1,095,586
Total	4,142,023	20,157,155	1,389,076	5,885,237

TABLE 69.—*Percentage by which imports of foreign lace into and exports from Great Britain of net and laces for 1933 is higher or lower than those of 1913, taken on the basis of United States currency*

	Imports	Exports
	Percent	*Percent*
Cotton lace and net	−95.92	−77.60
Silk lace	−87.45	+45.25
Silk mixed with other materials including aritficial silk		+2173
Total	−94.81	−70.80

4. The depression in the British lace trade

The statistics presented in the preceding pages all indicate a progressive depression in the British lace trade since the war; thousands of workers have left the trade, hundreds of lace machines have disappeared, production and export trade have fallen off radically. Some of the more important causes for this depression may be here stated:

1. There has been a decline in the general demand for lace in post-war years as compared with pre-war years.

2. Since the war fashion has decreed the popularity of narrow, fine Vals.; also of Alençons, Chantillys, and the metal thread novelty laces, laces in the production of which British manufacturers for various reasons cannot compete with France. Thus the fine Normandies, Clunys, and torchons for which Nottingham was famous in pre-war years find practically no demand. The conservatism of English lace manufacturers, their unwillingness either to create or to adopt and manufacture new styles and designs, or to create appealing novelties, and the tendency of the small machine holders to be content with the manufacture of cheap and low-quality lace—all together constitute perhaps the most important cause of the plight of the British lace trade, a cause which was fully recognized within the kingdom as well as without.

3. In competing in neutral markets with other foreign lace industries (and, of course, the prosperity of the British lace industry was built up on export trade), the United Kingdom has been at a distinct disadvantage since the war, because of the depreciation at one time or another of most European currencies, whereas the pound sterling was stabilized in 1925 at the pre-war par, a point which some British industrialists considered too high for the best interests of the British export industry.

4. Wages in the finishing departments of the British lace industry are fixed by a trade board which is a Government department. There is no comparable arrangement in France, where the average wages paid for these processes is about one-third of the rate paid in England.

5. Trade restrictions of all sorts, particularly heavy upon luxury articles such as lace, have weighed heavily upon British lace exports: Tariffs, import prohibition, exchange controls, etc.

6. The United States has practically disappeared as a market for British Levers laces, owing to the growth of the domestic industry.

Another general disadvantage suffered by the British lace trade is that in Nottingham the buyer never deals with the actual manufacturer but with the finisher, who is called the manufacturer; thus the buyer cannot give his own ideas to or discuss his needs with the actual producer. In Calais, on the other hand, the actual manufacturer works in close cooperation, not only with the buyer, but with the dictators of fashion. This disadvantage for the British grows directly out of the division of production in Great Britain between at least four different agencies. It is here interesting to note that the Nottingham Chamber of Commerce has seriously considered the establishment in London of a recognized general selling agency where buyers could rely upon seeing the latest and the best of Nottingham productions without visiting Nottingham and making a wearisome round of the warehouses, and where the buyers could discuss their needs with the producers. This plan has not been put into effect.

The English manufacturers complain too of design copying, particularly in Germany and Austria where in order to obtain the protection of a design the manufacturer is obliged to manufacture the lace of that design within 12 months of registration in Germany or Austria. Where it is not feasible to manufacture in the foreign country, therefore, the English manufacturer loses all right to his design after 12 months.

5. Effects of the safeguarding duties of 1925 upon the British lace trade

The depression in the British lace industry became so acute in 1922 and 1923 that the manufacturers applied to the Government for tariff protection. Under the safeguarding of industries act they were granted such protection in 1925, thus arousing a first-class tariff controversy. In support of their application they complained that they were being replaced both in the home market and in the foreign markets by cheaper foreign production and offered as evidence, statistics showing the greatly increased importations of foreign laces. Merchants, buyers, and retailers of laces, together with general free-trade interests, agreed that the British lace manufacturer was losing out in foreign markets but attributed his loss entirely to the fact that his laces compared unfavorably with foreign lace in quality, design, and fashion and that the manufacture of appealing novelties by the British industry would revive the trade. They denied that the lace industry was losing out in the domestic market and presented figures to show that increasing imports had been accompanied by corresponding increases in reexports (as shown in the table below) and that the safeguarding duties would destroy this trade. The manufacturers countered with the statement that recorded imports did not include the large quantities of lace coming in by parcel post which were exported in bulk and were included in the figures of exports of foreign merchandise, that no allowance had been made for the difference between the import and export price, and that "burnt-out" goods were declared as embroideries on entering the country and were declared as lace on leaving it.

TABLE 70.—*Imports of lace into Great Britain compared with exports of foreign lace, 1919–26*

Year	Imports	Reexports	Year	Imports	Reexports
1919	$4,363,808	$3,628,536	1923	$9,227,747	$3,440,462
1920	1,092,909	4,259,520	1924	10,138,178	7,879,923
1921	6,389,464	5,454,747	1925	6,596,825	3,885,127
1922	6,636,267	4,524,875	1926	2,706,557	462,854

In July 1923 a committee was appointed to investigate the needs of the lace industry with a view to a possible granting of the safeguarding duties. Reporting in November 1923, the committee recommended for a period of 5 years a 33⅓ percent ad valorem duty on all imported laces and lace articles. The labor government of 1924 refused to act upon the recommendation, but the conservative government after further investigation which confirmed the facts stated in the previous report, put it into effect on July 1, 1925.

Polemics commenced with the application of the duties. Of course statistics revealed an immediate and drastic decline in importations, and practically the complete disappearance of reexports; thus strong arguments were furnished for both the tariff and the nontariff groups. Tariff groups insisted that the entrepôt trade has not disappeared but that goods imported for exportation now enter under bond and do not enter British statistics. Nontariff groups insisted that the entrepôt trade was dead and pointed further to rises in unemployment and declines in the exports of British laces.

The safeguarding duties as applied to laces and embroideries were allowed to lapse in 1930. However, a general duty of 10 percent ad valorem was assessed upon laces by the Abnormal Importations Act of 1931; this duty was increased to 20 percent in April 1932, and in June 1933, by treasury order, the duties on imported laces and lace articles, and on embroidery and embroidered articles, were increased to 30 percent ad valorem.

III. THE LEVERS LACE INDUSTRY IN GERMANY

The Levers lace industry in Germany, operating 280 machines chiefly of English manufacture, is located mainly in Dresden, Leipzig, and Plauen. The German industry produces almost exclusively for the German market, exports being negligible. Fifty percent of the machines operated in Germany are owned by 2 firms, 1 in Dresden and 1 in Leipzig, each operating 70 machines. The gages of the German machines range from 7 to 16 points and produce a wide variety

of laces—Vals, torchons, Clunys, and bobbin-finings. The mill at Dresden is self-contained, all processes being carried out on the premises, but the mill at Leipzig has no facilities for bleaching and dressing and sends products to Plauen to be bleached, dyed, and dressed.

IV. TARIFF LEGISLATION IN THE UNITED STATES CONCERNING LACE AND LACE ARTICLES

The duties levied on laces under tariff acts for a period of more than 140 years ranged from 5 to 90 percent ad valorem. In 1812 and 1864 the duty was augmented, as part of the general fiscal policy of the country, in raising revenue to meet expenses entailed by war.

The duties have with few exceptions been assessed upon an ad valorem basis. With the exception of the act of 1909, which advanced the duty 10 percent on products of the Levers or go-through lace machine, no laws have been enacted which made the rate of duty dependent upon the type of fancy lace machine or upon some mechanical factor in the machine producing the articles, such as obtained in the case of Nottingham lace-curtain machine products, where the height of the duty might depend upon the gage of the producing machine. Types of lace have been mentioned but not styles; a definition of Valenciennes, Alençon, or Chantilly lace for tariff purposes would require to be postulated in terms of great accuracy and would be highly contentious.

In the act of 1913 laces were placed collectively in the sundries schedule rather than in the schedules relating to the different materials of which they were composed.

Paragraph 1430 of the act of 1922 carried two rates of duty, 90 percent ad valorem on laces and kindred articles, and 75 percent ad valorem on embroideries, drawn work, and similar fabrics. In the act of 1930, paragraph 1529 (a), laces and embroideries were made dutiable at the same rate, 90 percent ad valorem.

The pertinent parts of the paragraphs dealing with laces and lace articles commencing with the tariff act of 1890 are shown as follows:

TABLE 71.—*Paragraphs concerning laces and lace articles, Tariff Acts of 1890 to 1930*

Year	Paragraph	Text
1890	354	Cotton * * * braids, * * * thirty-five cents per pound; * * * gimps, galloons, * * * any of the foregoing which are elastic or nonelastic, 40 per centum ad valorem: *Provided*, That none of the articles included in this paragraph shall pay a less rate of duty than 40 per centum ad valorem.
	373	Laces, edgings, embroideries, insertings, neck rufflings, ruchings, trimmings, tuckings, lace window-curtains, and other similar tamboured articles, and articles embroidered by hand or machinery, embroidered and hemstitched handkerchiefs, and articles made wholly or in part of lace, rufflings, tuckings, or ruchings, all of the above-named articles, composed of flax, jute, cotton, or other vegetable fiber, or of which these substances or either of them, or a mixture of any of them is the component material of chief value, not specially provided for in this act, sixty per centum ad valorem: *Provided*, That articles of wearing apparel, and textile fabrics, when embroidered by hand or machinery, and whether specially or otherwise provided for in this act, shall not pay a less rate of duty than that fixed by the respective paragraphs and schedules of this act upon embroideries of the materials of which they are respectively composed.
	398	* * * braids, galloons, fringes, gimps, * * * dress trimmings, laces and embroideries, head nets, * * * any of the foregoing * * * made of wool, worsted, the hair of the camel, goat, alpaca, or other animals, or of which wool, worsted, the hair of the camel, goat, alpaca, or other animals is a component material, the duty shall be sixty cents per pound, and in addition thereto sixty per centum ad valorem.
	412	* * * braids, galloons, fringes, * * * any of the foregoing which are elastic or nonelastic, * * * and ornaments, made of silk, or of which silk is the component material of chief value, fifty per centum ad valorem.

TABLE 71.—*Paragraphs concerning laces and lace articles, Tariff Acts of 1890 to 1930*—Continued

Year	Paragraph	Text
1890	413	Laces and embroideries, handkerchiefs, neck rufflings and ruchings, * * * composed of silk, or of which silk is the component material of chief value, not specially provided for in this act, sixty per centum ad valorem: * * *.
1894	263	* * * braids * * * gimps, galloons, * * * woven, braided, any of the above made of cotton or other vegetable fiber and whether composed in part of India rubber or otherwise, forty-five per centum ad valorem.
	276	Laces, edgings, nettings and veilings, embroideries, insertings, neck rufflings, ruchings, trimmings, tuckings, lace window curtains, * * *, and articles made wholly or in part of lace, rufflings, tuckings, or ruchings, all of the above-named articles, composed of flax, jute, cotton, or other vegetable fiber, or of which these substances or either of them, or a mixture of any of them is the component material of chief value, not specially provided for in this Act, fifty per centum ad valorem.
	286	On * * * braids, galloons, fringes, gimps, * * *, dress trimmings, laces, embroideries, head nets, nettings and veilings, * * * any of the foregoing which are elastic or nonelastic, made of wool, worsted, the hair of the camel, goat, alpaca, or other animals, or of which wool, worsted, the hair of the camel, goat, alpaca, or other animals is a component material, fifty per centum ad valorem.
	300	* * * braids, galloons, fringes, * * * any of the foregoing which are elastic or nonelastic, * * * and ornaments, made of silk, or of which silk is the component material of chief value, forty-five per centum ad valorem.
	301	Laces and articles made wholly or in part of lace, and embroideries, including articles or fabrics embroidered by hand or machinery, * * * neck rufflings and ruchings, nettings and veilings, * * * composed of silk, or of which silk is the component material of chief value, * * * not specially provided for in this Act fifty per centum ad valorem.
1897	179	* * * laces, embroideries, braids, galloons, trimmings, * * * made wholly or in chief value of tinsel wire, lame or lahn, bullions, or metal threads, sixty per centum ad valorem.
	339	Laces, lace window curtains, tidies, pillow shams, bed sets, insertings, flouncings, and other lace articles; * * * and other articles, made wholly or in part of lace, or in imitation of lace; nets or nettings, veils and veilings, etamines, vitrages, neck rufflings, ruchings, tuckings, flutings, and quillings; embroideries and all trimmings, including braids, edgings, insertings, flouncings, galloons, * * *, tucked flouncings or skirtings, and articles made wholly or in part of rufflings, tuckings, or ruchings; all of the foregoing, composed wholly or in chief value of flax, cotton, or other vegetable fiber, and not elsewhere specially provided for in this Act, whether composed in part of india rubber or otherwise, sixty per centum ad valorem: * * *
	371	* * * braids, galloons, edgings, insertings, flouncings, fringes, gimps, * * * laces and other trimmings and articles made wholly or in part of lace, * * * head nets, netting, * * * any of the foregoing made of wool or of which wool is a component material, whether composed in part of india rubber or otherwise, fifty cents per pound and sixty per centum ad valorem.
	390	Laces, and articles made wholly or in part of lace, edgings, insertings, galloons, chiffon or other flouncings, nets or nettings and veilings, neck rufflings, ruchings, braids, fringes, trimmings, embroideries * * * all of the above-named articles made of silk, or of which silk is the component material of chief value, not specially provided for in this Act, * * * sixty per centum ad valorem: * * *
	408	* * * nets or nettings, laces, embroideries, galloons. * * * ornaments, trimmings and other articles not specially provided for in this Act composed wholly or in part of beads or spangles made of glass or paste, gelatin, metal, or other material, but not composed in part of wool, sixty per centum ad valorem.
1909	179	* * * laces, embroideries, braids, galloons, trimmings, * * * ornaments, * * * made wholly or in chief value of tinsel wire, lame or lahn, bullions, or metal threads, fifteen cents per pound and sixty per centum ad valorem.
	349	Laces, lace window curtains, and all other lace articles; handkerchiefs, napkins, wearing apparel, and all other articles made wholly or in part of lace or laces, or in imitation of lace; nets, nettings, veils, veilings, neck rufflings, ruchings, tuckings, flutings, quillings, embroideries, trimmings, braids, featherstitch braids, edgings, insertings, flouncings, galloons, * * * ornaments * * * tucked flouncings or skirtings; all of the foregoing, composed wholly or in chief value of cotton, flax, or other vegetable fiber, or of cotton, flax, or other vegetable fiber and india rubber, or of cotton, flax, or other vegetable fiber, india rubber, and metal, and not elsewhere specially provided for in this section, sixty per centum ad valorem: *Provided*, That no article composed wholly or in chief value of one or more of the materials or goods specified in this paragraph, shall pay a less rate of duty than the highest rate imposed by this section upon any of the materials or goods of which the same is composed: * * *.
	350	Laces, embroideries, edgings, insertings, galloons, flouncings, nets, nettings, trimmings, and veils, composed of cotton, silk, artificial silk, or other material (except wool), made on the Lever or Gothrough machine, seventy per centum ad valorem: *Provided*, That no wearing apparel, handkerchiefs, or articles of any description, composed wholly or in chief value of any of the foregoing, shall pay a less rate of duty than that imposed upon the articles or the materials of which the same are composed.
	383	* * * braids, galloons, edgings, insertings, flouncings, fringes, gimps, * * * ornaments, laces, trimmings, and articles made wholly or in part of lace, * * * head nets, nettings, * * * ornaments, * * * any of the foregoing made of wool or of which wool is a component material, whether containing india rubber or not, * * * fifty cents per pound and sixty per centum ad valorem.

TABLE 71.—*Paragraphs concerning laces and lace articles, Tariff Acts of 1890 to 1930*—Continued

Year	Paragraph	Text
1909	402	Laces, edgings, insertings, galloons, flouncings, neck rufflings, ruchings, braids, fringes, trimmings, ornaments, nets or nettings, veils or veilings, and articles made wholly or in part of any of the foregoing * * * all of the foregoing composed of silk, or of silk and metal, or of which silk is the component material of chief value, whether in part of India rubber, or otherwise and braid composed in part of India rubber, not specially provided for in this section, * * * sixty per centum ad valorem: *Provided*, That articles composed wholly or in chief value of any of the materials or goods dutiable under this paragraph shall pay not less than the rate of duty imposed upon such materials or goods by this section: * * *.
	405	* * * braids, laces, embroideries, galloons, neck rufflings, ruchings, fringes, trimmings, * * * composed wholly or in chief value of yarns, threads, filaments, or fibers of artificial or imitation silk or of artificial or imitation horsehair, by whatever name known, and by whatever process made, forty-five cents per pound, and in addition thereto, sixty per centum ad valorem.
	421	* * * nets or nettings, laces, embroideries, galloons, * * * ornaments, trimmings, curtains, fringes, * * * composed wholly or in chief value of beads or spangles made of glass or paste, gelatin, metal, or other material, but not in part of wool, sixty per centum ad valorem: *Provided*, That no article composed wholly or in chief value of beads or spangles made of glass, paste, gelatin, metal, or other material shall pay duty at a less rate than is imposed in any paragraph of this section upon such articles without such beads or spangles.
1913	358	Laces, lace window curtains not specially provided for in this section, * * * and all lace articles of whatever yarns, threads, or filaments composed; handkerchiefs, napkins, wearing apparel, and all other articles or fabrics made wholly or in part of lace or of imitation lace of any kind; * * * edgings, insertings, galloons, nets, nettings, veils, veilings, neck rufflings, ruchings, tuckings, flouncings, flutings, quillings, ornaments; braids, loom woven and ornamented in the process of weaving, or made by hand, or on any braid machine, knitting machine, or lace machine, and not specially provided for; trimmings not specially provided for; and articles made in whole or in part of any of the foregoing fabrics or articles; all of the foregoing of whatever yarns, threads, or filaments composed, 60 per centum ad valorem.
1922	1430	Laces, lace window curtains, * * * nets and nettings, embroidered or otherwise, veils, veilings, flouncings, all-overs, neck rufflings, flutings, quillings, ruchings, tuckings, insertings, galloons, edgings, trimmings, fringes, gimps, ornaments; braids, loom woven and ornamented in the process of weaving, or made by hand, or on any braid machine, knitting machine, or lace machine; and all fabrics and articles composed in any part, however small, of any of the foregoing fabrics or articles; all the foregoing, finished or unfinished (except materials and articles provided for in paragraphs 920, 1006, 1404, 1406, and 1424 of this Act), by whatever name known, and to whatever use applied, and whether or not named, described, or provided for elsewhere in this Act, when composed wholly or in chief value of yarns, threads, filaments, tinsel wire, lame, bullions, metal threads, beads, bugles, spangles, or products of cellulose provided for in paragraph 1213 of this Act, ninety per centum ad valorem; * * *.
1930	1529(a)	Laces, lace fabrics, and lace articles, made by hand or on a lace, net, knitting, or braiding machine, and all fabrics or articles made on a lace or net machine, all the foregoing, plain or figured; lace window curtains, veils, veilings, flouncings, all-overs, neck rufflings, flutings, quillings, ruchings, tuckings, insertings, galloons, edgings, trimmings, fringes, gimps, and ornaments; braids, loom woven and ornamented in the process of weaving, or made by hand, or on a lace, knitting, or braiding machine; * * * all the foregoing, and fabrics and articles wholly or in part thereof, finished or unfinished (except materials and articles provided for in paragraph 915, 920, 1006, 1111, 1504, 1505, 1513, 1518, 1523, or 1530 (e), or in Title II (free list), or in subparagraph (b) of this paragraph), by whatever name known, and to whatever use applied, and whether or not named, described, or provided for elsewhere in this act, when composed wholly or in chief value of filaments, yarns, threads, tinsel wire, lame, bullions, metal threads, beads, bugles, spangles, or rayon or other synthetic textile, ninety per centum ad valorem. * * *.

The average annual rates of duty paid under the paragraphs of the Tariff Acts of 1890, 1894, 1897, 1909, 1913, and 1922, which were equivalent of paragraph 1529 (a) of the Tariff Act of 1930, were—1890, 60.53 percent; 1894, 50 percent; 1897, 60.04 percent; 1909, 61.95 percent;[21] 1913, 55.47 percent;[22] and for the act of 1922, 74.39 percent.[23]

[21] The percentage was increased over the assessable duty of 60 percent by the duty of 70 percent which was levied upon the proportion of the total imports made on the Levers or go-through lace machines.

[22] The percentage is decreased below the assessable duty of 60 percent by free receipts from the Philippines.

[23] The percentage is the result of the dual rates of 90 percent levied upon lace and of 75 percent on embroideries, and of free receipts from the Philippines.

PART III.—COMPARATIVE WAGES, COSTS, DISTRIBUTION METHODS, AND COMPETITIVE CONDITIONS

I. WAGES

1. Difficulties of determining and comparing wages in the domestic and foreign lace industries

The determination of wages of workers in the domestic and foreign lace industry presents difficulties second only to those confronted in determining wages in the glass-blowing industry, difficulties which render such determination more or less inaccurate and comparisons of domestic with foreign wages unprofitable.

The number of types of employees in a lace mill is unusually large. This variety of types receiving different rates of compensation, which vary again from mill to mill, would not offer too serious difficulties were it not for the following facts:

First, these types are paid, varying from mill to mill, by timework or by piecework or partly by timework and partly by piecework; secondly, piecework rates fluctuate with the conditions of the volatile trade governed by fashion; and in a given locality which may be favorable or otherwise to a textile trade; thirdly, piecework rates vary according to the conjunction of seven highly variable factors inherent in any piece of lace, and wages, of course, vary according to the skill of the worker; and fourthly, domestic and foreign factory organization differ widely, many of the processes in the foreign industries being carried on by special agencies outside the mill.

Add to these difficulties those of converting foreign wages into a suitable standard during periods when currencies fluctuate violently, and of determining "real wages" in periods of highly fluctuating currencies, prices, and wages, and some conception of the problem may be had.

2. System of payment of twisthands in domestic mills

The center of the wage system in the lace industry is the twisthand. The determination of his remuneration causes the greatest trouble, not only to the employers and to the labor unions but to the student of comparative wages. The twisthand is paid largely by "rack rate" and partly by timework.

The principle of the rack rate is based directly upon British practice; indeed, the schedule upon which payment is made to twisthands in domestic mills is known as the "1894 Nottingham card." The principal feature of the rack rate, payment by the piece of goods produced and according to the labor and skill required in producing that piece, has never changed. The rack rate varies with the style, material, gauge of the machine, width of the machine, the quality of the lace, the number of bars used in a pattern, certain differentials in manipulation of the threads, and extra work demanded by attention to the pattern cards. Thus the twisthand is paid according to his experience and skill and according to the difficulties inherent in the production of a certain type of lace. Variations from these fixed rates are made by additions to and deductions from the basic rate, and extensions of various sorts are made to embrace new styles of lace and improvements in the machines.

As has been stated, the schedule upon which payment is made to twisthands in domestic mills is the Nottingham card of 1894. Up-

ward revisions were made in 1917, the rack rates for some classes of lace being increased from 5 to 15 percent; further, in order to meet the complaints of twisthands regarding the making of particularly difficult laces, certain minimum rates were set. In boom times after the war, the 1917 rates were augmented by a general increase of 33⅓ percent, but in 1920 the bonus was decreased to 15 percent in most factories, although some firms retained greater bonuses—some 20 percent—while one firm paid 1917 rack rates plus 10 cents per hour, plus 10 percent on the total. In 1932 the card rates were decreased by 10 percent; the rack rates set by the N.R.A. in July 1933 were the 1917 card rates plus 25 percent.[24]

Although the Nottingham card of 1894 is the theoretical basis for payments of twisthands, actual practice has varied from mill to mill. Minimum flat prices, varying according to style of lace and width of the machine, have obtained. Some firms have paid a flat rate of 35 cents per rack for goods of all styles made on 225-inch machines; one firm paid the same rack rate to every machine in the shop, regardless of the variable factors entering into the composition of a piece of lace. Another firm, of which the output comprised all classes of goods, considered the average rack rate to be 40 cents, with 46¾ cents for metal-thread laces. According to an investigation covering 12 domestic Levers lace mills made by the Tariff Commission in 1924, the average hourly machine rate ranged from $0.5030 to $1.1625, with a weighted average for the 12 mills of $0.8125.

Every lace machine is of necessity inoperative during a portion of each day, the twisthands carrying out many essential tasks for which under the rack rate they would receive no renumeration. These tasks include taking out empty sets of bobbins, running in a full set, replacing empty beams, and changing patterns. Some of this work is performed without recompense, and a portion is paid for by rates called timework, rates which vary from mill to mill. Before the war no payment was made for timework of less than 5 hours, but since the war practically every operation requiring more than an hour is considered subject to payment. Necessarily, wages paid to twisthands for timework constitute a very important factor in the cost of production. In 16 domestic mills investigated by the Tariff Commission in 1924 the ratio of timework (including auxiliary assistance at the machine and supervision) to piecework ranged from 10.20 percent to 52.40 percent, with a weighted average of 20.24 percent. Another process which stops operation of the machine and thus requires timework payment is known as "cutting-out." In order to equip the machine for the manufacturing of a new style of lace (and in the lace trade this must be done frequently) it is necessary to alter the set-out of the interior of the machine, to strip it of all material, and reclothe it, this operation taking the time of 2 twisthands from 1 to 2 weeks or longer. Timework rates must be paid during these periods.

Payment for timework in domestic mills varies. The prices paid in 1924 covered by the investigation made by the Tariff Commission ranged from 35 to 70 cents per hour. Some mills paid a lower rate

[24] The 1894 Nottingham card is archaic and takes inadequate account of larger machines and of new styles of lace developed since that date. Of course the card has been pieced and amended but it has added greatly to the difficulties of determining the final rack prices. A more modern card was drawn up by the American Lace Manufacturers Association in 1914, but it was not accepted by the labor unions, and is used in no domestic mill.

for short alterations than for protracted timework necessary for a cut-out, the payment for short alterations ranging from 45 to 57½ cents per hour, and for cut-outs, from 55 to 70 cents per hour.

3. Payment under the Calais schedule

The rack price card which forms the basis of payment to "tullistes" in the Calais lace industry was formulated in 1890, and although it has long been recognized as antique and outgrown, the difficulties involved in drawing up new schedules satisfactory alike to employees and employers have caused the failure of all attempts to replace it. Thus while the basic card has been retained, majorations have been added from time to time to meet changing conditions, such as rises in the costs of living, and currency depreciation, as well as the introduction of new styles. The Calais card of 1890 was, in fact, composed of 21 payment cards. The cards were increased in number and considerably revised in 1906. It will be recognized that the complexity of these cards and their basic differences, as compared with the English and American card, add considerably to the difficulties of comparing wages.

The rise in prices, caused by the war and currency depreciation, led in 1919 to 50-percent increases in the basic rack rates when paid as 1 franc and under per rack and to a 30-percent increase plus 0.15 franc per rack when the rack rate was higher than 1 franc. Other changes were made in payments for timework, and some additions were made to the rates of payment for specific laces.

The continued depreciation of the franc led to a strike of lace and net workers in Calais in February 1920, which was terminated by an agreement known as the "convention du 26 fevrier." The essential provision of the agreement was the creation of a permanent committee, known as the "commission paritaire", composed of representatives of each of the two parties to the agreement and the local inspector of labor. The work of this commission has consisted chiefly in establishing from time to time cost of living index numbers and applying corresponding increases to the wage scale of 1890 and its annex of the convention of August 1919. Therefore, there is added to the 1890 scale the increase provided by the convention of August 1919 (or the new scale therein provided is applied with any given increases) and the result is increased by the augmentations accorded by the commission paritaire as living cost indemnity: (a) 0.25 francs per rack if the rack price is less than 1 franc after the first increases from the 1890 scale and (b) 0.20 francs if after such increases the rack price is more than 1 franc. The resulting wage scale works out to an average of a little more than double the wage paid before the war.

Timework rates were advanced by the convention of August 1919 from 4 francs [25] per day of 10 hours to 10 francs [26] per day, plus the racks earned. In 1933 timework was paid at the rate of 150 francs per week of 48 hours, the par value of the franc being $0.0503.

4. Payment of twisthands in British lace mills

There appears to be no uniformity in the payment of twisthands in Nottingham proper and outside Nottingham in the surrounding districts. Nottingham twisthands have maintained separate schedules since an early date; twisthands outside Nottingham, in districts manufacturing the bulk of British production of Levers laces, prior

[25] Par value of franc, $0.193.
[26] Par value of franc, 1919, $0.1284.

to the year 1920, were paid according to individual arrangements with their employers, the payment being standardized by the establishment of uniform minimum rates in 1920.

Nottingham rack rates are based upon cards promulgated in 1905 which reduced their number from 21 to 15; a standard width of the machine was advanced from 16 quarters (144 inches) to above 18 quarters (162 inches) and below 20 quarters (180 inches) and the standard rack of 1,920 motions was established for all classes of Levers laces. The process of adding points to the width of the machine was abolished, and provision was made for payment by definite amounts for gages and widths higher or lower than the indicated standard. Minimum prices were established for the making of all classes of lace except number 11, silk veiling, and fancy dress nets made with warps or warp and spotting beam; this omission was rectified in 1913. One learner was allowed for every 7 or fewer men, such learner to serve for 4 years and to be paid half the rack price for the first 2 years, five-eighths for the third year, and three-fourths for the fourth year on half the racks made upon the machine with which the learner was placed, the difference to be equally divided between employer and teacher.

During the war standard prices were increased by a bonus of 75 percent; this was later reduced to 50 percent.

Inasmuch as the bulk of Levers laces made in England and imported by the United States comes from districts outside of Nottingham the wages paid in the latter are of greatest interest. Until the year 1920 there were no uniform rates of payment in districts outside of Nottingham. The formation in 1920 of the Midland Counties Lace Manufacturers Association, which embraces many of the machine holders in the outlying districts, led to the promulgation of a card which was agreed upon chiefly by the Long Eaton and District Association of Operative Lace-Makers and the Derby Lace Workers Section of the Workers Union, under which uniform rates were paid for certain classes of cotton laces of styles constituting the bulk of the output of the machinery in these localities. In 1932 the Manufacturers Association in conjunction with the Textile Section of the Transport and General Workers Union issued another wage schedule for the Long Eaton and Derby districts. These styles are included in four folios:

Folio 1. Bobbin-finings, including veilings made on fining set-outs, band Vals and loops, and thick-threaded goods.
Folio 2. Center gimps and Malines.
Folio 3. Coarse torchons and Clunys, including independent beam goods made with yarns coarser than 40/2 or equivalent.
Folio 4. All independent beam goods other than folio 3.

The up-to-date type of the machinery is shown by specific mention of 270-inch machines, and a wide range in quality by the mention of 15-point machines. A notable difference from the details of the Nottingham card is shown by the consideration of quality in connection with yarn count, and folio 3 contains the only reference in any card to mercerized yarns. The rate of payment for timework and the regulations concerning apprentices are different from those which obtain in Nottingham, 1 learner being permitted to every 5 full-priced men and the period of probation extending for 3 years only.

Although uniform minimum rates were set in 1920, in actual practice the rates vary from mill to mill, according to agreements between the manufacturer and his few intimate workers. It is common also, and permitted by the wage agreements, to set an average flat rate for a set of machines, provided the wage rate is not lower than the average minimum rate established in the cards.

Timework rates in the outlying districts, revised to 1932, are as follows:[27] For work taking 3 consecutive hours or more, 1s ($0.2433) per hour; for cutting out and starting new machines, the payment is 1s 3d per hour ($0.3042); and for payment of tying in warps of less than 800 yards in length is 1s 6d ($0.3650) per thousand threads.

5. Comparative rack rates

For rough comparison of rack rates paid twisthands in the United States, Nottingham, and Calais, it is necessary to consider styles which are standard in the United States, Calais, and the outlying districts of Nottingham, namely, Valenciennes, bobbin-fining, and Cluny. The following tables compare the rack rates paid for these 3 styles in the 3 centers of production named above. In considering these tables, however, certain reservations must be made; first, the figures are rates for an arbitrary specification and do not take into account the wide variations above the basic rates in all three countries; second, the Calais rack rate represents the 1890 card, plus estimated increases of 300 percent; and third, the final British and French wage figures are for the year 1932, and British figures bear little relation either to the 1931 or 1933 conversion rates, when the United States currency was respectively on and off the gold standard and French figures bear little relationship to the conversion rates of 1933. At the close of 1932 a flat reduction of 10 percent from the domestic card was in force; the English rate was promulgated in June 1932, and a consular report from Calais, dated December 1, 1932, stated that the prevailing French rates represented an increase of about 300 percent on the basic 1890 rates. It is evident that on these bases the comparisons for the end of 1932 were equitable.

TABLE 72.—*Comparison of rack rates paid in the United States, England, and France on narrow Valenciennes laces made with independent beams*

[12-point machine, 184 inches wide; 32 carriages, 140/2 beams, 160/2 bobbins, 60 bars, 15 quality]

Domestic schedule—Number 14, gimped Valenciennes without thick threads,[1] plus 15 percent		Schedule for the district outside the city of Nottingham—Folio 4, all independent goods other than folio 3		Calais schedule—Number 19, Valenciennes [1]	
			Pence		*Francs*
Standard	$0.22	Price for bars	7	Standard	0.95
Bars	.01½	Gage	1	Width of machine	.15
Gage	.02	Width	¼		1.10
Quality	.02		8¼	Majoration (300%)	3.30
	.27½				4.40
184-inch machine	.07½				
	.35				
Plus 15 percent	.0525				
	.4025				
Minus 10 percent	.0402				
	.3623				
Price for 1,920 motions per rack	.18115	Conversion to United States currency, £=$3.5061.[2] Price for 1,920 motions per rack	$0.1205	Conversion to United States currency, stabilized franc=$0.039179. Price for 1,920 motions per rack	$0.08619

[1] Standard of 3,840 motions for the double rack.
[2] Average rate of exchange for the year 1932.

[27] In view of the fluctuations of the pound in 1932 and of the dollar in 1933, these rates were converted at the old par of $4.8665.

TABLE 73.—*Comparison of rack rates paid in the United States, England, and France on thick-threaded cotton bobbin-fining laces.*

[10-point machine, 184 inches wide; 6-inch breadth (120 carriages); 18 quality. Total bars 148: 120 right-twist warp, 4 reverse twist warp, 16 thick threads and 8 back edges]

Domestic schedule—Number 10, thick-threaded cotton bobbin-fining or Honiton laces made with top or top and bottom bars		Schedule for the district outside the city of Nottingham—Folio 1, bobbin-finings, including veilings made on fining set outs, band Vals, and loops, and thick-threaded goods		Calais schedule—Article number 20 bis Embroidered Platts [1]	
			Pence		*Francs*
Standard	$0.13	Price for bars	7¼	Standard	0.90
Bars	.015	Extra net bars	¼	Width of machine	.15
Quality	.01	Thick threads (24)	¾	Brodeurs	.15
	.155	Width of machine	¼		1.20
184-inch machine	.043		8½	Majoration (300%)	3.60
	.198				4.80
Minus 10 percent	.0198				
	.1782	Conversion to United States currency £=$3.5061. [2]		Conversion to United States currency, stabilized franc=$0.039179.	
Price for 1,920 motions per rack	.1782	Price for 1,920 motions per rack	$0.1242	Price for 1,920 motions per rack	$0.09403

[1] Standard of 3,840 motions for the double rack.
[2] Average rate of exchange for the year 1932.

TABLE 74.—*Comparisons of rack rates paid in the United States, England, and France on cotton Cluny laces*

[9-point machine, 184 inches wide, 5-inch breadth (88 carriages); 140 bars; 30 quality; beam yarn 20/2]

Domestic schedule—Number 16, cotton Guipures, Maltese, Clunys, and Baggaleys, made with top bars without a warp		Schedule for the district outside the city of Nottingham—Folio 3, coarse Torchons and Clunys including independent beam goods made with yarns coarser than 40/2 or equivalent		Calais schedule—Article number 18[1], Guipure, Cluny, and similar independent bars	
			Pence		*Francs*
Standard	$0.10	Price for bars	7¼	Standard	0.90
Bars	.08	Extra bars	1	Extra bars	.60
Quality	.025	Gage	¼	Width of machine	.15
	.205	Width	¼		1.65
Less gage	.005	Yarn 20/2	⅜	Majoration (300%)	4.95
	.200		9⅛		6.60
184-inch machine	.0583				
	.2583				
Minus 10 percent	.0258				
		Conversion to United States currency £=$3.5061 [2]		Conversion to United States currency, stabilized franc=$0.039179	
Price for 1,920 motions per rack	.2325	Price for 1,920 motions per rack	$0.1666	Price for 1,920 motions per rack	$0.1293

[1] Standard 3,840 motions for the double rack.
[2] Average rate of exchange for the year 1932.

6. Payment for the minor processes

Payment for processes other than operating the machine is not standardized in the domestic industry. It varies in different localities in accordance with the available supply of suitable labor. In the Pawtucket district, proximity to the textile mills is a factor of importance in determining auxiliary wage rates. In the payment of auxiliary workers, there is no uniformity either in the individual mill or in the industry; for example, payment for the process of mending may be made by the rack, by the yard, by the number of holes, or by weekly wage. Most of the minor processes, such as slip-winding, brass-bobbin winding, threading, and mending, after a period of preliminary tuition at reduced hourly rates, are paid by piecework rates. Further, a certain portion of the finishing processes—drawing, clipping, and scaloping—is sometimes given out to homeworkers, and these processes, plus jennying and finishing, are subject to piecework rates. Weekly wages vary widely as the hours worked in lace mills depend upon State laws and prevailing conditions in the industry.

The N.R.A. code for the lace industry, approved in July 1933, provides for a minimum wage of $13 for a 40-hour week, "except that learners during the 6 weeks' apprenticeship shall be paid not less than 80 percent of the minimum wage and shall not exceed in number one learner to six craftsmen." The rate per hour is 32½ cents. These rates extend to homeworkers, thus equalizing their rates of wages with those of the factory workers.

Important functions such as designing, drafting, bleaching, and dressing are paid on the basis of monthly salaries, these higher-paid experts being chiefly English or French.

(*a*) *In Calais.*—In contrast to the practice of piecework payment in Nottingham and the United States, factory auxiliary workers in Calais are paid a weekly wage, timeworkers having a 48-hour week. A large proportion of the finishing processes, however, are carried out as homework in the country districts surrounding Calais; thousands of women and girls are employed in the vicinity of Calais and even as far as the Belgian border in clipping and scaloping. The work is distributed by entrepreneurs who also collect it for return to the manufacturers. Clipping is paid per thousand clips of two cuts each, the clipping contractors retaining about 25 percent as their commission for distributing and collecting the work. Calais wage rates for some of the minor processes will be found in tables 75 and 76 on pages 160 and 161.

(*b*) *In the British lace industry.*—British factory organization affords further difficulties to wage comparisons inasmuch as preliminary processes are carried on in the factories in the outlying districts of Nottingham, whereas finishing processes are carried on by special establishments in the city of Nottingham. The preparatory yarn processes are paid as piecework; although there have been uniform minimum piecework price lists since 1899, the rate varies somewhat from mill to mill. In 1920 a new minimum piecework price list was issued for yarn processes; this list was corrected in September 1922. Under a statute called "The Trade Board Acts", employees in the finishing processes in Nottingham are paid by the hour, uniform minimum rates having obtained since 1911. Various adjustments have been made, of course, since 1911. The general minimum time rate for the finishing processes, such as drawing, roving, ripping, ripping and roving, clipping, scaloping, cutting, and straight snicking or slotting, was set in 1922 at 6¼d per hour ($0.1267 at par). The 1922 rates are still in force. The absence of standard rates for these finishing processes in domestic mills makes comparison on the piecework basis impossible. For table 75, showing Calais and Nottingham wage rates for certain minor processes in pre-war years and in the post-war years 1923 and 1925, we are indebted to the final report of the lace and

embroidery committee appointed by the British Board of Trade under the Safeguarding of Industries Act. The report was published in April 1925.[28]

Table 76 shows approximate wages for minor processes paid in Calais in 1931.[29]

TABLE 75.—*Weekly wages in the Levers lace industry in Calais and Nottingham, pre-war, August 1923, and March 1925, with equivalent United States currency*

Personnel	Pre-war						August 1923		
	Calais			Nottingham			Calais		
	Hours	Rate	United States currency [1]	Hours	Rate	United States currency [1]	Hours	Rate	United States currency [1]
		Francs			£. s. d.			*Francs*	
Twisthand (tulliste) per rack	60	0.57½	$0.1110	55	5½	$0.1115	60	1.45	$0.0819
				55	6	.1217			
Say 150 racks per week	60	86.25	16.65	55	3 8 9	16.73	60	217.50	12.29
				55	3 15 0	18.25			
Brass-winder (wheeleuse)	60	35.00	6.76	55	1 3 0	5.60	48	83.75	4.73
	60	40.00	7.72	55	1 15 0	8.52			
Slip-winder (devideuse)	60	20.00	3.86	55	14 0	3.41	48	56.00	3.16
	60	25.00	4.83	55	1 0 0	4.87			
Warper (wapeur)	60	40.00	7.72	55	1 18 3	9.31	48	110.00	6.22
	60	45.00	8.69	55	2 5 0	10.95	48	124.00	7.01
Presser (presseur)	60	25.00	4.83	55	1 5 0	6.08	48	70.00	3.96
	60	30.00	5.79				48	100.00	5.65
Jacker-off (survideur)	60	[5] .50	.0965	55	[5] 6	.1217	48	[5] 1.29	.0729
Threader (rémonteur)	60	15.00	2.90	55	[5] 6	.1217	48	[6] 7.50	.4238
	60	18.00	3.47	55	[6] 2 1	.5069	48	[6] 8.00	.4520
Foreman (contremaître)	60	50.00	9.65	2	10 0	12.17		240.00	13.56
	60	80.00	15.44	4	6 0	20.93			
Overlooker (sousmaîtresse)	60	25.00	4.83	48	1 2 6	5.47	48	67.00	3.79
	60	30.00	5.79						
Pattern setter (échantillo-neuse)	60	20.00	3.86	48	16 6	4.01	48	51.20	2.89
	60	25.00	4.83						
Jennier (plieuse)	60	20.00	3.86	48	17 6	4.26	48	49.25	2.78
	60	25.00	4.83						
Finisher (paqueteuse)	60	15.00	2.90	48	17 6	4.26	48	30.00	1.70
	60	18.00	3.47						

Personnel	August 1923				March 1925					
	Nottingham				Calais [3]			Nottingham		
	Hours	Rate		United States currency [2]	Hours	Rate	United States currency [4]	Hours	Rate	United States currency [4]
		£.	s.	d.		*Francs*			£. s. d.	
Twisthand (tulliste) per rack	55			9¾	$0.1853	60	1.70	$0.0881	55	9¾	$0.1940
Say 150 racks per week	55	6	1	10½	27.79	60	255.00	13.21	55	6 1 10½	29.11
Brass-winder (wheeleuse)	48	3	3	0	14.37	48	97.50	5.05	48	3 3 0	15.05
Slip-winder (devideuse)	48	1	6	0	5.93	48	60.30	3.12	48	1 7 6	6.57
	48	1	7	6	6.27						
Warper (wapeur)	48	3	6	8	15.20	48	133.50	6.92	48	3 6 8	15.92
Presser (presseur)	48	2	5	0	10.26	48	100.00	5.18	48	2 5 0	10.75
	48	2	8	0	10.94				48	2 8 0	11.46
Jacker-off (survideur)	48			[5] 7½	.1425	48	43.00	2.23	48	1 12 6	7.76
	48			[5] 9¼	.1758						
Threader (rémonteur)	48	[6] 3		6	.7981	48	58.00	3.00	48	1 16 0	8.60
	48	[6] 3		8	.8361						
Foreman (contremaître)	5	0	0		22.80	48	250.00	12.95	48	3 4 0	15.28
Overlooker (sousmaî-tresse)	48	2	2	0	9.58	48	80.00	4.14	48	2 2 0	10.03
Pattern setter (échantil-loneuse)	48	1	8	0	6.38	48	56.00	2.90	48	1 8 0	6.69
Jennier (plieuse)	48	1	5	0	5.70	48	56.00	2.90	48	1 5 0	5.97
Finisher (paqueteuse)	48	1	5	0	5.70	48	35.00	1.81	48	1 5 0	5.97

[1] Value of franc=$0.193. Value of pound sterling, $4.8665.
[2] Value of franc=$0.0565. Value of pound sterling, $4.560338.
[3] The Calais rates in 1925 were increased by 6 per cent on Mar. 23, 1925.
[4] Value of franc=$0.051807. Value of pound sterling, $4.776250.
[5] Per 1,000.
[6] Per set.

[28] Information concerning wage rates paid in Calais before the war of 1870 and in 1904 are to be found on p. 90 of Tulles et Dentelles Mécaniques de Calais, by M. R. Bouffartigue.
[29] This information was obtained from consular report from Calais dated Dec. 31. 1931.

TABLE 76.—*Wages per 48-hour week in the Levers lace industry, Calais, France, Dec. 31, 1931*

Male workers (including apprentices)	French francs	United States currency [1]	Female workers	French francs	United States currency [1]
Large beam warper:			Brass-bobbin winder:		
First category	250–260	$9.80–$10.19	First category	150–160	$5.88–$6.27
Second category	200–220	7.84– 8.62	Second category	120–130	4.70– 5.10
Small beam warper:			Average category	100–120	3.92– 4.70
First category	150–160	5.88– 6.27	Slip winder:		
Second category	120	4.70	Handling all articles	100–120	3.92– 4.70
Unclassified	100	3.92	Average	80–100	3.14– 3.92
Presser:			Jacker-off	30– 80	1.18– 3.14
Foreman	200	7.84	Pattern girl:		
First category	235	9.21	First category	80–100	3.14– 3.92
Second category	220	8.62	Second category	60– 80	2.35– 3.14
Unclassified	100	3.92	Mender:		
Mounter:			First category	90–100	3.53– 3.92
Night	175	6.86	Second category	60– 90	2.35– 3.53
Day	120	4.70	Folder:		
Unclassified	90	3.53	First category	80–100	3.14– 3.92
Threader	175	6.86	Second category	50– 80	1.96– 3.14
			Packet maker	60– 90	2.35– 3.53
			Beginners, all classes	20– 50	.78– 1.96

[1] Converted at $0.0392, value of the franc. These converted figures, of course, bear little relation to the figures which would result from conversion in 1933.

7. Payment of designers and draftsmen

Draftsmen in domestic mills are chiefly of English or French nationality; native labor and even the sons of foreign twisthands do not take kindly to the trade with its long period of tuition at low wages. There is, therefore, no reserve of such labor in the United States and if a sudden demand for a particular style necessitated an increase in the number of patterns the domestic industry might find itself embarrassed. This difficulty has resulted in the employment of female labor for "reading-off" and designing. The rate of payment for draftsmen depends upon ability to draft different styles of lace. Draftsmen who leave the trade, for any reason, rarely return; salaries range from $30 to $90 per week.

The trouble and expense of teaching youths the intricacies of Levers drafting resulted in the last quarter of the nineteenth century in the refusal of most English firms to employ any one who was not bound by indentures of 7 years' duration. The weekly payment for these years was 4s ($0.97), 5s ($1.22), 6s ($1.46), 8s ($1.95), 10s ($2.043), 12s ($2.92), and 15s ($3.65). An apprentice who was indentured to a burgess or freeman of the city of Nottingham, was entitled to a burgess part, or the freedom of the city, but this remnant of the medieval guilds has been abolished. An apprentice having completed his indentures was considered as an improver and £2 ($9.73) per week was the usual price at which an improver would commence. Journeymen draftsmen were paid from £4 ($19.47) to £8 ($38.93) per week. The working hours were long, in some mills from 8 a.m. to 7 p.m., with allowances of 1 hour for luncheon and half an hour for tea; later, time was curtailed to 50 hours per week—8 a.m. to 6 p.m. daily, 1 hour being allowed at midday, and 8 a.m. to 1 p.m. on Saturday. Considerable overtime was made, without payment, and the entire vacation consisted of the customary holidays at Easter, Whitsuntide, the first Monday in August, Goose Fair, and Christmas, at the most 11 days.

The arrangements between the British Association of Lace and Embroidery Designers and Draftsmen and the Midland Counties

Lace Manufacturers Association, and a modification thereof, show a much improved situation over that described as having obtained in the nineteenth century, and includes a 44-hour week, payment for overtime, and higher wages. These lists are not given in the appendix, as they are not enforced.

It is claimed by the French draftsmen that their remuneration has not increased in the same ratio as that of the other departments of the industry.

The amounts paid to Levers draftsmen and twisthands in 1 year in the mills of the domestic industry investigated in 1924 were $148,546 and $782,545, respectively, the amount paid to draftsmen being about 19 percent of that paid to twisthands. For each $1 paid to a twisthand, 19 cents was paid to a draftsman, and conversely, for every dollar paid to the draftsmen, $5.27 was paid to the twisthand. The ratio of the drafting to the making labor affords an index of the importance of the style element.

II. COST DATA

The difficulties of ascertaining and comparing wages in the domestic and foreign lace industries apply in the same degree to the ascertainment and comparison of costs of production; inasmuch, however, as labor constitutes only one of many cost factors, obviously cost of production calculations involve a far wider range of acute difficulties than do wage calculations. The greatest difficulties arise in selecting domestic and foreign samples for cost comparisons, inasmuch as any given style of lace may be and is made with numberless variations, each variation bearing directly upon cost.

1. Variable factors inherent in Levers laces

Any given piece of lace represents a conjunction of seven highly variable factors: (1) Style, (2) pattern and weight, (3) gage of the machine, (4) quality, (5) width, (6) yarns (material and count), and (7) finish. Change one of these factors and the cost of production may be altered.

(*a*) *Style.*—There appears on page 182 a discussion of the four fundamental types of Levers laces, together with a glossary (pp. 102, 103) of the more common styles of Levers laces. The schedule of prices for making lace includes cards for 22 different styles. Although certain styles have become more or less standardized, there is no limit to the possible variations and mergers of styles which, when popularized, are given new names.

(*b*) *Pattern.*—Any style of lace may be made in an infinite number of patterns and, excepting cases of deliberate copying, patterns of one mill are never produced by another except the few trade patterns which have been universally made in domestic and foreign mills. Differences in pattern and mesh affect the weight of the article; these factors affect not only material costs but yarn processing and winding costs and wage rate for making costs; for example, brass-bobbin winding constitutes an important element in labor costs, and the number of racks of lace which can be made from a winding thus affects not only material costs but labor costs.

(*c*) *Gage.*—The gage of the machine, for Levers the number of bobbins to the half inch, is a measure of the fineness of the fabric. Obviously, then, the fineness of the gage affects both yarn costs and labor costs. Certain styles of lace are generally made on specific gages of machines, others vary widely.

(*d*) *Quality.*—Quality is another measure of the fineness of the fabric predicated upon the number of linear inches made by 1,920 motions of the machine. Differences in quality, of course, cause differences in the weight of the material per unit and affect labor and material costs directly.

(*e*) *Width.*—The widths of certain laces are standardized; the widths of others are not standardized. The effect of width upon costs is, of course, obvious and may be eliminated in cost studies by the reduction of all laces to the square-yard basis. Minor difficulties arise in the slight differences in the width of the laces caused by shrinkage after removal from the machine, but many laces of slightly different widths are sufficiently like or similar for competitive sales purposes.

(*f*) *Yarns.*—Laces may be of the same style, pattern, point, quality, and width, and yet their costs of production may vary considerably, according to the count and the grade of the yarns used in their manufacture. The construction of some styles of lace entails the use of five different groups of yarns. There is no uniformity of practice in the use of yarns either in domestic mills or foreign mills, each manufacturer using such counts as, in his opinion, give the best results. To make what appears to be identical lace, one mill may use 140/2 and 20/2, while another uses 70/1 and 30/3; it will be noticed that these groups of yarns are equivalents as far as yards per pound are concerned, the 70/1 being cheaper, but weaker, and more difficult to handle. Domestic mills generally use the high-priced, but stronger, 140/2, whereas foreign mills substitute the cheaper but weaker 70/1. Conditions that obtain as to yarns used in lace mills here and abroad therefore do not impair the validity of comparisons as they reflect actual conditions of manufacturing.

(*g*) *Finish.*[30]—Rather more uniformity of finish has been obtained as between domestic and foreign mills in the manufacture of certain standard laces than in any other of the seven variable factors. Narrow Vals usually have 2 lacers, plain bobbin-fining laces, 2 lacers and scalloping, etc.; Cluny laces have fewer or more lacers according to the pattern, which may have a crown front, or lacers in the body of the pattern.

Difficulties in making comparisons of domestic and foreign laces can be estimated from the description given of the variable factors inherent in a piece of lace and their effect upon cost; it is evident that comparisons cannot be made on identical articles in instances where style, design, multiplicity of materials, and handwork on the manufactured article enter into the cost of production.

2. Material costs

The question of ascertaining the amount of material used in a piece of Levers lace is an involved one. Five different counts of yarn may be used in the same pattern, brass-bobbin yarn, right-twist warp, reverse-twist warp, gimps, and thick threads, these being of different prices, and used in varying quantities. Each yarn is passed through two processes before being made into lace, the percentage of waste therefore is not negligible. The yarns used for brass bobbins and

[30] Special effects such as repoussé work, obtained by bearing on certain objects with a heated iron point, the cutting of buttonholes in beadings, or the hand coloring of laces need not be considered in connection with general principles of cost calculations.

warps are expensive; it is possible to estimate with accuracy the amount of each in a given piece, according to the formula already shown in chapter I. When the amount of yarn used for these purposes is deducted from the gross weight of the piece, the remainder consists of gimps and thick threads, but it is not possible to come to so correct a conclusion as to weight of these, as the number of threads per breadth and the amount used of each vary from pattern to pattern. Estimates of the respective amounts of these yarns in a piece are, therefore, approximate, but are of less importance, as the yarns used are comparatively low priced.

The same principles of calculation are applicable to the ascertainment of the amount of yarns used in laces made of all materials.

3. Labor costs, manufacturing, and other expenses

Wages have been adequately discussed in a preceding section, but one item, the cost of drawing lacers, has so vital an effect on the total cost of narrow laces that it is specially mentioned here, as it tends to show why domestic manufacturers with their higher labor charges cannot compete on very narrow laces. Costs of drawing lacers are the same if the lace be 6 inches wide or a quarter of an inch, which implies that as a percentage of total cost the labor charge for such operations increases with the decrease in width. As an example, it may be noted that the actual prices paid per dozen yards for drawing and finishing a half-inch width Valenciennes was 44.68 percent of the total cost of the finished lace, while the price paid for the same operations on a 5-inch lace of another style constituted 15.34 percent of the total finished cost.

Table 77 shows in detail overhead and other items of expense as taken from the books of a typical lace mill, and is here inserted to afford some idea of the relative importance of the various items.

TABLE 77.—*Analysis of manufacturing and other expenses in a typical domestic Levers lace mill*

Manufacturing expense:	
Fuel used	$9, 642. 06
Power purchased	2, 743. 40
Mill supplies:	
Jacquard cards	1, 862. 41
Other	7, 638. 38
Repairs and maintenance:	
Materials	3, 702. 40
Labor	1, 326. 00
General labor (power department, timekeepers, warehousemen, yardmen, watchmen)	9, 246. 69
Hauling and trucking, including garage and stable	520. 00
Liability and fire insurance	2, 877. 59
Miscellaneous operating expenses, such as office supplies, telegrams, and sundries	1, 630. 90
Other works expense (miscellaneous)	2, 343. 30
Administrative expense chargeable to manufacture:	
(*a*) Salaries of executives (number 2)	9, 600. 00
(*b*) Salaries of superintendents and of office force	26, 535. 18
(*c*) Salaries of designers, draftsmen, readers, punchers, and lacers	19, 729. 76
Designs and drafts purchased	112. 60
State and local taxes	5, 604. 56
Depreciation and obsolescence:	
(*a*) On buildings	5, 770. 94
(*b*) On machinery and equipment	11, 678. 86
Total manufacturing expense	122, 024. 94

TABLE 77.—*Analysis of manufacturing and other expenses in a typical domestic Levers lace mill*—Continued

Selling and delivery expenses:	
Shipping expense (cartage and freight out)	$3, 588. 00
Putting up material	76. 28
Salaries and wages of sales clerks and shipping department	767. 00
Commissions to selling agents (including New York charges)	53, 070. 58
Traveling expense (domestic)	1, 716. 57
Other selling expense	2, 876. 01
Total selling and delivery expenses	62, 094. 44

4. Sources and description of cost data

(*a*) *Domestic costs.*—During the investigation made by the Tariff Commission in 1924 covering costs of production in 1923 and 1924 information was obtained from the records of 18 representative manufacturers of Levers laces who operated 477 machines or 84.88 percent of the machines in the entire industry at that time. Eight of the mills were in Rhode Island, 3 in Pennsylvania, 2 in New Jersey, 2 in Connecticut, and one in each of the States of New York, Ohio, and Illinois. The costs of production of 154 samples of laces were obtained. The machines upon which these laces were made were of 7, 8, 9, 9½, 10, 10½, 12, and 14 points; 106 of the laces were of cotton and 48 were of silk, rayon, metal threads, or mixed fibers. The products of the industry at that time were predominantly of cotton and costs of 60 Valenciennes laces were obtained (this being the great competitive article of foreign manufacture), 16 bobbin-finings, and 30 Cluny laces. Since the Commission's investigation, however, the consumption of cotton laces has rather been superseded by Spanish laces of rayon, metal threads, and mixed fibers. In tables 78 and 79 are shown the analyses of domestic costs of production for 71 domestic laces, as follows: 8 Vals. (4 of 12-point and 4 of coarser than 12-point), 2 bobbin-fining nets, 9 bobbin-fining laces, 6 Cluny laces, 9 silk lace veils, 3 radium laces, 9 Chantilly laces, 14 Spanish laces, 11 metal thread laces.

If it be desirable to change the basis of cost of any lace from one dozen linear yards to the square yard, the alteration can be effected by the following formula:

$$\frac{\text{Point of machine} \times 2 \times 36}{\text{Number of carriages in the linear breadth of lace}} = \text{number of linear breadths of 1 yard in length in 1 square yard.}$$

As the piece of lace shrinks in width when taken from the machine and the loss may not be regained when it is dressed, the result given above is the square yardage of the lace on the machine.

Example: Lace made on 10-point machine, in breadths of 116 carriages, cost $2.3884 per dozen linear yards

$\frac{10 \times 2 \times 36}{116} = 6.2069$ linear breadths of 1 yard in length in a square yard. The cost of the square yard is obtained from the cost per dozen yards, thus: $\frac{\text{Cost } \$2.3884 \times 6.2069}{12} = \$1.2354$ cost per square yard.

(*b*) *Foreign costs.*—The Tariff Commission's cost of production investigation in 1924 included costs of 8 laces produced in France and 21 produced in Great Britain. France is the chief competing country in the production of Valenciennes and Great Britain in the production of bobbin-finings and Clunys.

Costs were obtained from Great Britain on goods produced by 11 concerns belonging to the Midland Counties Manufacturers Association and on goods produced by one concern not a member of the association. Costs for concerns belonging to the association were computed by the secretary of the association, who used the method and the form adopted by the association for computing costs of its members. Yarn costs were taken from the prices published weekly by J. S. Thackeray & Son, Ltd., a member of the Fine Spinners and Doublers Association, which maintains a uniform price scale for all its members. Wage costs were computed according to the union wage scales. For 7 of the 11 members of the association submitting samples used in comparing British and American costs in the appended cost tables, manufacturing expense was figured at the rate per rack found by the association to be the average for the industry. This made a high overhead charge, but it was in accordance with conditions in the British lace industry in 1924. Mills were running at less than half capacity, and there was no sign of improvement. The books of 4 of the 7 members for which the average overhead rate per rack was used were examined and their overhead was found to approximate the association figures. In the case of 4 of the 11 association members cooperating, manufacturing expense per rack was figured from detailed overhead data supplied by the individual company, and not at the association average rate. The costs used for products of these mills were, therefore, individual mill costs throughout.

The schedule issued to the members of the association contains 66 folios for computing costs of cotton laces, 30 for bobbin-fining laces, and 36 for independent beam laces of various gages and machine widths, made of yarns suited to the quality of lace produced on specific gage machines. Latitude is allowed for variations in yarn count, weight, and the use of mercerized cotton. Reports issued periodically give examples for finding the amount to be added for overhead expense. This cost computing schedule, although somewhat arbitrary, is based on experience and constitutes an advance over previous unsystematic procedure. It is designed to secure uniformity and to prevent lace being unknowingly offered for sale at less than its cost of production.

The 11 association firms from whom costs were obtained confine their work to "making", that is, to making lace in the brown. They sell to finishers (locally known as warehousemen) who send the lace out to be bleached (or dyed) and dressed on commission and then to be finished in their "warehouses." Data for finishing were obtained from a finisher who bought from all of the 11 lace makers mentioned and whose costs were, therefore, considered representative for purposes of this investigation.

The total mill costs for the English laces furnished by the association mills include the profits of the bleacher and the dresser, since bleaching and dressing were done on commission, but do not include the profits of either the lace maker or the finisher.

The costs obtained from one English firm not belonging to the association were obtained directly on the same basis as the American costs and do not include any profit whatever.

Costs were obtained for 8 French laces produced by 3 representative manufacturers, 2 in Calais and 1 in Caudry. In all French costs labor was given per rack, whether paid by the piece or the time rate. In getting time wages to this basis the total time wages for a selected period were divided by the production in racks in that period. Manufacturing expense was in a similar manner allocated to specific laces on the rack basis. Material was taken at cost price. The French mills did their own finishing.

There appear in table 80 analyses of 8 French laces, 4 Valenciennes, and 4 silk laces; and of 21 English laces, 8 bobbin-finings, 2 bobbin-fining nets, 7 Clunys, and 4 Spanish laces of mixed fibers. In construction, these foreign laces vary slightly in details from the domestic samples analyzed. Further, the foreign costs are calculated upon a basis which differs in some respects from that adopted for the domestic samples, the differences being induced by differences in factory organization and manufacturing customs. For example, the British practice of dividing production among 4 establishments—those of the maker, the bleacher, the dresser, and the finisher—not only renders the ascertainment of the costs of dyes and chemicals impossible, inasmuch as these are included with the total charges of bleaching and dressing, but such charges also include the profits of the bleacher and dresser.

5. Relation of material, labor, and manufacturing costs to total costs in the manufacture of certain domestic and foreign laces

The 71 domestic laces are analyzed in tables 78 and 79 which show for these samples the percentage of total cost represented by material, labor, and manufacturing expense. Corresponding percentages are given in tables 80 and 81 for the 29 foreign samples. The same unit is used in making comparisons between the domestic and foreign.

A careful scrutiny of the percentages appearing in the tables 78 and 80 sheds light upon the ability of the domestic industry to compete in the production of certain laces and on its inability to compete in the production of others. For example, of the French cost of production of 12-point Valenciennes, 67.03 percent, or roughly two-thirds of the total cost, represented material cost and only one-third labor and manufacturing cost, whereas domestic material costs of the same laces averaged only one-third of the total cost, and laboring and manufacturing expense represented two-thirds. In view of the relatively low wages in France, these figures go far in explaining the difficulties of the domestic industry in competing in the production of these laces even with a 90 percent tariff. In the French production of silk laces, including Chantilly, the ratio of labor cost to total cost is high in comparison with the same ratio for domestic production; this does not imply that French labor is paid at higher rates on a gold basis. These laces are elaborate, entailing considerable hand clipping, which is the reason for the larger percentage of labor and such articles are not produced in domestic mills. Silk laces consumed in the United States, therefore, are largely imported from France.

In the British production of bobbin-fining and Cluny laces the ratios of material to conversion costs exceed those for the same products in the domestic industry; the excess is not so great, however, as

in the case of French Vals. Inasmuch as the small imports of bobbin-finings and Clunys come chiefly from Great Britain, where wages are higher than in France, the domestic 90 percent tariff is sufficiently high practically to exclude importation of these laces.

TABLE 78.—*Percentage of total cost of domestic laces represented by material, labor, and manufacturing expense, by styles*

Style of lace	Samples	Material	Conversion		Total
			Labor	Manufacturing expense	
Cotton:					
Valenciennes, 12-point	4	34.87	33.30	31.83	100
Valenciennes, other than 12-point	4	41.29	33.56	25.15	100
Bobbin-fining nets	2	34.78	32.80	32.42	100
Bobbin-fining lace	9	32.09	38.22	29.69	100
Cluny lace	6	39.36	34.88	25.76	100
Silk:					
Veilings	9	31.31	30.47	38.22	100
Radium nets	3	34.39	26.96	38.65	100
Chantilly	9	34.92	28.19	36.89	100
Other:					
Mixed fibers, Spanish	14	50.47	26.38	23.15	100
Metal threads	11	68.74	17.28	13.98	100

TABLE 79.—*Percentage of total cost of domestic laces represented by material, labor, and manufacturing expense, by materials*

Material	Samples	Material	Conversion		Total
			Labor	Manufacturing expense	
Cotton	25	35.40	35.28	29.32	100
Silk	21	32.81	29.27	37.92	100
Other	25	57.88	22.69	19.43	100

TABLE 80.—*Percentage of total cost of certain French and English laces represented by material, labor, and manufacturing expenses, by styles*

Style of lace	Samples	Material	Conversion		Total
			Labor	Manufacturing expense	
French:					
Cotton:					
Valenciennes, 12-point	3	67.03	25.12	7.85	100
Valenciennes, other than 12-point	1	56.83	29.63	13.54	100
British:					
Cotton:					
Bobbin-fining nets	2	50.73	30.63	18.64	100
Bobbin-fining lace	8	42.32	32.17	25.51	100
Cluny lace	7	44.61	37.65	17.74	100
French silk laces	4	41.43	47.90	10.67	100
British mixed fiber laces	4	47.84	30.20	21.96	100

TABLE 81.—*Percentage of total cost of certain French and English laces represented by material, labor, and manufacturing expenses, by materials*

Material	Samples	Material	Conversion		Total
			Labor	Manufacturing expense	
Cotton	21	47.27	32.90	19.83	100
Silk	4	41.43	47.90	10.67	100
Other	4	47.84	30.20	21.96	100

The percentages shown in tables 78–81 are based on cost data for specific samples, of the number stated, chosen as typical and representative.

In the domestic production of Spanish laces of mixed fibers and metal threads, material costs predominate in relation to total costs, explaining why the domestic industry is in control of the domestic market for laces of this type.

A consular report from Calais, dated December 30, 1931, contains the following comments on the cost of production of laces in France.

The following would appear to be the proportions generally adhered to in figuring the cost price for the production of a cotton lace design of average quality:

TABLE 82.—*Percentage analysis of costs in a French Levers lace mill*

	Percent
Designing, card punching, etc	10
Raw materials	34
Labor:	
Wages of tulliste	16
Auxiliary lace workers	9
Outside help	5
Finishing and packing	3
Dyeing and dressing	8
Overhead, taxes, plant, rent, capital, power, heat, light, office personnel, etc	15
Total	100

III. DISTRIBUTION OF DOMESTIC AND IMPORTED LEVERS LACES

1. Importers

Levers laces are imported by four classes of merchants—the chain stores, large department stores, wholesale dealers, and domestic lace manufacturers.

The chain stores sell directly to consumers; their range of styles is limited and consists principally of standard cotton Valenciennes imported in regular sets of four widths. The year 1924 marked the peak of chain store importation and sales of Valenciennes, but such imports and sales in 1933 declined more than 50 percent.

Large department stores are important importers and retailers of Levers laces. These stores handle a very wide range of standard styles of laces and, in addition, import relatively small quantities but wide ranges of novelties.

Wholesale lace dealers import and offer to retail dealers the widest range of laces of all styles, designs, and materials. Two large importing houses handle only foreign laces; 2 more importing firms, 1 English and 1 French, are representatives of their respective factories in England and France and import only the products of their own mills.

The remaining importers handle both domestic and imported laces; the records of these wholesale houses reveal that the proportion of domestic to foreign laces purchased by them has increased steadily and is still increasing. A few wholesale houses consist of wholesale branches of large department stores.

A few domestic manufacturers import Levers laces of styles which cannot be successfully produced on a commercial scale in the United States and offer them for sale along with their own products. One domestic manufacturer imports silk nets which in times of great demand cannot be produced in sufficient quantities in the United States. Some of the laces imported by the domestic manufacturers are in the finished state and some unfinished, the finishing processes being carried out at the mill.

2. Distribution of domestic and imported laces

Domestic lace manufacturers dispose of their products through the following channels: Wholesalers or jobbers, the manufacturing trade,[31] the mail order business and chain stores, and the retail trade. According to a census report entitled "Distribution of Sales, 1929", 81.7 percent of the sales of domestic Levers laces in 1929 were made to wholesalers and 18.3 percent to industrial users. About 73.5 percent of the total sales were made direct from the factory.

There are certain domestic manufacturers whose entire output is taken and sold by individual firms, whose travelers cover the whole country.

The wholesale or jobbing trade requires a complete range of laces, including novelties, in order to keep pace with changing fashions. Mail order houses and chain stores, in general, handle only the cheaper staple grades of laces.

Lace is not sold by weight, but the price per pound can be illustrated by the French Val. lace, 12-point, 24-carriages, 16-quality, which is regularly sold in chain stores at 5 cents per linear yard. This lace measures about 375 yards per pound, so that the retail price per yard is equivalent to $18.75 per pound.

Methods by which domestic manufacturers and importers market their laces do not differ widely. The domestic factories, with one exception, are not adjacent to New York, but 10 of them have offices in New York, 5 have branches in Chicago, 3 have offices in Philadelphia, and 2 are represented in Los Angeles. The two classes of merchants offer their goods in the same markets and throughout the country the laces are sold by travelers from sample books. With the exception of a few exclusive houses, domestic laces are offered side by side with foreign importations; wholesale houses, as a rule, do not obtain for foreign laces a price higher than for comparable domestic laces.

IV. PRICES

1. Wholesale selling prices of domestic laces

There are presented in tables 83, 84, and 85, wholesale selling prices covering a wide range of years for various staple domestic laces. Obviously, only staple laces may be used for long-term price comparisons inasmuch as novelty laces fluctuate violently in price. Many styles of cotton lace and all styles of lace made of other materials than cotton are too subject to the sway of fashion to have any stable price; for such laces prices have little meaning apart from a specimen of the lace and a long technical description. Therefore, it is not expedient to quote selling prices for bobbin-fining laces, Spanish, Chantilly, and other silk, rayon, wool, and metal-thread laces. These laces have no standard quality or size.

[31] The manufacturing trade is the name given to the manufacture of garments by mass production, in which thousands of articles are trimmed with the same kind of lace; individual orders of lace by the manufacturing trade are necessarily large.

It is of interest to note that the prices for Vals. quoted in table 83 have been fairly stable since 1922; the decline in the value of many Vals. in 1927 and later years may be attributed to the declining popularity of Vals. and the growing demand for cotton Alençon laces. Prices for many patterns of Vals. remained stationary from 1927 to 1932; the prices of all Vals. increased sharply in 1933, because of the increased expenses of the manufacturers working under the code of the N.R.A. The peak prices for all laces were reached in 1920.

TABLE 83.—*Domestic Valenciennes lace—Wholesale prices in New York, per gross (144 yards), 1915–33*

	1915	1916	Mar. 1917	Nov. 1917	Aug. 23, 1918	Nov. 18, 1919	Dec. 17, 1919	Jan. 16, 1920
French Val., 9½-point, 21 quality:								
16 carriage lace and insertion, each	$1.80	$1.85	$2.00	$2.30	$3.14	$3.62	$3.98	$4.38
20 carriage lace and insertion, each	2.10	2.40	2.52	2.80	3.82	4.41	4.85	5.33
24 carriage lace and insertion, each	2.40	2.52	2.85	3.35	5.23	6.04	6.64	7.30
32 carriage lace and insertion, each	3.30	3.30	3.78	4.20	5.72	6.61	7.27	8.00
French Val., 12-point, 16 quality:								
16 carriage lace and insertion, each	1.80	2.00	2.00	2.40	3.27	3.78	4.16	4.58
20 carriage lace and insertion, each	2.40	2.40	2.64	3.24	4.41	5.10	5.60	6.17
24 carriage lace and insertion, each	2.70	2.70	3.18	3.80	5.16	5.97	6.57	7.23
32 carriage lace and insertion, each	3.60	3.60	4.14	4.64	6.30	7.28	8.31	8.81
40 carriage lace	4.50	4.80	5.00	5.80	7.89	9.12	10.03	11.03
German Val., 12-point, 16 quality:								
20 carriage lace and insertion, each	2.40	2.70	3.12	3.12	4.15	4.91	5.40	5.94
24 carriage lace and insertion, each	3.00	3.00	3.42	3.60	4.89	5.65	6.21	6.83
32 carriage lace and insertion, each	3.60	3.60	4.50	4.80	6.13	7.08	7.78	8.57
40 carriage lace	4.80	4.80	5.70	5.70	7.75	8.95	9.84	10.82
48 carriage lace	5.76	6.00	6.60	6.60	8.98	10.38	11.42	12.56

	Aug. 20, 1920	Nov. 3, 1920	Dec. 21, 1920	1921	1922	1923	1924	1925
French Val., 9½-point, 21 quality:								
16 carriage lace and insertion, each	$3.98	$3.50	$3.06	$2.40	$2.40	$2.40	$2.40	$2.40
20 carriage lace and insertion, each	4.85	4.25	3.72	3.18	3.18	3.18	3.18	3.18
24 carriage lace and insertion, each	6.64	5.85	4.26	3.60	3.60	3.60	3.60	3.60
32 carriage lace and insertion, each	7.27	6.40	5.52	5.12	5.12	5.12	5.12	5.12
French Val., 12-point, 16 quality:								
16 carriage lace and insertion, each	4.58	4.15	3.42	3.42	2.88	2.88	2.88	2.88
20 carriage lace and insertion, each	6.16	5.55	4.32	4.32	3.60	3.60	3.60	3.60
24 carriage lace and insertion, each	7.23	6.50	5.16	5.16	4.38	4.38	4.38	4.38
32 carriage lace and insertion, each	8.81	7.95	6.48	6.48	5.40	5.40	5.40	5.40
40 carriage lace	11.03	9.90	7.98	7.98	6.60	6.60	6.60	6.60
German Val., 12-point, 16 quality:								
20 carriage lace and insertion, each	5.94	5.35	4.44	4.44	3.72	3.72	3.72	3.72
24 carriage lace and insertion, each	6.83	6.15	5.10	5.10	4.32	4.32	4.32	4.32
32 carriage lace and insertion, each	8.57	7.70	6.48	6.48	5.40	5.40	5.40	5.40
40 carriage lace	10.82	9.75	8.28	8.28	6.84	6.84	6.84	6.84
48 carriage lace	12.56	11.30	9.48	9.48	7.92	7.92	7.92	7.92

TABLE 83.—*Domestic Valenciennes lace—Wholesale prices in New York, per gross (144 yards), 1915–33*—Continued

	1926	1927	1928	1929	1930	1931	1932	Sept. 1933
French Val., 9½-point, 21 quality								
16 carriage lace and insertion, each	$2.40	$2.40	$2.40	$2.40	$2.40	$2.16	$2.16	$2.58
20 carriage lace and insertion, each	3.18	3.18	3.18	3.18	3.18	2.64	2.64	3.18
24 carriage lace and insertion, each	3.60	3.60	3.60	3.60	3.60	2.88	2.88	3.45
32 carriage lace and insertion, each	5.12	5.12	5.12	5.12	5.12	3.84	3.84	4.62
French Val., 12-point, 16 quality:								
16 carriage lace and insertion, each	2.88	2.76	2.76	2.76	2.76	2.16	2.16	2.58
20 carriage lace and insertion, each	3.60	3.12	3.12	3.12	3.12	2.52	2.52	3.03
24 carriage lace and insertion, each	4.38	3.60	3.60	3.60	3.60	2.88	2.88	3.45
32 carriage lace and insertion, each	5.40	4.56	4.56	4.56	4.56	3.84	3.84	4.62
40 carriage lace	6.60	5.52	5.52	5.52	6.60	5.52	5.52	6.62
German Val., 12-point, 16 quality:								
20 carriage lace and insertion, each	3.72	2.88	2.88	2.88	2.88	2.88	2.88	3.45
24 carriage lace and insertion, each	4.32	3.24	3.24	3.24	3.24	3.24	3.24	3.90
32 carriage lace and insertion, each	5.40	4.44	4.44	4.44	4.44	4.44	4.44	5.34
40 carriage lace	6.84	5.40	5.40	5.40	5.40	5.40	5.40	6.48
48 carriage lace	7.92	6.36	6.36	6.36	6.36	6.36	6.36	7.62

TABLE 84.—*Domestic Levers laces—Wholesale prices in New York, 1913–30*

Description	1913	1914	1915	1916	1917	1918	1919	1920	1921
Drapery nets, 9½-point, 20 quality, 42 inches wide	Per yard $0.85	Per yard $0.85	Per yard $0.85	Per yard $0.92½	Per yard $0.92½	Per yard $1.00	Per yard $1.15	Per yard $1.35	Per yard $1.35
Drapery nets, 10½-point, 24 quality, 42 inches wide	-------	.60	-------	.67½	.70	.80	.92½	.92½	.82½
Drapery nets, 9½-point, 40 quality, 42 inches wide	.52½	.42½	.42½	.50	.57½	.62½	.70	.82½	.82½
Bobbin-fining German Val., 9½-point, 18 quality, 36 carriage, lace	Per dozen .42½	Per dozen .55	Per dozen .67½	Per dozen .67½	Per dozen .67½	Per dozen .67½	Per dozen .72½	Per dozen .78	Per dozen 1.12½
French Val., 10½-point, 16½ quality, 20 carriage lace	-------	-------	.23	.23	.25	.30	.37½	.37½	.54½
French Val., 12-point, 13 quality, 24 carriage lace	-------	-------	.31½	.32	.32	.52½	.53½	.57½	.75

Description	1922	1923	1924	1925	1926	1927	1928	1929	1930
Drapery nets, 9½-point, 20 quality, 42 inches wide	Per yard $1.27½	Per yard $1.27½	Per yard (1)	Per yard	Per yard	Per yard	Per yard	Per yard	Per yard
Drapery nets, 10½-point, 24 quality, 42 inches wide	.82½	.82½	$0.87½	$0.87½	$0.82½	$0.82½	$0.82½	$0.82½	$0.82½
Drapery nets, 9½-point, 40 quality, 42 inches wide	.82½	.82½	.80	(1)	-------	-------	-------	-------	-------
Bobbin-fining German Val., 9½-point, 18 quality, 36 carriage, lace	Per dozen 1.12½	Per dozen .57½	Per dozen .55	Per dozen .52½	Per dozen .50	Per dozen .50	Per dozen (1)	Per dozen -------	Per dozen -------
French Val., 10½-point, 16½ quality, 20 carriage lace	.52½	.27½	.27½	(1)	-------	-------	-------	-------	-------
French Val., 12-point, 13 quality, 24 carriage lace	.67½	.40	.40	.38	.38	.35	(1)	-------	-------

[1] Pattern discontinued.

As these patterns became less popular they were discontinued and the subjoined list is indicative of the price of similar goods from 1925 onward.

TABLE 85.—*Domestic Levers laces—Wholesale prices in New York, 1925–33*

Description	1925	1926	1927	1928	1929	1930	1931	1932	1933
Teneriffe edge, 12-point, 19 quality, 16 carriages per dozen	-------	$0.24	$0.21	$0.21	$0.20	$0.20	$0.20	$0.18	$0.20
Drapery cotton net, 9½-point, 36 quality, 36 inches wide per yard	-------	-------	.60	.62½	.62½	.62½	.62½	.57½	.75
Drapery cotton net, 9½-point, 28½ quality, 42 inches wide per yard	-------	-------	.82½	.85	.90	.90	.90	.80	1.07½
Drapery rayon net, 10½-point, 30 quality, 42 inches wide per yard	$1.25	1.10	.95	.90	.90	.79	.79	.70	.80
Panel curtain cotton, 9½-point, 27 quality, 50 inches wide per pair	-------	-------	8.25	8.00	7.85	7.85	7.85	6.50	7.65
Cotton and rayon dress net, 9½-point, 27 quality, 36 inches wide per yard	-------	-------	.90	.90	.90	.90	.70	.70	.75

2. Wholesale selling prices of imported laces

The extent of the fluctuations of prices for most imported laces (owing to the difficulties of standardization, variations in price according to slight variations in construction, and the practice of manufacturers and importers of setting prices according to the popularity of the particular style and design), renders impracticable the compilation of annual average wholesale prices of imported laces. Fixed prices of Valenciennes as previously discussed are not applicable to the highest type of Valenciennes known as "fil passé." The following table shows wholesale selling prices at New York of imported Calais Val. laces (fil passé), per dozen yards for the years 1914 to 1932. This pattern was produced in 1896, is still sold in the largest department stores, and is possibly the only pattern for which such a list of prices can be obtained.

TABLE 86.—*Wholesale selling prices in New York of imported Calais Val. laces (fil passé), per dozen yards, 1914–32*

Article and width	1914–15	1916–18	1919–20	1921–22	1923–24	1925–26	1927	1928	1929	1930	1931	1932
Calais Val. (fil passé), 14-point:												
16 carriage lace	$0.67	$0.79	$1.20	$0.75	$0.72	$0.75	$0.80	$0.80	$0.80	$0.80	$0.80	$0.80
20 carriage lace	.75	.90	1.56	.95	.90	.95	1.00	1.05	1.05	1.05	1.05	1.05
20 carriage lace	.80	.95	1.81	1.00	.95	1.02	1.08	1.10	1.10	1.10	1.10	1.10
24 carriage lace	.95	1.08	2.10	1.15	1.08	1.12	1.25	1.30	1.30	1.30	1.30	1.30
32 carriage lace	1.08	1.35	2.80	1.65	1.55	1.60	1.75	1.85	1.85	1.85	1.85	1.85
40 carriage lace	1.35	1.65	3.60	2.00	1.90	2.00	2.25	2.35	2.35	2.35	2.35	2.35
16 carriage insertion	.60	.70	1.15	.80	.75	.85	.90	.90	.90	.90	.90	.90
20 carriage insertion	.70	.85	1.56	1.00	.95	1.02	1.12	1.15	1.15	1.15	1.15	1.15
24 carriage insertion	.80	.95	2.00	1.15	1.08	1.15	1.25	-------	-------	-------	-------	-------
32 carriage insertion	1.08	1.35	2.80	1.65	1.55	1.50	1.50	-------	-------	-------	-------	-------

The rise of Alençon laces, which, when made on the independent beam set-out are analogous to Valenciennes laces, has led to the quotation of basic prices for these articles, as shown by a consular report from Calais, dated December 30, 1931:

Alençon laces come usually in designs larger than the Valenciennes varieties, and have been created largely during the past 2 or 3 years, being really a superior quality of the wider styles of Valenciennes laces, and have an embroidery effect. These are sold practically under the same conditions as the Valenciennes styles at prices averaging about as follows, per meter:

Width, in centimeters	Francs per meter
2½	0.33
3	.43
4	.56
5	.65.50
6	.87
8	1.08
10	1.29

The seven above-stated standard widths for the Alençon varieties are designated "hauteurs" 12, 16, 20, 24, 32, 40, and 48 respectively * * * Basic prices are the same for edgings, insertings, etc.

3. The mark-up on imported Levers laces

The landed cost of imported Levers laces includes the foreign selling price, plus an average of 7½ percent for transportation and landing charges, plus 90 percent duty. The difference between the landed cost and the wholesale selling price represents the importers' "mark-up" or margin for expenses and profit. The wholesale selling price on the American market of imported laces averages about two and a half times the foreign selling price.

The ascertainment of any acceptable figure representing the retailer's mark-up is practically impossible, because of the wide range of retailers and the extreme variance in their mark-up policies; these depend upon the prestige of the store and the clientèle.

During the Tariff Commission's valuation investigation under section 340 of the Tariff Act of 1930 information was collected with respect to the mark-up by importers. Data were obtained from 15 wholesale importers of Levers laces whose imports for the two years, July 1, 1927, to June 30, 1929, were valued at $3,635,813, or 28 percent of the total imports of machine-made laces during that period. From these total importations the investigators selected, for the purpose of determining landed value and selling price, samples representing a cross section of imports, representative both as to lace construction and type of article; for each sample purchase prices and sales prices were tabulated. These laces were sold in some instances at prices ranging from a very high profit during the height of demand in the spring or fall season to a price which approached landed cost during the period when the style was passing or interest in the individual pattern was waning. According to the weighted average of different landed costs and sales prices during the period, the mark-up for the various styles of laces is shown in the following table.

TABLE 87.—*Importer's "mark-up" on the landed value of Levers laces imported between July 1, 1927 and June 30, 1929*

[Data obtained by United States Tariff Commission]

Style	Specimens chosen	Total imports of importers chosen	Percent of total	Dutiable value of imports tabulated	Proportion of total tabulated	Mark-up on landed cost	Average
					Percent	*Percent*	*Percent*
Cotton:							
Alençon	324	$1,203,755	33.16	$54,767	4.14	45.45	
Valenciennes	275	629,149	17.33	20,789	3.30	40.73	
Binche	72	150,602	4.15	7,359	4.89	25.33	42.67
Filet	26	29,723	.82	1,073	3.61	40.13	
Sundries	30	46,892	1.13	2,080	5.09	67.29	
Silk, including rayon:							
Chantilly	216	973,009	26.81	27,199	2.80	53.74	
Spanish	4	47,424	1.31	1,338	2.82	42.49	49.80
Metal thread	69	555,259	15.29	6,907	1.24	43.98	
Total and average percentage	1,016	3,635,813	100.00	121,512	3.34	45.68	

As seen in table 87, the highest mark-up of any item was on "sundries"; this is accounted for by the fact that sundries includes chiefly novelties, on which high profits are made during brief periods. The second highest mark-up was on Alençon, the cotton lace in greatest demand during the period 1927–29. Of course, there was a relatively high mark-up on Chantilly, for it has practically no competition in this country.

4. Retail prices

The factors which influence the purchase of laces by the department stores for retail disposal are demand, price, and appearance. It is rare, if not unknown, for the buyer or department manager to have any knowledge of the variable factors inherent in a piece of lace other than style, width, and component material. Subtle details, such as the intricacies of pattern, gage, and quality, do not enter into the choice, the reasons for the purchase being the desirability of the article and sometimes the possibility of offering the lace within a definite price limit. Wide elaborate laces are generally comparatively high in price, and as the principal reason for the purchase by the consumer is the desire to possess the article, the question of price becomes of secondary importance. For these reasons, and such others as the extent of demand through fashion and the prestige of the store offering the lace, retail prices of other laces than Valenciennes vary so widely that giving a list would serve no useful purpose.

Retail prices which are alike upon different laces of the same material are possibly fixed with the purpose of putting certain laces on sale, irrespective of some of the details of manufacture, at a definite price limit.

V. SUBSTITUTES FOR LEVERS LACES

All laces may be said to compete with each other when they are made of the same material and when they are similar in width, weight, and style. Barmen lace, burnt-out lace, embroidery lace, and some other laces made on fine-gage curtain machines may be considered to be competitive with Levers laces.

Technically, hand-made laces are not directly competitive with Levers laces; a hand-made lace is one thing, and a machine-made lace is another, and price differences ordinarily allow no confusion of the two. When hand-made laces are cheap enough, however, they are substituted for machine-made laces. Inasmuch, therefore, as Chinese hand-made laces, copies of various European hand-mades, have been imported into the United States in large quantities and sold at prices which this market has usually associated with machine-made products, they may justly be considered substitutes for Levers laces and, therefore, competitive.

A later chapter deals in detail with hand-made laces. There is presented here, however, a table showing United States imports for consumption of hand-made laces from 1912 to 1933. Imports reached a peak in 1923–24 and have since declined steadily. Most of these laces are imported from China.

TABLE 88.—*Total hand-made laces: Imports for consumption, 1912–33*

Year	Cotton	Flax, etc.	Silk	Rayon	Total
Fiscal					
1912	$909,075	$84,871	$8,418	----------	$1,002,364
1913	671,805	52,545	1,152	----------	725,502
1914 (July 1–Oct. 3, 1913)	51,483	2,691	32	----------	54,206
1914 (Oct. 4, 1913–June 30, 1914)	146,320	7,648	91	----------	154,059
1915	42,817	2,952	780	----------	46,549
1916	208,057	79,188	24,345	----------	311,590
1917	730,471	77,807	16,371	----------	824,649
1918	663,387	133,003	10,392	----------	806,782
1918 (July 1–Dec. 31)	76,436	14,332	4,933	----------	95,701
Calendar					
1919	913,350	33,065	28,269	----------	974,684
1920	986,499	31,854	81,489	----------	1,099,842
1921	570,358	46,335	122,722	----------	739,415
1922 (Jan. 1–Sept. 21)	1,786,273	35,447	71,911	----------	1,893,631
1922 (Sept. 22–Dec. 31)	589,134	30,570	19,637	----------	639,341
1923	1,944,550	389,943	76,368	----------	2,410,861
1924	2,125,728	168,143	34,048	----------	2,327,919
1925	1,566,194	193,220	17,840	----------	1,777,254
1926	1,005,803	153,511	32,089	----------	1,191,403
1927	1,224,856	125,130	16,584	----------	1,366,570
1928	777,585	22,472	8,396	----------	808,453
1929	596,080	31,838	8,095	----------	636,013
1930 (Jan. 1–June 17)	193,573	4,766	328	----------	198,667
1930 (June 18–Dec. 31)	201,119	16,912	3,524	$696	222,251
1931	444,364	10,608	1,657	572	457,201
1932	337,382	2,371	272	77	340,102
1933	286,929	7,569	----------	----------	294,498

VI. COMPETITIVE ADVANTAGES AND DISADVANTAGES OF THE DOMESTIC LEVERS LACE INDUSTRY

In addition to the advantage of its location in the principal lace consuming country, aided by a 90 percent ad valorem tariff duty, the domestic Levers lace industry profits by superior organization. Domestic lace mills operate machines varying in number from 2 to 63, the average number of the machines in a mill being about 26. In France and Great Britain the average number is 11, although in both countries there are numerous producing units operating only two or three machines. Further, domestic mills carry out all processes, including bleaching, dressing, and finishing in the mill, whereas in France bleaching and dressing, and in Great Britain bleaching and dyeing, dressing, and finishing are carried out in special establishments, each requiring a profit. Obviously, then, the American factory organization requires a larger capital outlay permitting certain economies to be made in operation which cannot be made in the foreign industry.

This advantage of superior organization, however, is not as great as it would be were lace a less volatile product. Beauty, skill, workmanship, fashion, and originality of design are such fundamental factors in the salability of any lace that the close supervision of all processes by the manufacturer and the opportunities for the free exercise of originality and experimentation permitted by the numerous small foreign factories constitute a very real advantage which offsets in part the economies effected by domestic mass production.

The competitive disadvantages of the domestic Levers lace industry may be summarized as follows:

1. All Levers lace machines employed in the domestic industry are imported, chiefly from Great Britain. Inasmuch as these very expensive machines must pay heavy freight, insurance, and duty charges before being established in domestic mills, the initial cost of establishing an industry in the United States or making replacements of parts or entire machines is much greater in the United States than in Great Britain and France.

2. Practically all twisthands, designers, draftsmen, and dressers employed in the domestic lace industry were born in France or England and were imported with the permission of United States authorities for the purpose of working in domestic lace mills. American labor does not take to these occupations, inasmuch as the necessary long, low-paid apprenticeship, which in England and France is accepted in the lace centers as a matter of custom and tradition, is a practice entirely foreign to American labor and one which they are not inclined to accept. The available supply in the United States of these highly skilled workers is so limited that in times of great demand there is an acute shortage, while in times of depression the domestic manufacturers are willing to operate with little or no profit in order to keep their staff of workers together. In the chief European lace-making centers—Calais, Caudry, and Nottingham—there are excellent schools giving instruction in designing and drafting. There are no such schools in the United States, a fact seemingly attributable to the lack of interest shown in the craft.

The production of Levers laces requires the mastery of many intricate technical details and the employment of highly skilled technicians; further, it requires that these technicians possess originality, a highly developed artistic sense, and devotion to their work. It is evident, then, that in European lace-making centers, devoted almost wholly to the manufacture of lace and similar products, a tradition and an experience have been built up which constitutes an incalculable competitive advantage.

3. All fine count, prepared cotton yarns for use in the brass bobbins and most other yarns finer than 80/2 are imported.

4. The French people have built up throughout a long period of years and maintain a preeminent position as dictators of world fashion. The Calais lace manufacturers not only contribute to the preeminence but receive definite advantages from it. Their lace styles and designs, if popularized by Paris fashion, may create a wide demand, and having advanced information as to the season's styles, they are in a better position to supply the world market.

5. The French operate some Levers machines finer in gage than those employed in the United States; laces made on these fine machines, therefore, find no direct competition in this country.

6. The women and girls in the homes in the Calais district have grown accustomed throughout the years to contributing to the family income by clipping lace at relatively low wages. The lower clipping costs which obtain in Calais constitute, therefore, a real advantage in the production of certain laces in which clipping costs mount high in relation to total costs.

VII. METHODS OF PROCEDURE IN MAKING FANCY LACE [32]

The manufacture of lace, from the raw materials to the finished article, sometimes entails more than 20 different processes, shown as grouped in Diagram 1. These processes naturally fall into four groups:

1. Preparatory artistic work.
2. Preparatory work on the yarns.
3. Actual making of the lace on the machine.
4. Subsequent finishing processes.

The machine may be approached from two directions, the drafting room, and the yarn room; the results of the labors of the two departments meet at the machine.

1. Fashion, designing, and drafting as vital factors in the Levers lace industry

Fancy lace is the aristocrat among textile fabrics; no class of textile fabric is so delicate, and so difficult to make, and no other requires so long a time to acquire proficiency in the higher branches of production; none is more completely an article of voluntary consumption, none is more a creation of art, and finally no other more completely depends for consumption upon the originality, novelty, and beauty of its design. Obviously in the production of such an article the factor of fashion and the processes of designing and drafting assume paramount importance.

(*a*) *Fashion.*—Nothing is more vital to the Levers lace industry than fashion, for it determines what style of lace is to be worn, which style is to be superseded, of what material the lace is to be made. Fashion determines how much lace is to be used on wearing apparel, as well as its manner of adorning that apparel; it determines what new creations shall be popularized as "novelties" and whether those novelties shall remain as staple goods. The climax in quantity was reached a generation ago, when a skirt of considerable circumference was encircled with overlapping ruffles of wide lace, which utilized more yards of lace than the inches used in its successor. Tailor-made suits, the directoire, and untrimmed silk suits of underwear have since reduced the use of lace to a minimum. The use of period and of national styles in dress and of Bulgarian and Rumanian peasant colors tend to eliminate lace as an article of adornment.

In discussing the influence of fashion upon the lace trade, however, it is necessary to distinguish between staple lines, such as cotton Valenciennes used for lingerie and children's frocks and "novelties" consisting of new and striking effects in style, design, and material. Fashion influences the consumption of staple lines much less than novelties, though it dictates the amount of the former to be used upon

[32] The technical and other details here given of the making of Levers laces have not heretofore been available in published form. They will furnish the reader some idea of the complexity and importance of preparatory work and the operations of the machines.

any article. Competition in the production and sale of these staple lines is much keener than in the production of novelty laces.

Fashion dominates the novelty lace trade. A new effect in lace, if popularized by fashion, is capable of reviving a lagging trade. The novelties of today frequently become the staple lines of tomorrow; further, buyers when purchasing staple lines tend to deal with the

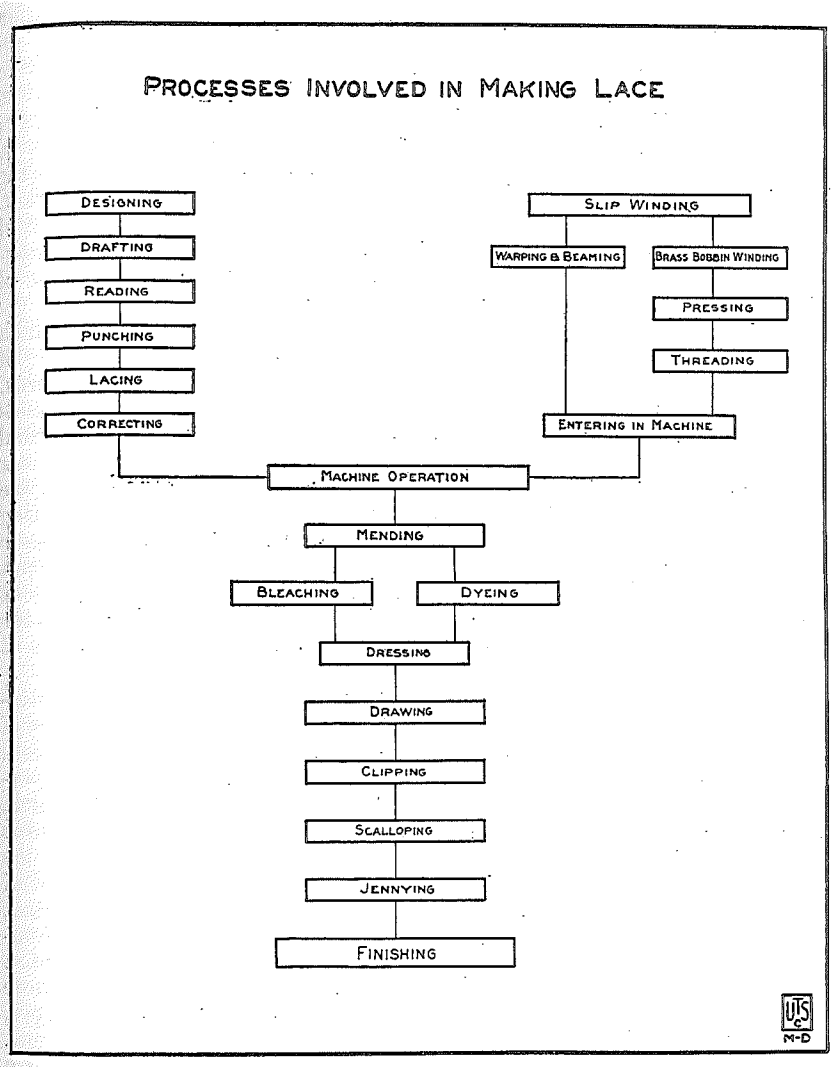


DIAGRAM 1.

houses where they obtain their novelties. For these reasons the novelty trade is of great importance to the domestic lace manufacturer.

Fashions originate in France, although occasionally a world event will have the effect of promoting a style, a good example of which will be found in the "King Tut" style following the discoveries made in Egypt. The couturieres of Paris sometimes give ideas to the lace

manufacturers of Calais; frequently they adopt and popularize the creations of the Calais designers.

Why the French retain their position as arbiters of fashion is a question that scarcely lies within the scope of this study; however, it may be observed that they do retain it in spite of many attempts to dislodge them. The French mind, with its versatility and appreciation of form and color, seems to lend itself readily to the conception of transient and vivid effects.

A considerable advantage accrues to the French lace industry from its proximity to and identification with the world arbiters of fashion. Buyers from all over the world attend the spring mannequin parades at the Parisian race courses, Auteuil and Longchamps, in order to obtain advance fashions. The Calais lace manufacturers being "on the inside" have stocks of the new styles ready for the market. Domestic lace manufacturers are quite aware of the importance of creating and popularizing new styles. The American Lace Manufacturers Association holds periodical expositions for the purpose of exhibiting and establishing their own styles.

(*b*) *Designing.*—It is not possible to over-emphasize the part which designing plays in the success of a lace manufacturer. Any style of lace may be produced in an unlimited number of designs or patterns. Even when the style remains constant, the volume of sales depends to a large degree upon the continual appearance of new and original designs. Retailers continually demand new designs, making their production by the domestic mills imperative, for if new designs are not forthcoming from domestic mills, they are obtained from importing houses whose buyers journey to Europe twice a year. Domestic manufacturers who create novel designs are able to sell their output much more readily. Some few patterns are sold freely throughout successive seasons; two outstanding French imitations of hand-made lace produced in 1896 are still to be found in the pattern books of large department stores.

The designer is an artist. He must possess three essential characteristics: ability to draw well, technical knowledge of the capabilities of the machine which must produce his design in lace, and imagination. The first enables him to draw shapely objects of well-balanced proportions, the second saves him from the errors of drawing designs which, however beautiful, cannot be reproduced in lace, and the third affords originality and distinction to his work. The imagination of the designer, which is also his inspiration, must be under the control of his knowledge of the capabilities of the machine. On the other hand, technical skill without artistic imagination will result in commonplace copying. The successful designer must, therefore, have a perfect balance of technical skill and imagination. Very much more thought and study are present in every design than appear on paper, for the designer molds his taste and his art to the needs of the moment. Sets of laces are made in various widths, and in the drawing of them it is essential that the principal features and characteristics of the initial design be maintained.

(*c*) *Protection of designs.*—In the discussion on page 162 of the variable factors inherent in Levers laces the following statement is made with reference to pattern: "Any style of lace may be made in an infinite number of patterns and, excepting cases of deliberate copying, patterns of one mill are never produced by another except the few trade patterns which have been universally made in domestic and foreign mills." The members of the American Lace Manufacturers' Association have agreed not to copy one another's patterns. Copying may consist, not in the reproduction of each flower, leaf, object, or mesh of the design in the same size and position, but rather in the effect produced by the general disposition of the design whereby one pattern may be offered in substitution for the other; on analysis it may be difficult to prove or disprove that such subtle differences constitute copying. The effects of such similarity are liable to be detrimental to the sale of the original pattern, especially if the second pattern be produced in a quality which permits it to be offered at a lower price. Protection of designs against unlawful use is therefore important.

Instances of the production of a pattern of Levers lace by the same firm over a period of years are not unknown, but in a trade where fashion holds sway, where styles constantly change, and the life of a pattern may be comparatively short owing to the demand by retailers for novelties, protection of a pattern by legal action may not be of such value as to warrant the expense of the procedure. On the other hand while the Levers lace industry does not lend itself, in the more expensive styles, to the American principle of mass production, in the production of staple laces for the manufacturing trade enormous quantities of the same patterns are sometimes made, and legal protection of a popular design may be valuable and desirable.

It may accordingly be to the advantage of producers of laces to take steps to protect their designs through the United States Patent Office. The bill (H.R. 14727) introduced in the House of Representatives on February 20, 1933, by Representative Sirovich, may be of interest to designers and manufacturers of laces and other textiles. This bill would authorize specimens, drawings, photographs, or other identifying representations of designs to be filed with the Register of Copyrights, together with statements under oath identifying the applicants and original authors and such other information as the Register of Copyrights might require. In any action after issuance of a certificate of registration, presumption of copying might be held to arise from substantial resemblance to the registered design. No patent under sections 4929 and 4931 of the Revised Statutes can be issued for any design for textiles, laces, or embroideries on an application filed after the bill became law.

(*d*) *Drafting.*—The work of the draftsman is far more complex and mechanical than that of the designer. The draftsman must be an artist, a mathematician, and a lace-machine technician; his work is a subtle fusion of the artistic and the technical. He must interpret the design in terms of the machine. The machine has infinite versatility—the beauty of its products depends upon the artistry and the capabilities of the draftsman. He must experiment incessantly on the machine and the meshing board, developing new effects in lace and new types of construction. A consular report speaks of him as the "soul of the machine."

Eight or ten years of arduous study and intimacy with the lace machine are prerequisites to successful drafting. The draftsman must know the exact movement of each thread in, and each part of, the machine which executes the design; indeed, in executing a design

he must translate it by a mathematical procedure into a highly complex chart from which are punched the jacquard cards which command the movement of each of the bars guiding the threads. On the draftsman's chart is a number representing exactly the passes, the combinations, the movements, of each warp and beam thread at any moment during the lace-making process, and the draftsman must be sure that the sum total of these many thousands of movements through the combined work of the jacquard and the bobbin thread will be an artistic reproduction of the design.

It is not difficult to understand the failure of American labor to take kindly to the draftsman's trade, with its long apprenticeship, its intensive application, and the small pay and recognition which it receives in relation to the preparation and skill required. Practically all draftsmen in domestic mills are foreign born. In Europe young men have for a century proudly followed their fathers in the drafting profession; excelling in that art is a serious goal. With them the profession, endowed with a century of tradition, has acquired a unique prestige in the lace-making centers.

Books, in French, are published on the subject of drafting, and there are various technical schools in England and France where young men receive instruction in designing and drafting, and do practical work upon Levers lace machines. There are no such courses offered in the United States, chiefly because of the lack of interest in the trade manifested by native Americans.

The lace manufacturer emphasizes equally with designing the value of the technique of drafting, whereby the artist's design is translated into the chart from which figures are deduced, to enable the jacquard cards to be punched. In fact, in some of the most important commercial lace productions, where the pattern is small, technique has far more to do with value than design; for instance, the prime necessity of fil passé Vals is draftmanship, design taking second place.

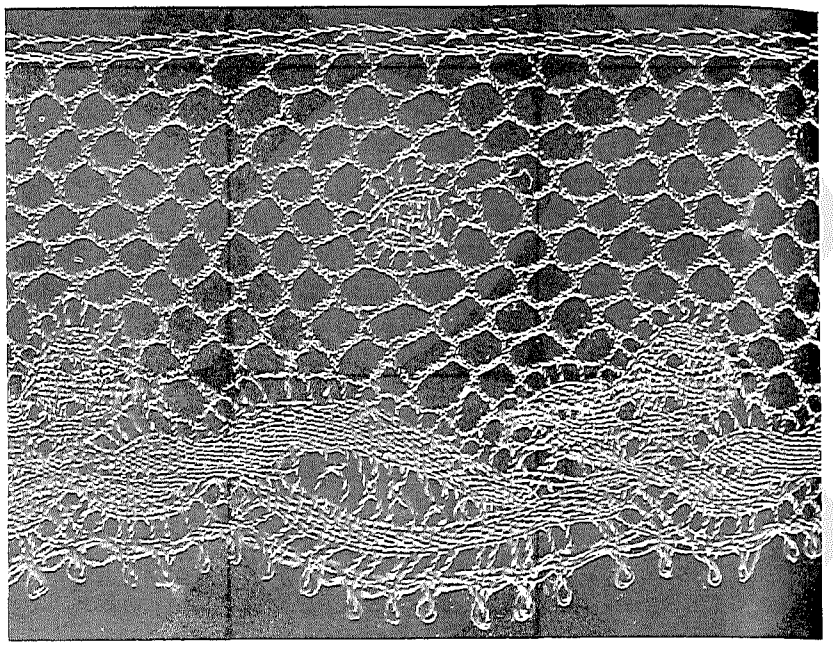
The draft is several times larger than the design, the size varying with the length and quality, to allow the filling in with clarity the details of the workings of the threads. The design is drawn on the draft square for square, with such modifications as are indicated by the draftsman's knowledge of the play of the machine, and every movement of the beam and warp threads is recorded motion by motion, the passage of the threads up and down being indicated by distance units called "gaits."[33]

2. Types of Levers laces

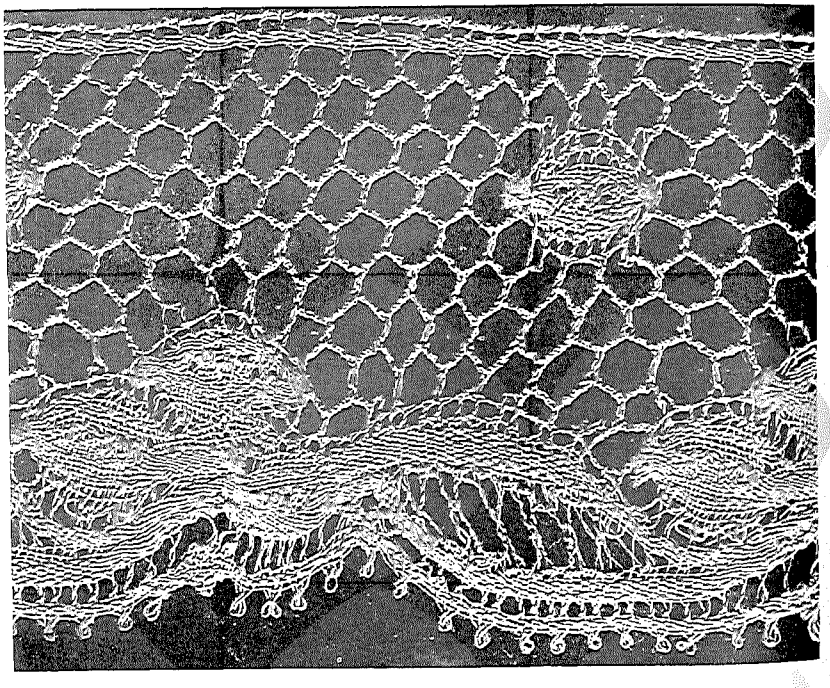
The many styles of lace made on the Levers lace machine may be classified according to the four fundamental systems of lace manufacture. It should be emphasized, however, that inasmuch as the ingenuity of lace draftsmen is unlimited, such a classification is arbitrary. An indefinite number of styles, variations of each fundamental type, may be developed; indeed, each fundamental system may merge with one or more of the others and variations of the one merge with variations of the other. A list of all the styles which have been developed could be extended indefinitely. It is the intention here,

[33] The word gait is applied to the space left between the threads of 2 neighboring carriages, and is the technical term used to denote the measurement of a distance unit, to be traversed by a thread in moving laterally from the space between 2 carriages to the adjoining space.

PLATE 3



HAND-MADE VALENCIENNES LACE (ENLARGED).



LEVERS MACHINE-MADE VALENCIENNES LACE (ENLARGED).

however, to discuss briefly the chief styles of lace made at the present time by the four fundamental systems:

1. Vraie Valenciennes, Calais Vals, or "fil passé" laces.
2. Top bar or independent beam laces.
3. Bobbin-fining laces.
4. Silk laces made with top bars or top and bottom bars on an Ensor net ground.

(*a*) *Vraie Valenciennes, Calais Vals, or "fil passé" laces.*—The production of this type of lace is a very successful attempt to imitate on a machine the texture of hand-made Valenciennes lace. The machine-made lace approaches so nearly the hand-made that even a connoisseur who is not a draftsman may be deceived. It is made chiefly of fine yarns of good quality, on fine-gage machines, 3 or 4 inches to the rack, and there are many "lost motions."[34]

The threads which form the design are worked in a form technically known as a "band." This method was patented in the middle of the last century under the name of tabby weaving. The bobbin threads are drawn through the band threads and twisted in a manner similar to that of threads of hand-made lace. It is this manipulation of the bobbin threads which has given to this style of lace the name of "fil passé." The purls are formed by 2 bobbins, are drawn through the band on the front, and twisted, forming a scallop known as "écaille Vraie Valenciennes." It is largely in connection with the forming of the purls that the lost motions are used, the purls in some cases, although less than one-sixteenth of an inch apart on the lace require 32 to 44 motions for their manipulation.

The drafting of Vraie Valenciennes ("fil passé") is the most difficult of all drafting processes. A few French manufacturers have practically the monoply in the production of this type of lace, which is made in sets of edges and insertions, ranging from seven-sixteenths of an inch to an inch and a half in width. It is quite expensive.

(*b*) *Top bar or independent beam laces.*—Independent beam laces are made without a warp, the place of the warp being taken by a number of small beams. Each beam is independent and is separately weighted so that it can work individually without reference to the others, according to the requirements of the pattern. The bars are arranged in tiers, generally four gaits apart, and each tier has a fundamental "deadstop", the term used for the lowest point in the breadth in which the thread can work. The position of these deadstops varies according to the width of the lace.

Many of the most popular styles of lace are made by the independent beam system, the three most common being the ordinary Valenciennes, Alençon, and Cluny. Other popular styles made by this system are torchon, certain Ensor net laces, Maltese, guipures, Hamburg, Russian point, and Yak. The width of these laces ranges from half an inch to 8 inches; all-over nets are made by independent beams in some styles. The gages of the machines vary with the style, the qualities extend from 8 to 60 inches per rack, and the materials used comprise cotton yarns from 20/2 to 220/2, and worsted and metal threads; independent beam laces of silk are rare. Many distinctive individual effects are identified with independent beam laces, such as the Cluny Spot, the Maltese Cross, the kidney or bean, the

[34] "Lost motions" are machine motions made when the different parts of the machine operate while the wheel which turns the work roller does not act, the pick which operates the wheel being held off or controlled from the jacquard. There is, therefore, no visible production in length during lost motions.

band-front, the fan-front, and the crown-front for torchon or Maltese laces.

Valenciennes and Alençon laces constitute the bulk of European production and of American importation of cotton Levers laces. Valenciennes generally range from one-half to 2 inches in width, although some are as wide as 4 inches, and are made in sets of edges and insertions for trimming underwear, dresses, and children's clothes. They are of two main types—the diamond mesh or French Vals and a round-hole mesh called German Vals. There is a small production of filet lace with a square-hole mesh. Some Valenciennes are made with Maltese or Cluny effects. Alençon is a Levers machine imitation of the Lyons Alençon machine-made lace. It is quite similar to and interchangeable with the wider types of Val. It can be made both by the independent beam system or as a single or double warp bobbin-fining. Alençon lace came into popularity in 1927 and succeeded in stimulating the lagging demand for cotton laces.

Machine-made Cluny laces are imitations of hand-made Cluny lace. They are made up in edgings and insertions from one-half to 6 inches in width, and are also produced as all-over nets made the width of the machine. They are used mainly as dress, upholstery and curtain trimmings, and as piano cloths, bedspreads, and table covers. Coarse yarns predominate in their manufacture.

(*c*) *Bobbin-fining laces.*—Bobbin-fining laces are made with slack bobbins and heavily weighted warps. They are made with 2 warps, the yarn of one being right-twist and the other being reverse-twist. Formerly all the threads were placed on the same beam but it is now the custom to place the right and the reverse-twist threads on different beams. When all the threads were on the same beam they were subjected to a uniform tension, but with the 2 sets, right and reverse, on separate beams, it is possible to vary the weight. Half of the threads of the right-twist warp are threaded in the back bars, while all the threads of the reverse-twist warp are threaded in 4 bars in front of the first half of the right-twist threads; the other half of the right-twist threads are threaded in bars in front of the reverse-twist warp. Thus one right-twist and one reverse-twist thread work with every bobbin thread; the set-out arrangement of the right-twist warp is in four tiers, and the order of the bars is alternately a back and a front bar. The reverse-twist warp threads twist straight along the bobbin threads, and the right-twist warp threads either twist or plait along the bobbin threads, dropping to the next bobbin to make net ties or weave back and forth over one gait thus forming the objects of the pattern of solid fining. By extra weight on the right-twist warp these threads work straight and draw the bobbins across the gait and the reverse-twist threads lie between the throws of the bobbin threads. This is an example of lace made with slack bobbins and heavily weighted warp.

Various nets are used in bobbin-fining laces, such as diamond-shaped and round-mesh; fancy nets—Grecian, Point de Paris, Point Binche, filet, Mirecourt, Snowflake, Craquelé—are easily made and are quite effective. Thick threads are at times used to define the shapes or to form heavy gimping or flossing. The top of a breadth of lace is finished by having several threads called "straight-ups" running side by side, and the bottom by a series of small loops called purls. The bottom of the breadth is generally made in a curved shape and the waste net in the scallop is cut away.

Styles of lace made on the bobbin-fining system include the more popular Alençon, both double and single warp, Baby-Irish, Binche, Bohemian, Carrick-ma-crosse, Duchesse, filet, Honiton, Normandie, Point de Paris, shadow, and Venetian. All-over nets, both plain and thick-threaded, are also made on the bobbin-fining system.

A wider range of lace articles is made by the bobbin-fining system than by any other system; included are edges, insertions, and galloons, all-overs, bedspreads, handkerchiefs, and streamers. The widths of bobbin-fining laces range from one-half inch to 8 inches. Gages of the machines used for making bobbin-fining lace are 9, 9½, 10, 10½, 12, and 14-point; the qualities range from 8-inch racks to 36, exceptionally slacker.

(*d*) *Silk laces made with top, or top and bottom bars, on Ensor net ground.*—The styles of lace made on the Ensor net ground (hexagonal mesh) are mainly the Spanish and Chantilly styles; some variations of these, called Margot or Bourdon, are characterized by the use of a very heavy cord in outlining the design. Chantilly laces are of a light style, designs of small delicate flowers and leaves being drawn with minute detail. Elaborate Chantilly laces require an extraordinary amount of clipping, thus increasing considerably the expense of finishing. There are four ways of drafting Chantilly laces:

1. With center gimps on a 4-bar Ensor net ground.
2. With center gimps and the warps in bottom bars and with fancy nets introduced anywhere in the pattern.
3. Without gimps, the objects being filled with warp or bobbin-fining.
4. With double stump bars which enable Ensor net and bobbin-fining to be made simultaneously.

Chantilly laces range in width from 1 to 54 inches. The narrow laces are made vertically across the roller; the wide laces, for flounces, are usually made laterally across the machine and are then known as "crossbands." They are made on machines with gages of 10 to 14 points. While most Chantilly laces have silk in the warp and bobbins, and spun silk in the gimps and thick threads, a substantial amount is made with fine cotton yarns for the gimps and thick threads of cotton superimposed on a silk ground. Practically all fine silk Chantilly laces are imported from France.

Spanish laces range in width from 2½ to 6 inches. They are made with back and front gimps or center gimps, and are imitations of hand-made Spanish laces, the designs consisting of large roses, flowers, and leaves. Because of the large size of the figures in the design and the comparative lack of delicate detail they are made on coarse-gage machines, of 9, 9½, and 10 points, and are of slack qualities, from 18 to 36 inches. The warp and bobbin threads are of silk, and the gimps and thick threads of spun silk.

Spanish-style laces, which have little in common with Spanish laces, have been increasingly popular since about 1920, particularly those made of metal threads, worsted, and rayon, either singly or in combination. Domestic producers are so successful in the production of these Spanish-style laces that they dominate the market and imports are small.

Silk laces are usually made with the silk undyed. Occasionally the silk is dyed black before it is entered in the machine and it is then difficult for the twist hand to see the thread against the black parts of the machine; to relieve this situation the sley and the facing bar, the parts of the machine over which the threads and the lace pass,

are covered with yellow or light-blue paper. On the other hand, it is sometimes difficult for the twisthand to see white cotton thread when the machine is erected with the back to a whitewashed wall; under these conditions the wall is sometimes painted black.

From time to time, attempts have been made to produce imitations of, and substitutes for blankets, cotton cloth, and Turkish toweling, and even imitations of Barmen lace on the Levers lace machine. It has proved to be technically possible to produce some of these articles, but the ventures have not been successful commercially, because apart from inferiority and defects inherent in the substitute articles, the cost of producing them on the Levers machine is always more than the cost of producing the same articles on machines specially built for those purposes.

3. Reading and punching of Jacquard cards

After a pattern is drafted and arranged or set-out, it is "read off" on to a sheet of specially squared paper; in the squares numbers are placed which indicate the position of each thread in the pattern as specified by the draft. If a column of figures on the sheet be read perpendicularly the result gives the work of one bar in a pattern; if a line of the sheet be read horizontally the result gives the work of all the threads in two motions of the machine as affected by the working of the cards on the Jacquard cylinders and their influence upon the steel bars which hold the threads. Every movement of the threads as shown by the draft is indicated numerically upon the figure sheet. Reading off is not difficult but must be done with meticulous accuracy. The draft and the figure sheets are the counterparts of each other, and if either be lost, it can be reproduced from the other.

The numbers on the sheet indicate the positions of the holes to be punched in the Jacquard cards. These are made of stiff but pliable cardboard, of such a length and width as to fit exactly the face of the Jacquard cylinder. The cards are punched on a machine called a piano puncher.[35] The action of the punching machine is not different from that used for punching Jacquard cards for looms and comprises two movements, one horizontal and the second vertical. The holes punched in the cards correspond to those of the cylinder of the Jacquard, and the numerical value of the holes is the same as the numerical value of the droppers in the machine. The cards are laced together in two packs, the odd numbers for the cylinder of the front motion of the Jacquard, and the even numbers for the cylinder of the back motion. The work requires speed and accuracy and the puncher must be oblivious to all outside attractions and influences when working, as all mistakes must be found and taken out of the cards by the draftsman. Punchers average from 100 to 120 cards per hour.

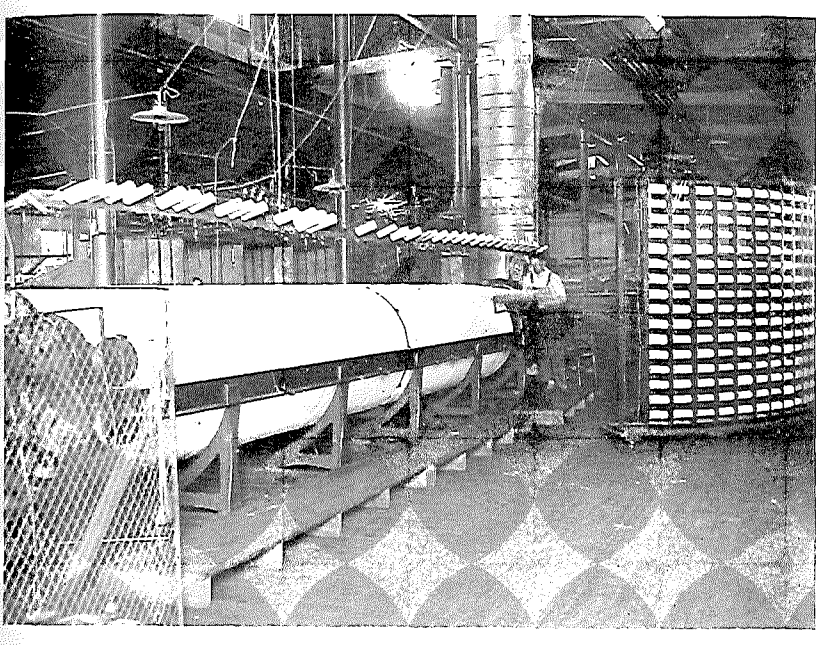
4. Yarn preparation

The slip-winding or spool-winding of yarns for use in Levers lace machines does not differ from the same operation performed for other types of textile machinery.

Warping or the placing of the requisite number of threads on the main warp beam comprises two operations, the winding of the threads from the spools onto the warping mill, and the running back of the threads onto the warp beam. The threads for a full warp are placed

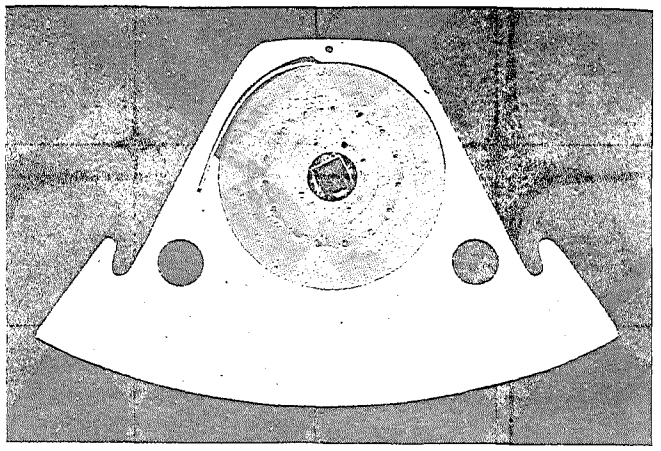
[35] Invented by Whitehall and improved by A. M. Topplin who patented a machine with sufficient pins or keys to punch holes, which controlled a bar to the equivalent of 39 positions on the draft. British patent no. 104,359, July 24, 1874.

PLATE 4

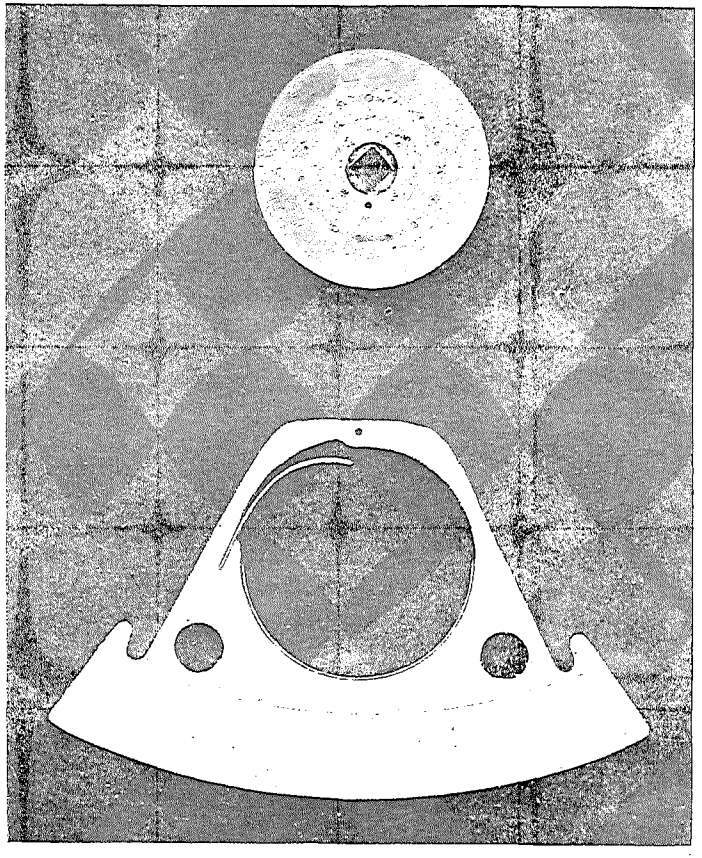


WARPING.

PLATE 5



BRASS BOBBIN MOUNTED IN ITS CARRIAGE.



BRASS BOBBIN AND ITS CARRIAGE SHOWN SEPARATELY.

on the mill by successive windings through perforated metal plates called "brasses." When all the threads are on the mill, the ends are fastened onto the main warp beam, the mill is weighted by means of leather belts, in order to maintain an even tension, and by a reverse motion the beam revolves and unwinds the threads from the mill onto itself. Lighter beams, about 1⅛ inches in diameter, with only one thread to a breadth, are wound directly onto the beams from the spools, the required tension being maintained by passing the threads round the mill or a small roller, the threads being traversed to the same extent as the width of the individual breadth of lace.

The yarn processing which is unique to the lace industry is the winding of the brass bobbins and because of this distinction it is fully described. Brass bobbins[36] consist of two thin rolled discs, grooved on the under surfaces and riveted together, face to face, with a narrow space between them. The bobbins are quite thin, and the thickness depends upon the gage of the machine. Each bobbin has a square central orifice for use in placing a number of them together on a shaft or mandrel when the operation of filling them with yarn is performed; the circle of rivets round this orifice acts as a base upon which the yarn is wound. A brass bobbin-winding machine supplies a number of bobbins, 120 or more,[37] with the same number of yards of yarn; the number of bobbins to be simultaneously filled with yarn varies somewhat in different mills, but is governed by the capacity of the spool jack. Formerly it was the custom to run the threads from the spools onto a drum, about 20 inches wide, to the extent of thousands of yards, and then by the revolution of the shaft holding the brass bobbins to fill the bobbins from the drum, but this process is not used in domestic mills, the required tension and regularity of the threads being obtained by passing them, between the jack and the brass bobbins, round a cloth covered roller. The threads are stretched over the bobbins, carefully slipped into the circumferential grooves, and the revolution of the square shaft fills the bobbins; the length placed on the bobbins, 120 yards or more, is shown by an indicator and superimposed in one continuous layer from start to finish. When the bobbins are full the shaft is removed and a new one on which empty bobbins are already mounted is placed in position, the threads from the full bobbins are passed over the empty ones and inserted in the grooves, the thread is cut between the empty and full bobbins, and the new shaft of bobbins is filled as before. The number of bobbins in a set for a 10-point 184-inch machine would require the filling of 30 shafts of 120 each. The operation of brass-bobbin winding is carried out by female labor. Brass bobbins are now made with considerable capacity in order to minimize the stoppages for replacing empty sets and the consequent loss of time and material which this process entails.

When the bobbins are filled with yarn they expand and have to be pressed flat again before use on the machine. In this operation the bobbins are placed on wires on a metal frame and pressed by hydraulic power, sometimes to the extent of 20 tons per square inch.

[36] The use of the word "bobbin" in a lace factory is confined to these brass bobbins, and the wooden bobbins on to which the yarns are wound are termed "spools."

[37] One English firm winds 216 threads at the same time from a drum onto the brass bobbins and places 640 yards of fine silk within them.

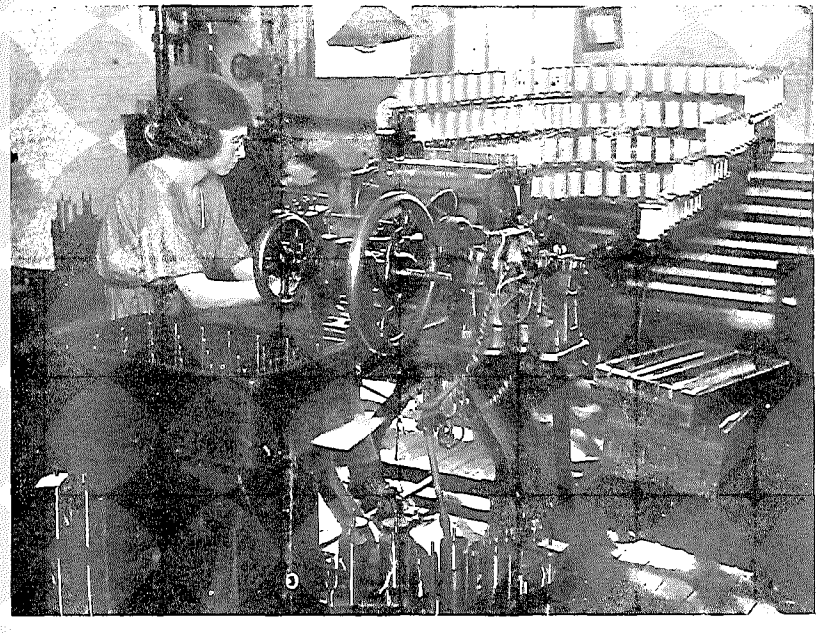
This contracts them, and the contraction is maintained by a flat metal plate dropped over the wires (before pressing) to which a nut is screwed and which prevents their expansion when the pressure is removed. The frames of bobbins are steamed in an oven, and when cooled off by rotating fans retain their close formation; when removed from the wires, the bobbins are inspected and wide bobbins, due to irregularities of yarn or tension, are removed; the other bobbins are then threaded or placed in carriages.

A carriage is a thin steel holder with a base shaped on the arc of a circle, and has a circular hole at the center into which the bobbin is entered. A verge, at the bottom of the hole, fits into the groove of the bobbin, and serves as a rail, in the course of the revolving which results from the running off of the thread, and a fine spring at the top of the carriage holds the bobbin in position by aid of a neb which enters between the sides of the bobbin and acts as a brake as the thread is withdrawn. At each end of the flat carriage is a flange or ear into which the catch bars which actuate the carriages fall.

Threading is done by boys or girls by hand, the bobbin being placed in the orifice of the carriage, the verge and neb adjusted, and by means of a hook fixed into a metal block the thread from the bobbin is drawn through a small hole in the top of the carriage. A good threader will insert 800 to 1,000 bobbins an hour, not including the removing of the empty bobbins from the carriages. During the last 25 years complicated machines have been patented and perfected which automatically remove the empty bobbins from the carriages, place them together in a box, insert full bobbins, and thread and deliver carriages in a receptacle at the rate of 2,500 to 3,000 an hour. These have been tried with questionable results in domestic lace mills, in most of which the process is carried out by hand as described.

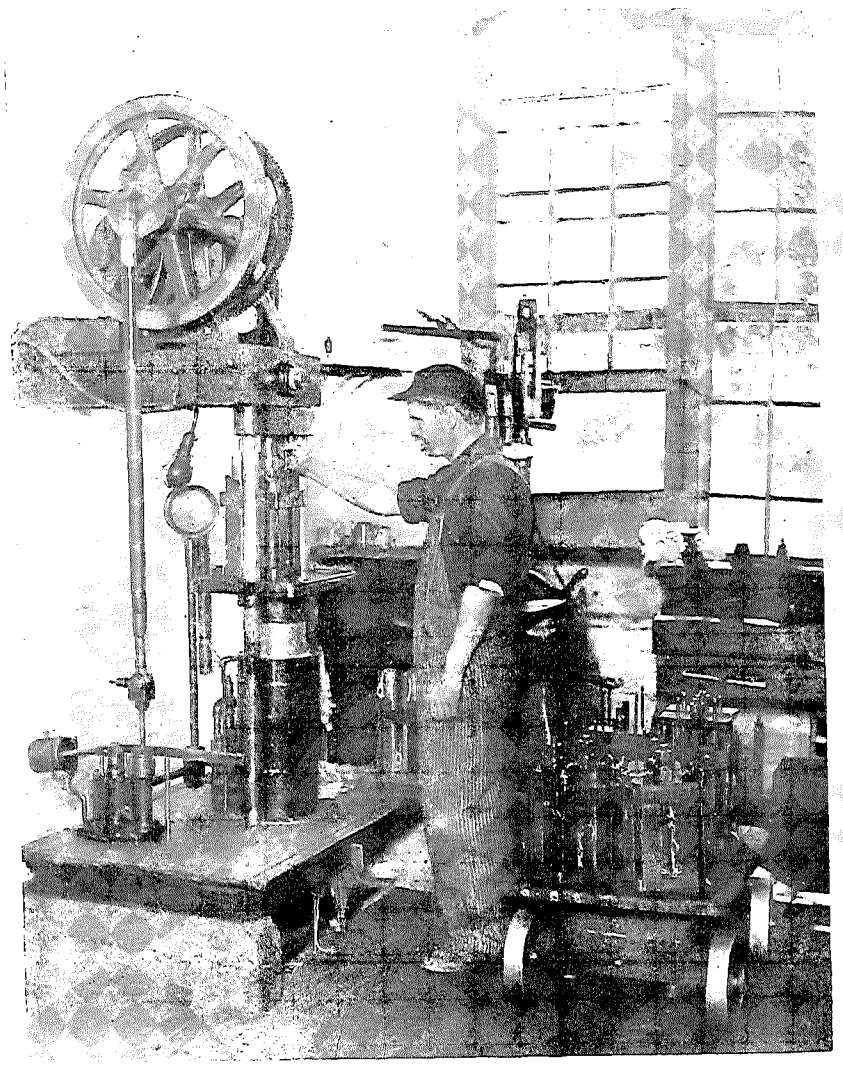
When the bobbins are wound they are of the same weight, through having the same number of yards of yarn in each. The threads of a score or more of carriages are taken in the hand and the carriages thereby lifted and shaken. Those carriages in which the springs are weak descend lower than those in which they are tight. The carriages are sorted into groups—tight, medium, and slack—and these are worked as units in different parts of the machine to avoid the streaky effect which would result in the lace if carriages of differing tensions were mixed. The operation of the lace machines empties the bobbins of the yarn, and the length withdrawn from each bobbin differs according to the amount of bobbin-fining which is made or according to the number of threads round which the bobbin thread is required to twist. All the bobbins, therefore, are not emptied at the same time, and when they commence to run out in considerable numbers (every bobbin that runs out makes a hole in the lace) it is customary to remove the whole set from the machine. The residue of yarn which remains upon the unemptied bobbins was formerly saved by being backwound onto spools, the short lengths of a few yards each being tied end to end, but the increase in the price of juvenile labor altered conditions to such an extent that the wage paid for the process was more than the value of the yarn salvaged, and the process is now mostly abandoned and the small amounts of yarn on the bobbins are stripped off.

PLATE 6



BRASS-BOBBIN WINDING.

PLATE 7



PRESSING BRASS BOBBINS.

It is customary for every machine to be equipped with two full sets of carriages and three full sets of bobbins, in order that during the time one set is in use in the machine another set may be wound, pressed, threaded, and shaken to avoid the loss of time which would occur if the machine were required to wait while any of these processes was performed.

The manufacture of bobbins and carriages requires such care that their production constitutes a separate branch of industry in the lace-machine producing centers. The making of them was first undertaken by one Shepperly of Nottingham, a watchmaker; the fine touch, trained sight and habits of exact manipulation possessed by watchmakers are still the best qualifications for employment in this department.

VIII. TECHNICAL PROCESSES OF MANUFACTURE

1. The Levers lace machine and its operation

A lace machine consists of two parts, the portion where the lace is made and the jacquard which governs the pattern; these two parts together form the lace machine in its entirety.

Lace is a delicate fabric but a lace machine weighs as much as 33,000 pounds, is 9 to 10 feet in height, and occupies a floor space of about 50 feet by 10 feet, and when fully equipped contains enough yarn, if tied end to end, to stretch from New York to San Francisco and back again, and even in some cases, half way around the world.

The body of the machine, where the lace is made, is from 170 inches to 224 inches in width; a few machines have been built as wide as 260 inches.[38] Quarters, units of measurement of 9 inches, is the term used for expressing the width of a machine. At one time a 16-quarter machine, 144 inches wide, was the standard, but no machines of 144 inches in width are built at the present time. Recognition of a larger machine as a standard occurred in England in 1905, when a dispute between the employers and the employees was arbitrated under the "Conciliation trade disputes act" of 1896, and the award gave the standard width as "above 18 and below 20 quarters, 162 to 180 inches."

The working parts of the inside of the machine consist of combs, points, bobbins, carriages, steel bars, and brackets. Midway between the floor and the inside is a perforated guide called a sley; this runs from end to end of the machine and is about 12 inches in width; it is usually made of light metal, perforated with many small holes, and is similar in texture and make to the wire screening used on windows, but is heavier in material and coarser in mesh; the mesh of the sley is generally finer, by inch measurement, than the gage of the machine. It is rubbed over from end to end with a mixture of soap and lampblack until the holes of the meshes or sieves are filled. It is then painted over with a solution of black varnish to give it hardness and durability, and pricked or "set out" for the entering of the threads in accordance with a specification given by the draftsman, this specification being governed by the kind and width of lace required, a lace machine always being set out to make a definite width of lace. The sley is placed somewhat to the left of the center of the width of the machine, and the part pricked for a definite breadth is from 2 to 4 inches to the left of the position where that breadth is made by the

[38] The width of the first Levers lace-machine, built in 1813, was 18 inches.

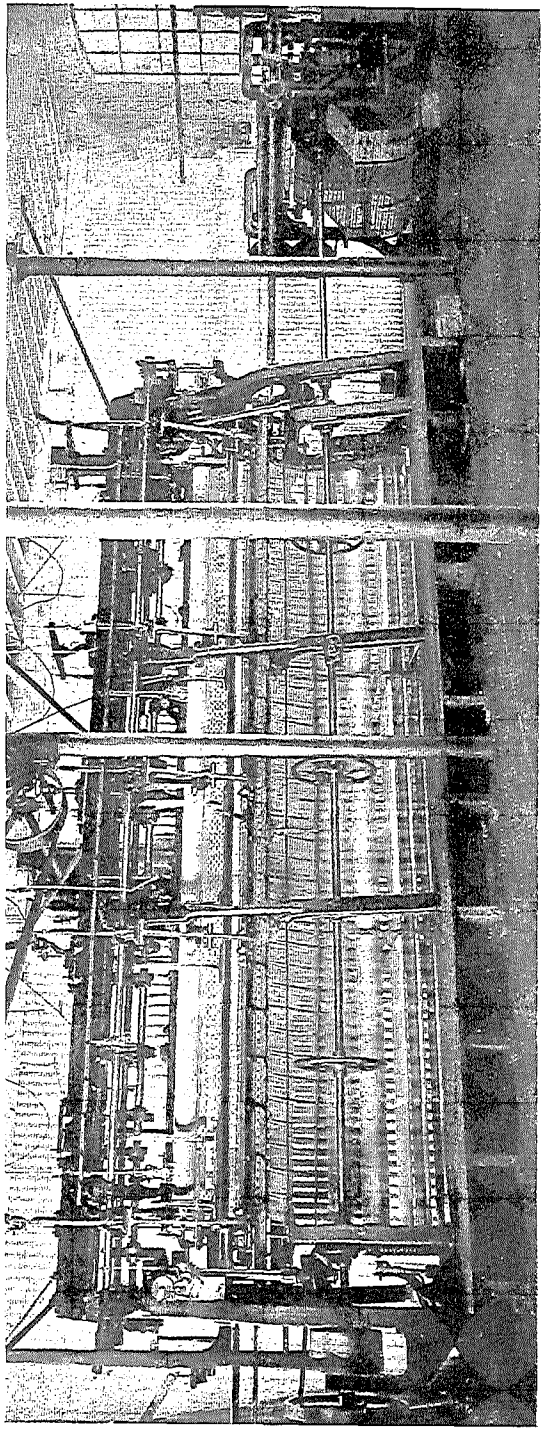
threads in the machine. This displacement is for the purpose of forming the "angle" and causes the threads to rub against the left side of the holes in the steel bars, thus preventing them from floating in the holes, as would be the case if they worked perpendicularly from the sley.

The "setting-out" of a Levers lace machine is different for each width of the same style and for 3 of the 4 fundamental systems of manufacture. To illustrate the setting out, take a 6-inch plain bobbin-fining lace of 120 carriages made on a 10-point machine of 184 inches in width. Commencing at the left side of the sley, 30 sections of 6 inches each would be marked off; in these spaces holes would be pricked in the sley for the entering of the warp threads and of the thick threads required for the patterns. The machine would require 2 main warps of 3,600 threads each and 8 small beams of 30 threads each, also 3,600 bobbin threads, making a grand total of 11,040 threads. Each of the 30 breadths would contain 120 right-twist warp threads, 120 reverse-twist warp threads, 8 beam threads, and 120 bobbin threads, making a total of 368 threads per breadth.

The warp beams are of the length of the machine and are placed in slots in metal arms below and behind the sley. The smaller beams, of which there may be many, are placed behind the warp-beams. The warp threads pass directly to the sley, but threads of the smaller beams are passed through a metal beading or row of eyelets of looped wire and then upward through the sley in front of the warp threads. Both warp and beam threads are then entered through the steel bars which are above the sley and which are supported by upright brackets.

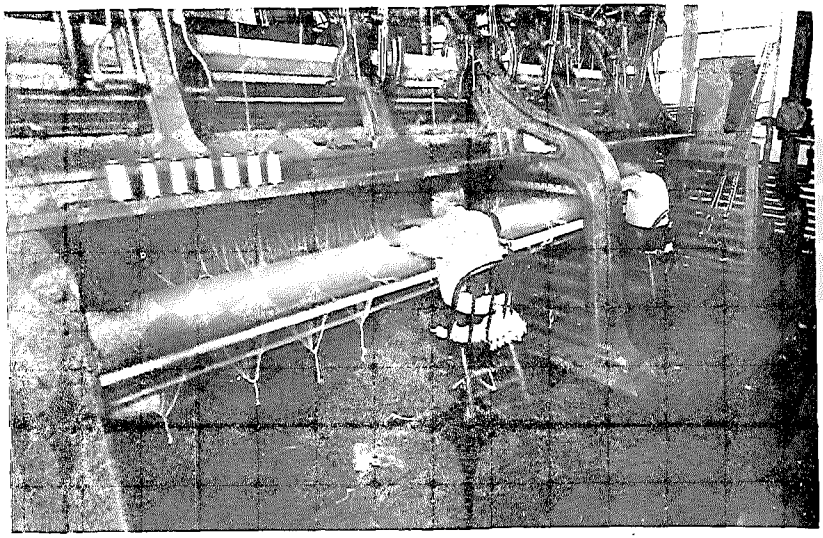
The bars are long, ribbon-like pieces of watch-spring steel, the thickness of a piece of paper; some idea of the fineness may be formed from the statement that each bar is from one-eighth to one-twelfth of a millimeter in thickness and that a number, varying from 100 to 240, each separated from the next by a thin metal guide called a "brass", which renders their free action more certain, work side by side without restrictive friction in a narrow space from 1½ to 2 inches wide. These steel bars are perforated with small holes at mathematically exact intervals of 2 or 4 gaits for the purpose of holding the threads, and are called half or quarter bars, respectively. They extend throughout the length of the machine, and beyond at each end; at the left side of the machine they are attached to individual spiral springs, held in a metal frame, and at the right side they extend a distance about equal to that of two-thirds of the length of the machine itself and are joined to the jacquard. Between the machine and the jacquard, they spread out in the shape of a fan and pass through niches in an upright brass bar, which holds them in position, before they are hooked onto the draw-bits of the jacquard. Each bar is threaded with warp or beam threads, passing vertically through the bars into the space between two comb bars, and fastened to the work-roller above. The function of these bars is to deflect the warp or beam threads, through the action of the jacquard, so that a bobbin will pass on one side of a given thread and on its return movement on the other side, thus forming a twist; all the threads in any individual bar act in the same manner throughout the whole width of the machine. The thousands of threads are passed by hand, each to a particular hole, in an individual bar; this work is performed by the twist hands, the setting up of a machine occupying 2 men from 10 days to 2 weeks.

PLATE 8

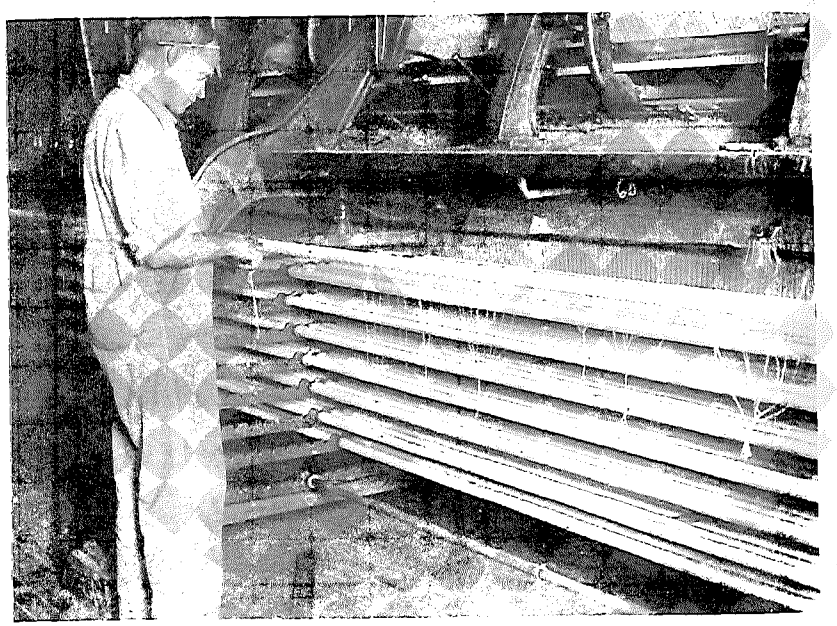


LEVERS GO-THROUGH LACE MACHINE.

PLATE 9



TYING-IN WARPS.



TYING-IN BEAMS.

The comb bars run the entire length of the machine and face each other, one at the front and the other at the back of the threads, and comb leads, each of which is 2 inches in width, are screwed into the comb bars, side by side. Every comb lead contains a number of curved, thin, steel blades cast into metal, the number of blades in one comb lead being four times the point designated for the machine.

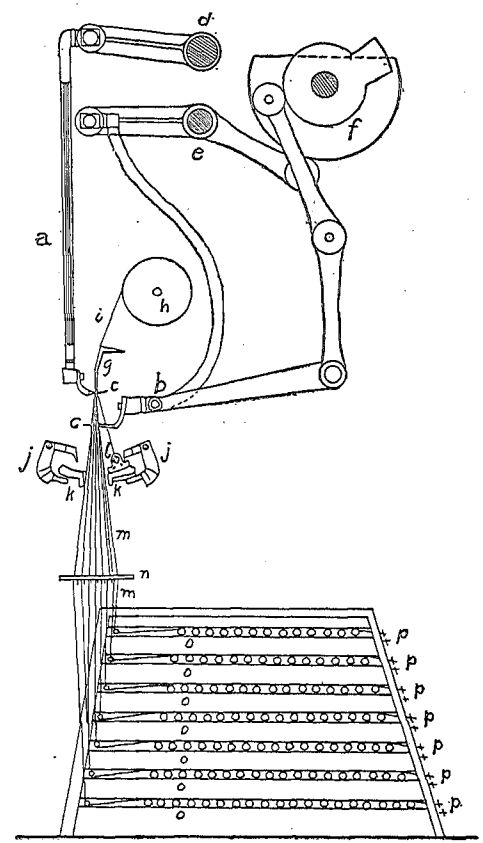


DIAGRAM 2.—Section of a Levers lace machine.

a. Front point bar
b. Back point bar
cc. Points
d. Front point bar shafting
e. Back point bar shafting
f. Back point bar cams
g. Facing bar
h. Single roller
i. "Lace"
jj. Catch bars
kk. Comb leads
l. Bobbin and carriage
mm. Beam threads
n. Sley
oo. Beams
pp. Beam springs and nuts

A 10-point machine, therefore, has 40 blades in each comb lead of 2 inches[39]; this leaves 39 spaces between the blades of each lead, and the fortieth carriage works in the space between 2 adjacent leads. The comb bars are about 2 inches apart, on the arc of a circle, and if brought closer together or moved farther apart, are moved on the same arc; the space between is called the well, and the base of this well, below the level of the bottom of the comb leads, is formed by the steel bars which carry and guide the warp and beam threads.

[39] The 184-inch, 10-point machine would have 92 leads of 40 combs or blades screwed to each of the two comb bars, a total of 7,360 combs with space for 3,679 carriages.

The tension given to the warp threads is obtained by a cord passed around a metal collar on the end of the beam. One end of this cord is fastened to a stud fixed in the beam frame, and the other end is attached to a powerful spiral spring having a hook attached at the other end; the hook is passed through a perforated metal plate which is a fixture. The screw is drawn up by a wing or fly nut until the cord round the pulley at the end of the beam is tight enough to form a brake sufficient to produce the required tension on the warp threads carried on the beam; for the small gimp and thick thread beams, light cord and lighter springs are used and are adjusted separately.

The dead-stops must place each thread between 2 carriages with great accuracy, because when the lateral movements are made, if the thread at the end of its movement is not precisely between 2 carriages, it may be cut down, and the inside parts of the machine may be seriously damaged. In each groove of a comb lead a carriage holding a brass bobbin works backward and forward. The warp and other threads in each gait have a separate bobbin or weft thread; this constitutes one of the fundamental differences in principle dividing the ordinary weaving loom, which has one weft thread to the whole of the warp threads, from the Levers lace machine. In an 18-point machine 36 carriages and bobbins, each holding upwards of 100 yards of cotton or silk yarn, swing side by side in an inch with a space between them in which warp and beam threads are congregated, clear of each other and clear of the threads through which they pass. The carriages are suspended, by the threads wound on the bobbins, from the work roller above, and catch bars fall into the flanges of all the carriages on each side. There are two catch bars above the carriages, one at the front and the other at the back of the warp threads; these catch bars have a to-and-fro and an up-and-down motion imparted to them. The to-and-fro motion alternately pushes and pulls the carriages through the warp or beam threads after they are moved by the jacquard. The front catch bar takes the carriages and draws them up the combs to the extreme limit of their motion, and returning, pushes them to the center of the well dividing the comb bars. At the back of the warp threads, another catch bar is waiting and falls into the back flanges, and at the same time, the first catch bar rises and releases the carriages, thus allowing the back catch bar to draw them up to the other extremity. The comb bars being placed exactly opposite to each other and the carriages being wide enough to bridge the space between, they are entering the comb bar on the back motion before they leave that on the front, and one or other of the catch bars always holds them, as one does not release the carriages until the other has them in charge. Thus one catch bar conducts them through the warp threads at each motion from one side and then returns them to the other catch bar which seizes them all simultaneously and conducts them back again to the other side of the warp threads.

Perfection of movement, an action similar to that of a pendulum, requires the carriages to travel at their greatest speed as they pass the vertical line, and have a short period of repose at the extremities of their motion; this slight retardation where the machine is opened to its fullest extent is obtained through elliptical gearing so arranged that the slowest part of the motion coincides with the two dead points. The pauses at these points give time to enable the jacquard to actuate

safely, and without shock to move the steel bars holding the threads to their preordained positions; at the same moment that the warp or beam threads reach the extreme limit of their movement, the bobbins and carriages pass through with a movement at right angles to that of the warp and beam threads, tying them firmly into position.

Above the carriages are 2 point-bars, 1 at the front and 1 at the back of the machine, long bars of steel carrying the point-leads, which consist of pieces of cast metal, 2 inches in width, placed side by side, in which are placed needlelike points about 1¼ inches in length, of the same number to an inch, or more, as the bobbin threads. The action of these points will be discussed later.

Above and between them there are two rollers the length of the machine; as the lace is made, it is wrapped around an upper roller

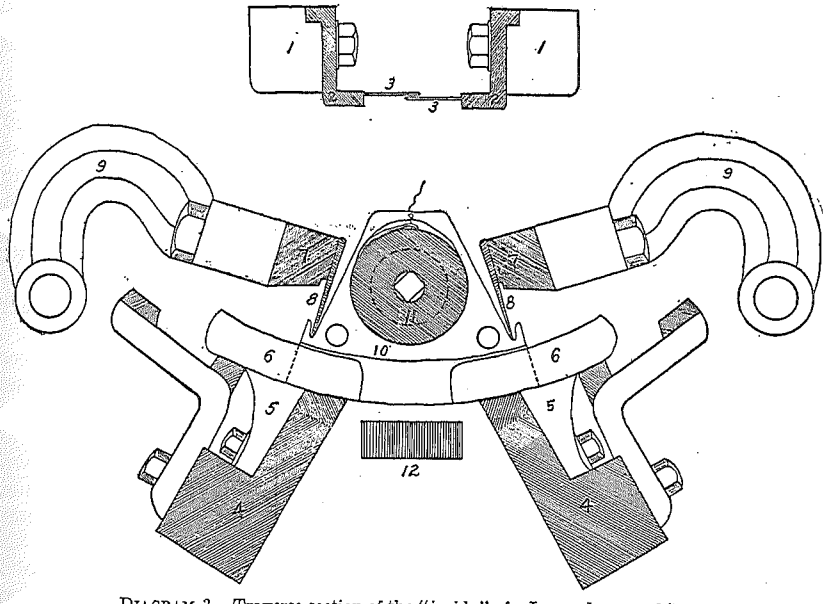


DIAGRAM 3.—Traverse section of the "inside" of a Levers lace machine.

In this sketch the carriage is over the "fosse", the base of which is formed by the top bars which carry the threads and are connected with the jacquard (12). It is exactly in the center and both catch bars hold it, while the points which compress the intertwisting warps and bobbin threads are together (3). One of the catch bars (7, 8) is about to release it and the other one is ready to draw it up the side combs (6).

1. Point bars
2. Point leads
3. Points
4. Comb bars
5. Comb leads
6. Comb blades
7. Catch bars
8. Blades of catch bars
9. Catch-bar arms
10. Carriage
11. Bobbin
12. Steel bars

resting upon a lower one, which is covered with short metal points or spines, whence its name, porcupine roller. The lower porcupine roller gathers the lace as it is produced and holds it taut after it has passed over a flat metal surface called the facing bar. As the porcupine is turned by a toothed wheel at a regular and even pace, which does not alter until the wheel is changed, the speed at which the upper roller is turned in the opposite direction by frictional contact with the porcupine is invariable, no matter how thick or thin it may be; it becomes thicker with the additional layers of lace which are wound around it.

Variations in quality are obtained by means of a series of toothed wheels, which turn the roller at a speed proportionate to the number

of teeth in the circumference, or by a clawker which falls a longer or shorter distance on the rachet wheel and so takes more or fewer teeth at a motion; every alternate motion of the machine is recorded by a tooth and pinion wheel, which indicates the number of racks of lace on the roller at any given time.

(*a*) *The jacquard.*—The jacquard is attached to the lace machine by a steel shaft, fitted with two or three wheels in front of the machine by which the twist hand can obtain leverage to start and stop the machine. This center shaft runs the entire length of the machine and of the bars at the right hand of the machine until, at its point of contact with the jacquard, a cogwheel on the shaft engages with another cogwheel attached to the jacquard. These cogs are so adjusted that the motion of the machine synchronizes with the motion of the jacquard; therefore when the front motion of the jacquard has placed the threads in position, through its action on the bars, the carriages pass through on the front motion and the front point bar takes up the twists which have been made and vice versa.

The jacquard, as it is used in the modern Levers go-through lace machine, has evolved as much as, or more than, the machine itself. Various methods have been used for traversing the steel bars which carry the warp and beam threads; the Dawson wheel or cam, the nog, the Manchester top, and the spring dropper jacquard. The last mentioned represents the final evolution to date and is practically the only one now made. The spring dropper jacquard was invented by David Binch in 1851. At that time it had only a single cylinder with 3 droppers to a bar, of a capacity of 7 gaits. The modern jacquard has 2 cylinders with 7 droppers to a bar and a capacity of 39 gaits.

The double spring dropper jacquard is of a much more complicated system than that applied to ordinary looms, for, whereas in those cases the thread has 2 possible modes of action by government from the jacquard, in the Levers lace machine, it may have 39.

Two metal plates cross the top of the jacquard and form the lower clamps of two vises which are divided into as many independent orifices as there are available spaces for bars in the jacquard; these metal plates, called "driving blades", move backward and forward by the direction of cams; when they move backward the orifices are opened, and when they move forward, the orifices are closed. The upper clamp of the vise in every one of the orifices is attached to one of the steel bars by means of a thin metal plate called a "box"; the lower clamp of the vise is in one piece and has only one movement, whereas the upper clamp is composed of as many parts as there are boxes to the bars and each one is movable and can act independently of the others. Now, if anything solid be placed between the two clamps of the vise, when the lower clamp moves forward the upper one will be moved forward also for a distance equal to the thickness of the solid substances, the droppers, inserted between the clamps; as the upper clamp, the box, is attached to the steel bar, which contains threads, it will be moved forward also the same distance.

Underneath the boxes are two 6-sided cylinders, each cylinder being the width of the jacquard, one placed at the front and the other at the back; these are rotated alternately one-sixth of a complete revolution, and so alternately control the two sets of orifices of the front and back motions. These cylinders are pierced from end to end, on each face, with seven rows of holes equally spaced. Above each

cylinder are two brass plates, the upper one perforated with square holes and the lower one with round holes which correspond exactly with those in the cylinder. Above these plates are the boxes containing droppers, which are held separately and in a definite order in the brass plates which keep them upright, each with its head just below the level of the sliding lower clamp of the vise. A dropper is a steel pin about 10 inches long with an enlarged head; droppers are of six sizes, each head being equal in size to a specified number of gaits. The first, called the "dummy", is longer than the others and is always working, as it is upon its upper part that the other droppers are bedded when raised; the lower part carries an enlargement equal to half the distance between two carriages and is called the "half gait"; it is used in long throws to insure the thread being carried to its required level.

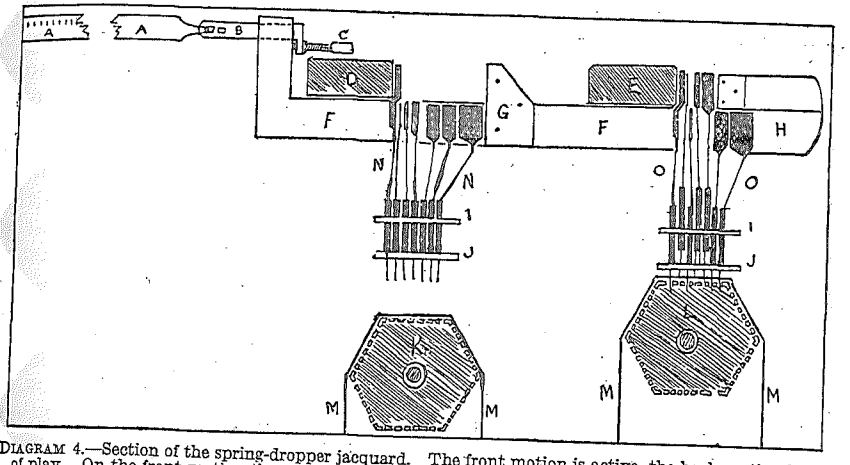


DIAGRAM 4.—Section of the spring-dropper jacquard. The front motion is active, the back motion is out of play. On the front motion the one, four, and eight gait droppers have been raised by the Jacquard cards, forming the number thirteen gaits. The other droppers have fallen through the holes punched in the card, into the cylinder.

AA. Steel bar
B. Drawbit
C. Screw.
D. Back motion driving blade
E. Front motion driving blade
FF. Boxes
G. Buffer of back motion box
H. Buffer of front motion box
II. Upper dropper plates
JJ. Lower dropper plates
K. Back motion cylinder
L. Front motion cylinder
MM. Jacquard pattern cards
NN. Back motion droppers
OO. Front motion droppers

The next dropper is equal in thickness to 1 gait, the next to 2, the next to 4, the two next to 8 each, and the last, sometimes to 8, sometimes to 16 gaits. Beginning with the two gait, each of these droppers is grooved at its lower edge in order to bury any of the droppers in front of it which may not be raised. The exception to this is the second 8 gait dropper, which is differently shaped because it never has to bury any other dropper and never works except in conjunction with the first 8 immediately in front of it; and the 16 gait, when used must bury the second 8 only and such other droppers as are not raised in front of the first 8-gait. The play of these droppers must be exceedingly free; they are lubricated with powdered graphite, as are the comb-leads, carriages, and steel bars. The jacquard of a machine making independent beam laces, requiring a full number of droppers for every bar, if working 150 bars would use $150 \times 2 \times 7$, or 2,100, droppers.

The capacity of the jacquard is sometimes extended by the use of a supplementary jacquard operating what are known as "bottom bars." In the manipulation of bottom bars all the warp threads are passed through 2 sets of bars known as "bottom bars" and "stump bars"; these are placed in 2 ranks, one above the other. The bottom bars are below the stump bars, and the stump bars are placed in the well of the machine, along with the other top bars; there are, as a rule, four stump bars, and they are of heavier caliber than the other steel bars. The function of the bottom bar is to place the thread at the top or bottom side of the hole in the stump bar as required, and the action of the stump bar twists the thread with the bobbin thread at either the top or bottom side of the gait, according to the position of the thread in the hole in the stump bar, as provided by the action of the bottom bar. The bottom bars may throw as much as 2 inches, but the stump bars generally move only across one carriage, though it is possible to throw them over two or more carriages.

This work necessitates the use of two jacquards, the ordinary top-bar jacquard, and the bottom-bar jacquard which is much smaller and is placed underneath the bars of the top-bar jacquard. The bottom-bar jacquard has but one cylinder, and its rate of speed is therefore double that of the individual cylinders of the top-bar jacquard; horizontal needles connect with other vertical needles and so actuate the bottom bars. The threads in the stump bars cannot function at the places where the stump bars are supported over the brackets, and a few bars are used from the top-bar jacquard—fill-up or bracket bars—as many as are necessary, equally divided between the back and front bars, and behind and in front of the stump bars. As a rule, the number of bottom bars does not exceed 600, but as many as 1,200 have been used, this large number necessitating an arrangement in tiers.

The cards of the pattern are passed over the cylinder and either hang in folds, supported by wires on arms, or lie on the floor in a cradle; they work in an endless chain. Each cylinder has an up-and-down motion imparted to it, each card lies temporarily upon the upper flat side, and when the cylinder rises its surface is replaced at each motion by the surface of a card presenting either holes or plain space, which is pressed against the lower brass plate, and the vertically placed droppers are raised by the portions of the card not punched out, which can be so arranged that they may present any combination of numbers to place the threads in the lace as required by the arrangement of the draft. If the space under a dropper is punched out, the dropper pin falls through the hole into the hollow cylinder and is out of action. The heads of droppers which are raised are inserted in the space between the clamps of the vise, and when the driving blade moves forward, the front movable part will be moved forward to the extent of the sum of the size of the dropper heads so trapped; consequently, the bar will be deflected and the threads in it will be moved laterally throughout the length of the machine toward the right or the left above the dead-stop, according as there are more or fewer droppers entrapped. If the 1-, 2-, and 4-gait droppers are raised, the bar will rise 7 gaits above the dead-stop; if at the next motion the 4 gait only is required, the spring at the left of the machine draws the bar back again, so that the thread will stand 4 above dead-stop, and when the droppers in 1 motion fall after carrying out their work, the bar has already been controlled by the droppers of the other motion; therefore, the threads do not sink to dead-stop and are not required to mount from that place to their new positions. A bar rarely throws more than 10 gaits at once. It is while the carriages are at the extreme limit of their motion that the jacquard moves the steel bars to the prearranged positions for each motion of the pattern; when the threads have reached the extremity of their movements, the carriages pass through to the opposite limit of their motion, tie the threads in, and the point bars take up the lace which has been completed.

The point bars are above the catch bars. After each motion a point bar is lowered, the points pass through the threads as soon as they are crossed, compress the twists, take them up, and lift and fix them firmly to the work which is already finished; the point bars withdraw clear as soon as they have completed the operation, and resume positions to commence the same operation again; these movements are effected automatically and methodically. Thus, all the parts of the machine operate in perfect accordance with, and in some instances in obedience to the jacquard, which controls all the movements of the threads in the course of making the pattern, the threads in each bar having a movement absolutely independent of but coordinating with the movements of other bars.

The two cylinders repeat the operation alternately, of presenting a card to the surface of the dropper plate, so that the spaces between the driving blades and the front of the boxes are served alternately also, and the whole series of cards is brought successively in contact with the lower brass plate, time after time. Thus the jacquard expresses the pattern by actuating the thread-controlling devices of the machine, and it is by modification of the lateral movement of the threads that the varieties of patterns are produced. The threads in the bars are worked in a predetermined fashion and produce an enlacement of warp and bobbin threads by the impulse communicated to the warp threads by the jacquard. In a way the draft is active and compels the threads to pass into such positions as are necessary to reproduce the original design with all the artistic touches which have been added to it.

When the pattern cards are first placed upon the cylinders of the jacquard, a pattern is run off. It is the duty of the draftsman to correct this pattern, take out all card punching or reading errors, change any arrangement of the threads which traps or causes them to break, and alter any part of the pattern which it is desired to beautify. Alteration of a pattern, once it is drafted and punched, is expensive, because the draftsman has to alter not only the draft but punching sheet and cards, a long and tedious process. Patterns of silk, made on Ensor net, as a rule require less alteration than those of cotton, of bobbin-fining, or of independent beam types.

When the pattern is corrected, the draftsman directs the alteration of the weight on the warp or beams to a suitable tension, and the future weighting of the pattern devolves upon the twist hand, under the foreman.

(*b*) *Theory of lacemaking by machine.*—All laces are formed by the conjunction of the movements and the intertwisting of the two distinct sets of threads—the warp and beam, and the bobbin threads. The following short explanation of the theory of lacemaking is condensed from chapter II of M. Bouffartigue's book, "Tulles et dentelles

mécaniques de Calais": From a roller, A, suspend by a thread a weight, B, representing the bobbin and carriage. At equal distances on each side of this, place two longer threads, C and D, which will represent the warp threads. If the bobbin and carriage B swing from and toward the observer and the other threads remain stationary, there will be no result, but if the threads C and D be drawn to opposite sides while the bobbin thread B is in front of them and then be drawn back to their original positions when the bobbin B is at the back of them, a chain will be formed. Similarly, in a machine, if a bobbin passes through the back motion on the left-hand side of a certain warp thread, and before it returns to the front comb bar, the warp thread should be deflected and its position be changed by the action of the jacquard, so that the bobbin in its forward movement now passes on the right side of the same warp thread, it is clearly to be seen that a twist has been formed between them through the conjunction of movement of the two sets of threads; these motions can be repeated indefinitely.

To sum up, to form a ground there are required two sets of threads: The bobbins which always follow the same path in the combs, and the warp or beam threads which pass in front of or behind the bobbin threads to the right or to the left as they are drawn by the action of the jacquard on the steel bars through which they are threaded. The objects are made by supplementary threads held in reserve at certain moments, or intervening at other moments, either to form the objects or to leave empty spaces on the net; these work at the same time as the warp threads. When it is considered that it is possible to procure the intervention of the supplementary threads at moments determined beforehand, it follows that the realization of the forms of flowers, leaves, or other objects which are usual in lace, is possible also.

This short description of the action of the machine and jacquard gives an idea of the great difficulties which had to be overcome by stubborn will and determined effort, by attempts ceaselessly renewed, and by attention to details requiring eternal retouching and recommencements.

(*c*) *Mode of driving the machine.*—If machines stand on the ground floor of the factory building, the feet of the standards are bolted to piers of stone, set in concrete foundations. When they are placed in higher stories of the building, the floors must be specially constructed and supported to hold them. The machines are driven by power, either by belts from a universal shafting, or by gears from individual motors averaging about 2½ horsepower each. The propelling of a number of machines through a single source of power is wasteful, since the machines are subject to frequent stoppages, and the power runs when the machines are not working. The propelling of machines by individual motors disassociates them, thereby effecting a corresponding saving of power.

The working of a lace machine creates a great amount of vibration. Opinion is divided as to whether the machine works best on solid foundations or on floors which communicate a certain proportion of this vibration to the shell of the building; in both cases, however, it is customary to fasten the tie bar of each machine to the roof of the building, or the ceiling of the room, with thick iron bars.

The standard unit of measure of lace on the machine is called a "rack" and consists of 1,920 single motions of the machine; the number of inches of lace per rack is called the "quality." The smaller the number of the quality the better in grade is the lace, because there are more machine motions in a shorter length and this is distinguishable in the texture; therefore a lace of 12 quality, or "12-inch racks" is better in grade than a lace of the same style of 18 quality or "18-inch racks."

(*d*) *Length of webs.*—The webs of lace are taken from the machine in various lengths. The most usual mode of procedure is to take the web off when either 1 or 2 windings have been made. When crossbands are made, it is practicable to make only as many as are requisite to fill the order, as each band is complete in itself, and all that is necessary is to make a small additional piece of 2 or 3 inches at each end, for the purpose of fastening the piece onto the pins of the dressing frame. It is not customary to make laces, made the right way on the machine, of shorter lengths than 12 yards; otherwise, the breadths will consist, when finished and carded, of short lengths.

(*e*) *Production.*—A Levers go-through lace machine travels, with safety, from 140 to 160 motions per minute, producing on an average about 4½ racks an hour; a Levers lace machine with landing bars is somewhat slower; the number of racks made per week on either type of machine will vary somewhat with the class of goods. The case, instanced by a machine-builder, of a Levers go-through machine making 480 racks in a week is very exceptional; 350 racks per week is a large output, and taking into consideration the various delays incidental to changing patterns, entering full bobbins, tying-in beams and other necessary tasks, it may be said that 300 racks per week is a conservative and safe average if the machine runs double handed for a 97-hour week.

Calculations may be made for the linear production per week of any width and quality of lace by the following formulae: *For ordinary laces.*[40]—Multiply the number of breadths of the machine by the quality and by the number of racks per week, and then divide by 36; this will give the linear yards of lace made per week. *All-over nets.*—Multiply the number of racks per week by the quality and divide by 36; this will give the length of the production per week, for the full width of the machine, in yards; multiply the yards by the number of breadths into which the piece is cut up; this will give the number of linear yards of all-over net of a given width made per week. *Crossbands.*—Multiply the number of racks per week by 1,920 and divide by the motions in the pattern; this will give the number of crossband breadths made; multiply the result by the width of the machine, which will give, when reduced from inches, the total linear yardage for the week. The quality of crossband laces does not affect the quantity of production, except as it affects the productivity of the machine, but it affects the linear width of breadths of lace of the same number of motions. For instance, the linear width of a crossband lace, of which the pattern is 960 motions long, would be 9 inches, at 18 quality, or 13½ inches at 27 quality, but there would be 60 breadths of either in a web of 30 racks; on a machine making lace of 180 inches in width on the metal there would be 300 yards of lace of either 9 or 13½ inches in width.

[40] A formula for calculating the area in square yards of a given number of breadths will be found in the section dealing with costs. (*See* p. 165.)

The production of various types of lace at different qualities, on 184-inch machines, making 300 racks per week is shown in the following table 89.

TABLE 89.—*Weekly production of Levers laces, 184-inch machines, 300 racks in 97 hours*

Style of lace	Width of lace	Breadths in machine	Production per 300 racks	
			Linear yards [1]	Cards of three dozen yards each [1]
Valenciennes lace: 15 quality, 12-point	16 carriages 2⅛ inch	274	34,250	951+14 yards.
	20 carriages 5/16 inch	219	27,375	760+15 yards.
	24 carriages 1 inch	183	22,875	635+15 yards.
	32 carriages 1⅛ inches	137	17,125	475+25 yards.
Normandie or Cluny lace: 18 quality, 10-point.	40 carriages 2 inches	91	13,650	379+6 yards.
	48 carriages 2½ inches	76	11,400	316+24 yards.
	60 carriages 3 inches	60	9,000	250.
	80 carriages 4 inches	45	6,750	187+18 yards.
	96 carriages 5 inches	38	5,700	158+12 yards.
	120 carriages 6 inches	30	4,500	125.
All-over nets:				
15 quality			[2] 125	625.[3]
18 quality			[2] 150	750.[3]
Crossbands:				
18 inches, quality 960 motions	9 inches	[4] 600	3,000	
27 inches, quality 960 motions	13½ inches	[4] 600	3,000	

[1] These results would be subject to a reduction of 3 to 5 percent for shrinkage in dressing and damage in finishing.
[2] Full width of machine in inches.
[3] Linear yards, 36 inches.
[4] Breadths made.

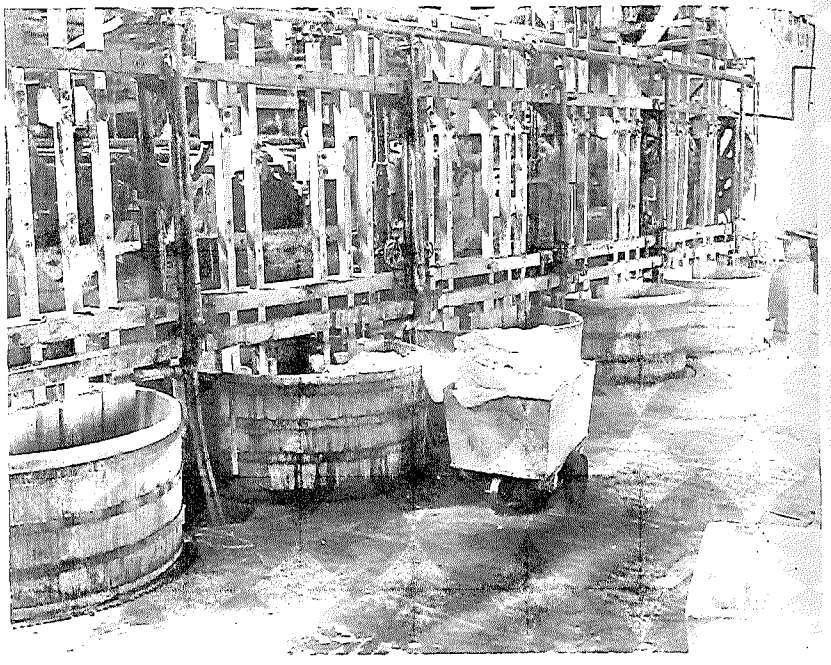
The styles of lace shown in table 89 are typical of the cotton lace industry; by the application of the systems of calculation shown for these examples, the quantity produced per week of any other style of lace, made of any other material, can be ascertained.

Loss of production through loss of time in changing patterns has already been referred to; this occurs principally through a pattern requiring more bars and beams following one requiring fewer bars and beams. It is a practice in some English firms to draft all independent beam patterns with the same number of bars whether required for the pattern or not, which procedure entirely avoids tying down extra beam threads which may not be required for the purposes of any particular pattern. This method is referred to in section 4 of General Instructions of the Revised List of Payment for Levers Laces, issued in 1914.

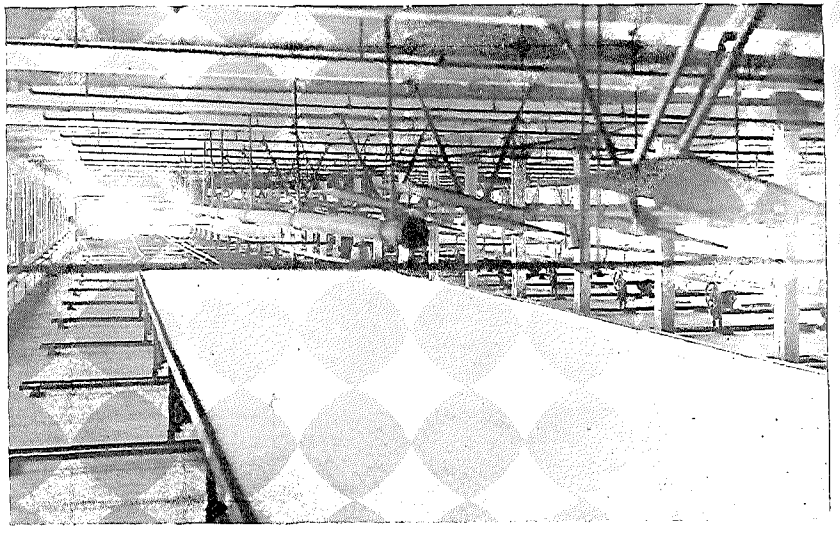
When bars threaded are not required in a pattern, and are marked on the dead-stop paper as "in or out" the threads may be left up or pulled down at the discretion of the lace maker to save alteration, but such bars shall not be paid for. The bars marked "in or out" shall only apply to back or center gimps and warp threads.

A plan sometimes adopted in the domestic industry consists of the use of a chart upon which patterns are listed with a record of the number of beams required by each in numerical order. Orders for which there is no urgency can then be filled by following the making of one pattern by the making of another with approximately the same number of bars. By this plan the number of bars can be gradually reduced to a minimum or increased to a maximum with the least possible loss of time.

PLATE 10



BLEACHERY.



DRESSING ROOM WITH FRAMES.

2. Finishing processes

(*a*) *Mending.*—Lace suffers some damage in the process of making; threads break, bars mislap, or are too high or too low in the gait. Defects thus caused are discovered upon inspecting the piece, and are mended after tying a loose knot over each damaged place. The finer parts are mended by hand, the dropped pattern being carefully replaced by the needle; it is also possible to do some mending by machinery.

(*b*) *Bleaching.*—It is not feasible to bleach fancy lace by the Scotch system mentioned in the chapter on Nottingham lace-curtain machine products. Instead, it is scoured, boiled, mechanically pounded by heavy wooden mallets in tubs of soapsuds, then immersed in solutions of hyperchloride of lime, and later of acid, and then washed.

(*c*) *Dyeing.*—The vogue of silk, rayon, wool, and metal laces has extended the possibilities of combination of color, and laces made of these materials are dyed in all shades. Various materials, such as cotton, wool, viscose, and cellulose acetate rayon, are sometimes used in making the same fabric and are subject to the action of dyes in different ways; the principle of the 2 or 3 color dyeing is that several materials are employed, each with its own selective dyeing affinity, by the physical attraction of the different fibers. Silk and wool are animal products, cotton and rayon are vegetable products, and laces made of them can be dyed in the same bath by the selective process. The dyes are mixed in their due proportions, and the one which dyes the animal product does not color the cotton or artificial silk, nor does the one which affects the vegetable product color the silk and wool. The use of vegetable dyes is practically confined to one material—logwood, which is chiefly used in the dyeing of silk fabrics. All dyes should be fast to light and moisture.

(*d*) *Dressing.*—Bleaching or dyeing leaves the material limp and raw, and it is dressed by passing it through a weak bath of soda ash at about 110° F., and then sizing with thin starch paste to the desired stiffness, which depends upon the weight of the fabric. A small amount of blue coloring matter is added to the starch to neutralize the yellow tinge remaining, even after the most careful bleaching, and for this tinting ultramarine blue is generally used in the size; Indanthrene blue R.Z., however, finds extensive use on account of its excellent fastness. After the web is starched, the surplus of stiffening fluid is extracted by passing the lace through a calendar [41] and it is then ready for "dressing."[42]

A dressing frame consists essentially of two extended, parallel, horizontal frames, provided with means of supporting and stretching the fabric; the distance between the frames is adjustable, and the inside of the bars is lined with pins, onto which the selvage is fastened, without any damage to the lace.

The dressing rooms are kept at a very high temperature but they are well ventilated, with numerous windows, and the air, by being constantly changed and in motion, has no ill effect upon the health of the workers, who, with the exception of the expert, are usually girls. Revolving fans above the dressing frame waft the hot air downward and dry the lace rapidly.

[41] In the case of rice nets, or coarse nets used for hat shapes, the amount of starch is very great, and is not wrung out previous to dressing.

[42] In England, dressing is a separate business, and firms make a specialty of dressing particular kinds of lace, such as curtains, bobbinets, silk laces, and veilings. The factories are very large, in one case having the capacity to dress pieces 140 yards long and 460 inches wide.

All pieces shrink when taken from the machine; some laces are dressed to the same width as they are made; but pieces of filet or square-mesh lace cannot be dressed to their full width; Ensor net goods, on the other hand, can be dressed wider; the only type which is habitually dressed wider is veiling, which is sometimes stretched to more than four times the width of the piece on the machine, losing in length in the process.

The purpose of the dressing is to obtain the full extension of the meshes to the proper shape, the recovery of the width to the same size as on the machine, and the stiffening of the fabric to prevent collapse when the piece is taken from the frame, so that the design will be symmetrical and not distorted. The article should support a reasonable amount of handling and remain stiff and bright while in stock.

(e) *Finishing.*—The work of finishing lace is carried out in well-lighted rooms, and the workers, who are all women or girls, must have clean hands, because lace cannot be redressed or put through any cleaning process after it is once drawn or cut up. The laces are drawn, which allow the breadths to fall apart, and the loose bobbin threads are cleared away; clips or loose threads, which pass from one detached object to another, are then removed by clipping, of which there are three separate methods. (1) In 1897, Cordier-Levray invented and patented a clipping machine, and a similar machine is in use today. The work is done automatically by the blades of revolving knives, which pass over the lace with a motion similar to that of a lawn mower, the cut threads being withdrawn by suction. (2) Sprig nets, which have detached spots and objects in regular rotation, exact distances apart, can be clipped by a shuttle, the two edges of which consist of knife blades which can be adjusted to definite widths and passed under the clips. (3) Hand clipping with scissors.

Few laces have a straight front. Most of them are indented or curved, the surplus material being cut out by hand. A small proportion of this drawing, clipping, and scalloping is done by outside workers who take the lace to their homes; the French system of middlemen does not obtain in the United States.

After the lace is drawn, clipped, and scalloped, it is examined, mended, and calendered by being passed between heated rollers; this process gives a smooth surface and a glossy appearance to the finished article. It is then wound by jennys on to cardboard, the usual amount placed on one card being three dozen yards,[43] but if the lace is intended for shipment to countries where the duty is assessed by weight, these cards are omitted. The lace is bound on to the cards by ribbons, a strip of colored paper being inserted beneath the outer layer to show the pattern, then ticketed and hydraulically pressed, and is ready for the market. Thus ends a long series of processes which present many difficulties, and which give to the perfect production of lace a merit not always appreciated at its real value; for lace, however beautiful, cannot convey to the lay mind, by its appearance, the amount of study and processing work which has been necessary for its production. Any slackness of attention or carelessness of manipulation may cause damage and result in work which cannot be accepted as of the high standard that the market demands but must be sold as seconds, which, although costing as much to produce as the perfect lace, does not carry the full price but must be sold at a loss.

[43] In France, the usual quantity placed on a card is 11 meters, which is equal to 12.03 yards.

3. English and French terms used in the Levers lace industry

The Levers lace industry abroad is identified with the cities of Nottingham, England, and Calais, France. Some of the names applied to parts of the machine, having originated in England, have been adopted in France, without change of pronunciation, such as dropper, catch-bar, stump-bar, gait, gage; other French names have been evolved from the English words, such as wapage, wheelage; and in other cases a French word has entirely replaced the English word. A glossary of English technical terms and the French equivalents is given in table 90.

TABLE 90.—*Equivalent English and French terms used in the Levers lace industry*

MACHINERY

English	*French*	*English*	*French*
Levers lace-machine	Métier Leavers.	Spring	Ressort.
Go-through lace machine	Métier du système go-through.	Quality wheels	Roues de qualité.
Carriage	Chariot.	Nipper	Romaine.
Bobbin	Bobine.	Manchester jacquard	Jacquard à ficelles.
A set	Jeu de chariots, bobines.	Bottom bar jacquard	Jacquard latéral.
Point bar	Barre garnie de pointes.	Boxes and draw-bits	Boîtes et draw-bits.
Point lead	Plomb de pointes.	Bar wrench	Clef.
Comb bar	Barre de combs.	Dropper gage	Calibre pour les droppers.
Comb lead	Plomb de combs.	Card-nippers	Becquettes.
Beam, roller	Rouleau.	Slip-winding machine	Devidoir.
Porcupine roller	Rouleau porc-épic.	Warping mill	Ourdissoir.
Sley	Peigne.	Drum	Tambour.
Rack-bell	Compteur à racks.	Brass-bobbin winding machine	Table à wheeler.
Top bars	Guide-barres pour gros fils.	Card punching machine	Piano à percer.
Warp bars	Barres de fond.	Jenny	Moulinet.
Bottom bars	Fines barres.		

PERSONNEL

Twisthand	Tulliste.	Draughtsman	Dessinateur-mise-en-carte.
Foreman	Contre-maître.	Reader-off	Pointeur.
Slip-winder	Devideuse.	Puncher	Perçeur de cartons.
Warper	Wapeur, ourdisseur.	Overlooker	Sous-maîtresse.
Brass-bobbin winder	Wheeleuse.	Mender	Raccomodeuse.
Threader	Rémonteur.	Jennier	Plieuse.
Jacker-off	Survideur.	Finisher	Pacqueteuse.
Presser	Presseur.	Pattern-girl	Échantilloneuse.
Designer	Esquisseur.		

PROCESSES

Weighting beams	Reglage.	Bleaching	Blanchiment.
Slip winding	Devidage.	Dressing	Apprêtage.
Warping	Wapage, ourdissage.	Drawing	Effilage.
Brass-bobbin winding	Wheelage.	Clipping	Découpage.
Threading	Rémontage.	Cutting-out	Déchiquetage.
Jacking-off	Survidage.	Scalloping	Écaillage.
Reading-off	Pointage.	Overlooking	Visitage.
Punching	Perçage.	Folding	Pliage.
Mending	Raccommodage.	Finishing	Confection, finissage.
Dyeing	Teinture.	Sampling	Échantillonage.

TABLE 90.—*Equivalent English and French terms used in the Levers lace industry*—Continued

MATERIAL

English	*French*	*English*	*French*
Lace	Dentelle.	All-over	Laize.
Spotted-net	Tulle moucheté.	Flounce	Volant.
Edging	Bande, bord.	Tie	Barbe.
Insertion	Entre-deux.	Cross-band	Bande de travers.
Beading	Trou-trou.	Skein	Écheveau.
Galoon	Galon.		

TRADE TERMS

Quality	Rendement.	Lacer, selvage	Lisière.
Width	Largeur, hauteur.	Back and front gimps	Matelaissé.
Length	Longueur.	Scallop	Écaillé.
Warp	Chaine.	Purl	Picot.
Ground	Fond.	Sample	Échantillon.
Net	Réseau.	Draught	Mise-en-carte.
Mesh	Maille, treille.	Figure sheet	Barême.
Thick thread	Brodeur.	Deadstop	Pancarte.
Flossing	Plumetis.		

CHAPTER III

BOBBINET

I. DESCRIPTION AND USES

Bobbinet is a plain (unfigured) lace with hexagonal meshes made by intertwisting threads. It is an exact machine-made imitation of the net made by hand on the lace pillow with bobbins—hence the name bobbinet. The products of the bobbinet machine are called bobbinet in the United States, plain net in England, and tulle in France,[1] the fine qualities in France being called "tulle uni" and the coarse qualities "tulle grec." Other names are wash-blonde, mosquito net, Mechlin, Cambrai, Bretonne, Brussels, and silk illusion; coarse yarn cotton nets, heavily starched, are in England called rice-nets.[2]

Certain variations from regular bobbinet have been made on the bobbinet machine:

1. Square-mesh net was made on the bobbinet machine in England in 1921.[3]

2. An imitation of Grecian net is made by the extension of the length of the hole to eight motions. Bobbin threads change positions at the first, third, fifth, and seventh motions; they cross each other at the first and fifth, but at the third and seventh motions single threads only cross the wale.

3. A variation called "striped net" has been developed by the introduction of gimps, worked from independent beams threaded in steel bars, the movements of which are controlled by cams or Dawson wheels. The possibility of movement is limited, and the pattern consists of stripes of varying width divided from each other by bands of plain net.

4. Diamond-shaped objects have been formed on the mesh by the omission of certain bobbins at definite distances on the machine. As the two sets of bobbin threads traverse the net diagonally in opposite directions the desired result is obtained.

5. Diamond-shaped objects of a color different from the groundwork of the net were created by carrying colored threads in the bobbins at definite distances.

In addition to these variations made on the bobbinet machine, two other products have been made by mechanical adaptations of the machine. Having invented the bobbinet machine in 1809, Heathcoat experimented with adaptations. In 1813 he perfected an adaptation for the production of quillings. Quillings, known in the United States as "footings", are narrow insertions of plain net of cotton, silk, or rayon, ranging from 1 to 5 inches in width. They are

[1] The name is taken from that of the city of Tulle, Department of Corrèze.

[2] Funk & Wagnall's Dictionary defines bobbinet as "An open perforated fabric formed by a series of threads crossing and partially twisting around each other and producing hexagonal meshes: a machine-made imitation of pillow lace." Bobbinet has been described as "a lot of holes fastened together with threads" and a domestic manufacturer advertises his goods by the slogan, "If you'll buy the holes we'll throw in the yarn."

[3] Patents nos. 186, 466, 212, and 591.

made on the bobbinet machine as a result of Heathcoat's 1813 adaptation causing the traversing bobbin threads to turn again at intervals when the desired width of the net is attained. A lacing thread put in while the work is going on keeps the adjoining breadths united; these threads are drawn when the piece is dressed.[4] Quillings have also been made with point d'esprit spots. A patent taken out in Great Britain in 1911 (25729) contributed improvements to the quilling adaptation.

Point d'esprit net was patented in 1831; it consists of the introduction, by means of a small jacquard and special appliances attached to the rolling locker machine, of small spots made from the bobbin threads at regular intervals, throughout the piece without forming a pattern. A bobbinet machine arranged to produce point d'esprit is known as a spotted-net machine. Point d'esprit nets are made of cotton, silk, and rayon.

None of the variations of the original bobbinet are made in this country except a modification of method no. 5, which is used for women's sport coats. Consumption of these variations is quite small, and American requirements are imported.

Bobbinet is made in different weights and textures, of various materials and counts of yarn, and with the size of the mesh varying according to the use for which it is intended. The great bulk of production both in this country and abroad is made of cotton yarn, but substantial amounts are made of silk and rayon. Nets of wool and nets of metal threads (made with metal threads in the bobbins and a yellow cotton warp) are novelties which may be made sporadically according to the dictates of fashion. There are small importations of nets of flax, but such are not made in domestic mills.

Coarse, and medium grades of cotton nets are used for mosquito netting, for the basic netting used as the foundation of embroidered lace window curtains, and for the lining of men's straw hats. Further, these coarse nets may be so weighted and stiffened that they are heavy and firm enough to be used for making hat shapes. The bobbinets made in small mesh of fine yarns are known as wash-blondes and are used as foundation fabrics in making embroidered laces, as bridal veils, as yokes and sleeves, and as trimming for women's wearing apparel. Occasionally cotton nets have patterns printed on them in colors and are used as all-over laces.

Silk nets are used for trimming women's hats and outerwear; the lightest of these silk nets, called "illusion nets", are used for bridal veils. Silk nets may be ornamented with chenille spots applied to the surface at regular intervals by hand, and rayon nets may be tucked.

II. DEVELOPMENT AND PRESENT SCOPE OF THE DOMESTIC BOBBINET INDUSTRY—TARIFF HISTORY

The first bobbinet machine brought into the United States was smuggled in (knocked down in parts) by lace makers who fled from the Luddite riots in England in 1818. Authorities differ as to the date and location of the initial factory, but the following dates and places are claimed: Medway, Mass., 1818; Watertown, Mass., 1820; Ipswich, Mass., 1824. Other firms started to make bobbinet in small quantities, and a small mill was started at Germantown, Pa. This very small bobbinet industry collapsed in 1830. From that time

[4] The History of Machine Wrought Hosiery and Lace, by W. Felkin.

until about the eighties of the nineteenth century no machine-made lace of any kind was produced in the United States.

The manufacture of net on the bobbinet machine was revived in 1895 by a firm of carpet and Nottingham lace-curtain manufacturers in Philadelphia. Toward the end of the nineteenth century another plant was established at Newburgh, N.Y. In 1909 there were 26 bobbinet machines in the country, and in 1913 there were 31. Later some machines were imported by a firm at Williamsbridge, N.Y., and this firm, together with the two previously mentioned, operate most of the bobbinet machines in this country. At the present time there are only 61 such machines operated in 5 mills. Only 1 of these 5 mills manufactures bobbinets solely and it operates 16 machines; in the others the chief production consists of Levers laces and Nottingham lace curtains, bobbinets being a side line.

The larger part of the bobbinet industry in the United States is American owned and controlled. However, the controlling interest in one firm in Rhode Island is held by a long-established French house, which owns factories at Calais and Lyons, and which, through its Parisian influence, holds a distinguished position as an arbiter of fashion. One long-established British firm of bobbinet manufacturers has a house in New York, where its products are sold with the products of an eminent British firm of Levers lace manufacturers.

The smallness of the domestic industry may be compared with 2,600 bobbinet machines operated in Great Britain and approximately 4,000 operated in Europe; domestic production is much smaller than that in either Great Britain, France, or Germany. The failure of the bobbinet industry to develop in the United States may be compared with the development which the Nottingham lace-curtain industry and the Levers lace industry have attained, the latter with the same degree of protection.

Nets and nettings made on the bobbinet machine were subject to a 60-percent ad valorem duty between 1897 and 1922; beginning in 1922 the rate has been 90 percent.[5] In the Tariff Act of 1930 the wording was elaborated to include all products of a net machine, thus providing for future developments.

III. EQUIPMENT NECESSARY FOR THE PRODUCTION OF BOBBINETS

1. The bobbinet machine

Bobbinet machines are very large and expensive; the buildings in which they are installed must be specially constructed. The gage or points of the bobbinet machine are expressed in the number of bobbins to the half inch, as with the Levers lace machine. The gages of the machines in the domestic industry range from 6½ to 13 points, making 13 to 26 meshes to the inch. There is no preponderance of any specific gage among domestic machines. The width of domestic machines ranges from 204 to 320 inches. All of the bobbinet machines employed in the domestic industry are imported; 1 was manufactured

[5] Nets and nettings of wool were accorded a duty of 60 percent ad valorem, plus 50 cents per pound by the Tariff Acts of 1897 and 1909; the Tariff Acts of 1913, 1922, and 1930 accorded wool nets and nettings the same duty as that accorded to the same products of cotton, and under the Tariff Act of 1909, par. 405, laces (including bobbinets) of artificial or imitation silk or of artificial or imitation horsehair were dutiable at 45 cents per pound and in addition thereto, 60 percent ad valorem.

in France, 2 in Germany, and the remainder in England.[6] The number and distribution of the bobbinet machines operated by the domestic industry is shown in the following table.

TABLE 91.—*Bobbinet machines in the United States, 1933*

State	Number of mills	Number of machines	Quarterage
New York	2	31	819
Pennsylvania	1	10	338
New Jersey	1	8	196
Rhode Island	1	12	290
Total	5	61	1,643

The one machine in the domestic industry of French origin was imported by a French firm as part of a branch plant in Rhode Island. The machines destroyed in the north of France during the war were replaced by the firm of Le Fléve of St. Etienne; there is also a firm which builds bobbinet machines at Lyons.

The essential construction of the machine has not changed in four generations; therefore, it does not become obsolete or out of date and, according to the experience of the British firm which is still using machines built in 1830, the life of a machine may be measured in terms of a century rather than of decades.

It should be pointed out that nets and nettings are made also by the Mechlin machine, the holes in these nets being of the same shape as nets of hand-made Mechlin laces. In the Mechlin machine there is only one row of carriages, which do not traverse; the warp threads are carried in steel bars similar to those used in the Levers lace machine, and traverse one wale only; there is no jacquard; and the bars are moved by cams or Dawson wheels. Twelve of these machines are owned by two firms in the United States and are installed in plants making other types of lace and equipped with other kinds of textile machinery; their production is sporadic and has never been important. They are mentioned here because their products are included in the domestic production of "nets and nettings."[7]

Bobbinet machines are very expensive. A large foreign machine builder has quoted the following prices for a 10-point rolling locker machine 300 inches wide, 104 millimeters: 1914,[8] £995 = $4,842; 1923,[9] £1,483 = $6,784; 1932,[10] £1,512 = $5,298. To the foreign price, with transportation to the United States, must be added the domestic tariff duty. The duty on imported bobbinet machines was 45 percent ad valorem under the Tariff Act of 1909; 25 percent ad valorem under the act of 1913; and 30 percent under the act of 1922. The Tariff Act of 1930, in paragraph 372, retains the 30-percent rate. Obviously, then, the initial cost of establishing a bobbinet mill in the United States is large. The fact that the 17-month exemption from tariff duty accorded to Levers lace machines by the Tariff Act of

[6] The following firms build and export bobbinet machines: John Jardine & Co., F. W. Burton, Stevens & Williamson, G. A. Eastwood & Co., and William Hooton, all of Nottingham; Schubert & Salzer, and Kappel, both of Chemnitz, Germany.

[7] The 12 Mechlin machines in the United States range from 136 to 222 inches in width and the total quarterage is 220. The greater number of these are of 10-point gage, the other gages being 12- and 14-point; 8 of them were built in France and 4 in England.

[8] Pound sterling converted at par, $4.8665.

[9] Pound sterling converted at $4.574825, the average value for the year 1923.

[10] Pound sterling converted at $3.5038, the average value for the year 1932.

1909 was not extended to bobbinet machines may account in part for the greater success of the Levers lace industry in establishing itself in this country.

2. Accessory equipment

The accessory machinery necessary for the production of bobbinet is practically identical with that necessary for the production of Levers laces. The one difference in yarn preparation is that, except in the finest gages, the brass bobbins are not pressed. There is no pattern, and therefore no preparatory work of an artistic nature, such as drafting, reading-off and jacquard card punching. The mending is done by hand, and the apparatus for bleaching, dressing, and finishing does not differ from that used in other branches of the lace industry. It is a simple matter, therefore, to carry on bobbinet manufacture as a side line to Levers lace production.

IV. MATERIALS USED IN MAKING BOBBINETS

In making bobbinet, yarns are used for two purposes only, the warp threads and the brass-bobbin threads. The cotton yarns are mostly two-ply and are worked in the brown. Although attempts have been made to cheapen the cost of production by the use of singles bobbin yarn, they have not been universally successful. The cost of the increased amount of mending and the loss through extra damage sometimes more than counterbalanced the difference in price between the singles yarn and its equivalent two-ply yarn. In addition, the singles yarn has not the tensile strength of the two-ply, and when the piece is stretched the bobbin yarns carry all the tension and are apt to crack, the warp yarn meanwhile bearing none of the strain, as the piece loses in length. The warp yarn is generally 20 counts heavier than that used in the brass bobbins, although this varies, as the bobbin-yarn is sometimes only 10 counts finer than the warp; rarely are the counts of yarn for the 2 purposes the same. Warp yarns are generally obtained from domestic sources, and range from 20/2 to 140/2; one instance was of 70/1. Brass-bobbin yarns range from 24/2 to 140/2, and the singles yarns consist of 40/1 and 70/1. All prepared yarn and counts finer than 80/2 are imported.

Silk yarns used for making bobbinet are of the very finest "grand exquis" Italian silk. The most usual counts are 26/28, 27/29, and 30/32 deniers, the last number being a standard count for silk lace yarns. Other counts used are 20/22, 24/26, and 13/14.

As a rule the same count of silk is used on the warp and in the brass bobbins. Raw silk contains about 25 percent in weight of gum, which is lost when the silk is "boiled off." Bobbinets are also made of rayon, and the same count is used for both warp and brass-bobbin threads in the coarser quality nets; in some of the finer quality nets the warp is of cotton and the bobbin threads are of rayon. The counts used are 80, 100, 125, 150, and 300 deniers. Varied effects are obtained by using a warp of one color and bobbin threads of another with the result that the color appearance changes when the finished material is regarded from different directions. This net is called "scintilline."

V. LABOR

The twisthands who operate bobbinet machines in the United States are members of the Chartered Society of Amalgamated Lace Operatives of America, and are affiliated with the lace-curtain twisthands and the readers and correctors of lace-curtain patterns. Certain restrictions as to employment obtain, as in the Levers and lace-curtain sections, and in the main they are the same, with the exception that the period of apprenticeship is only 3 years instead of 4. The number of domestic machines is small, consequently the number of skilled men available is limited, and during slack periods of business it is customary to employ them on nonproductive work around the factory, in order that they may be available when required. One firm of manufacturers with a large number of Nottingham lace-curtain machines and also two bobbinet machines found themselves compelled to pay the curtain wages for making bobbinets; this made the article so costly that they were unable to compete and they sold the machines.

VI. ANALYSIS OF DOMESTIC PRODUCTION AND FOREIGN TRADE IN BOBBINETS

1. Domestic production

Domestic production of bobbinets has not been consistently recorded by the Bureau of the Census. In 1914 and 1919 the value of bobbinets was included in the figures shown for all other laces; in 1921 the linear yards and value were shown separately; in 1923 the value was included with that of other articles as "all other nets and laces", and in 1925, 1927, 1929, and 1931 value only was given. The data, as far as available, are shown in the following table.

TABLE 92.—*Domestic production, by value, of bobbinets as recorded by the Bureau of the Census, 1914–31*

Census year	Value	Census year	Value
1914	(1)	1925	$155,726
1919	(1)	1927	465,752
1921 [2]	$334,652	1929	836,373
1923	(3)	1931	149,655

[1] Included in all other laces.
[2] 1,149,890 linear yards, showing a unit value of $0.291.
[3] Included in all cotton nets and laces.

2. Exports of domestic bobbinets

Exports of domestic bobbinets are not separately recorded; it is known, however, that they are negligible and are shipped chiefly to Canada. The record of Canadian imports of bobbinet from the United States shows that from March 31, 1914 to March 31, 1931, imports of bobbinets from the United States totalled in value only $10,110, or a yearly average of $595. During this period the Canadian tariff on American bobbinets was 35 percent ad valorem.

3. Exports of foreign merchandise

The value of exports of imported cotton nets and nettings, which was recorded from 1912 to 1921, inclusive, totaled $172,640. This figure constituted about 1 percent of total imports of cotton nets and nettings during this period. Of the total exports from 1912 to 1921, $77,896 were accounted for by exports in 1920.

4. Imports for consumption

Imports of nets and nettings have been separately recorded since the beginning of the fiscal year 1912. Table 93 shows imports of nets and nettings from the beginning of the fiscal year 1912 to the end of the calendar year 1933. The imports recorded as "nets and nettings" are chiefly bobbinets but imports recorded under the act of 1909 included some nets made on the Levers lace machine, and under the act of 1913 included nets and nettings made on the Nottingham lace-curtain machine. Under the act of 1922 these latter were excluded but veils and veilings of cotton and flax were listed with nets and nettings. It is known, however, that imports of Nottingham nets and nettings and of cotton veils and veilings during these years were small.

TABLE 93.—*Nets and nettings: Imports for consumption—value and duty, 1912–33*

Year	Value				Total duty collected	Average ad valorem rate of duty
	Cotton [1]	Flax, etc.[1]	Silk	Total		
Fiscal:						*Percent*
1912	$1,042,564	$1,873	$685,433	$1,729,870	$1,094,732	63.28
1913	985,151	292	1,137,217	2,122,660	1,350,339	63.62
1914 (July 1–Oct. 3, 1913)	465,638	1,153	480,149	946,940	587,170	62.01
1914 (Oct. 4, 1913–June 30, 1914)	1,221,078	3,278	926,364	2,150,720	1,290,431	60.00
1915	1,036,044	781	1,067,704	2,104,529	1,262,718	60.00
1916	1,996,992	365	2,010,188	4,007,545	2,404,527	60.00
1917	2,221,800	2,266	2,107,391	4,331,457	2,598,731	60.00
1918	1,651,732	9,419	893,751	2,554,902	1,532,941	60.00
1918 (July 1–Dec. 31)	439,666	155	260,517	700,338	420,203	60.00
Calendar:						
1919	2,645,382	13,718	1,508,110	4,167,210	2,500,346	60.00
1920	1,983,802	6,062	2,246,970	4,236,834	2,542,100	60.00
1921	1,996,008	2,151	1,740,597	3,738,756	2,266,917	60.63
1922 (Jan. 1–Sept. 21)	1,287,236	112	758,392	2,045,740	1,260,772	61.63
1922 (Sept. 22–Dec. 31)	203,451		138,145	341,596	307,436	90.00
1923	1,103,381	7,152	625,760	1,736,293	1,562,664	90.00
1924	1,065,543	1,467	495,849	1,562,859	1,406,573	90.00
1925	1,173,478	802	456,617	1,630,897	1,467,807	90.00
1926	1,136,014	3,266	486,315	1,625,595	1,463,036	90.00
1927	1,372,999	5,397	490,872	1,869,268	1,682,341	90.00
1928	1,774,571	7,269	849,712	2,631,552	2,368,397	90.00
1929	1,903,473	2,633	860,063	2,766,169	2,489,552	90.00
1930 (Jan. 1–June 17)	933,194	837	415,669	1,349,700	1,214,730	90.00
1930 (June 18–Dec. 31)	[2] 251,933	473	214,116	466,522	419,870	90.00
1931	[2] 1,148,615		300,905	1,449,520	1,304,569	90.00
1932	[2] 810,624	254	196,956	1,007,834	907,051	90.00
1933	[2] 837,254		145,796	983,050	884,745	90.00

[1] Includes veils and veilings. [2] Excluding veils and veilings.

As shown by the above table, importations reached their peak in terms of value in 1916, 1917, 1919, and 1920, and fell to their lowest record in 1933. The size of the importations during 1916 and 1917 were due in part to the requirements of the American Army. From 1913 to 1916 and in 1920 imports of silk net predominated in value, owing to their fashion-dictated popularity. The record low for importations of silk nets in 1933 was due in part to the fact that such fabrics as chiffon and georgette crepe had largely replaced silk bobbinets as sleeves and yokes. The principal hole counts of imported silk nets are 33, 36, and 39.

Cotton bobbinet is imported in widths of 72, 90, 108, and 120 inches and occasionally in widths as large as the machine, ranging to 380 inches. The length of the pieces imported varies from 30 to 75 yards. Cotton bobbinet is imported chiefly through New York, Chicago, and New Orleans.

TABLE 94.—*Nets and nettings: Average annual imports for consumption under the acts of 1913 and of 1922*

Act	Cotton	Flax, etc.	Silk	Total
1913	$1,836,673	$4,269	$1,506,807	$3,347,749
1922	1,377,611	3,723	622,412	2,003,746

5. Imports of rayon nets

The growing importance of rayon for use in the manufacture of nets and nettings and veils and veilings has been recognized under the Tariff Act of 1930 by a separate import classification. Statistics of imports thus recorded follow.

TABLE 95.—*Nets and nettings, veils and veilings, of rayon or other synthetic textile: Imports for consumption—Tariff Act of 1930* [1]

Calendar year	Quantity	Value	Unit value
	Pounds		
1930 (June 18 to Dec. 31)	32,025	$76,804	$2.398
1931	70,109	170,341	2.430
1932	46,492	85,298	1.835
1933	114,367	226,414	1.980

[1] A detailed analysis of imports of nets and nettings of cotton, silk, and rayon through the port of New York for the first 4 months of 1932 disclosed that the records of imports of cotton, silk, and rayon in some instances comprised nets of other materials. This inaccuracy was negligible in the records of cotton and rayon nets but of a total of $65,558 recorded as silk nets and nettings about one-third, $22,898, were of rayon. The actual imports of silk nets were therefore less and the actual imports of rayon nets were more than those shown in published statistics. The same analysis showed that less than half of the imports recorded as rayon nets and nettings, veils and veilings, were nets in the trade acceptance of the term. 58 percent of the imports of rayon nets consisted of waterwave hair nets, sleeping caps, and berets, small manufactured articles made by hand, or on knitting machines and bore no resemblance to or affinity with the fabrics made on bobbinet machines and imported in the piece, mostly in widths of 72 inches.

Rayon nets are imported from England, France, Germany, and Switzerland. The imports are mainly of 29 to 36 holes in quality, with nets of 32 holes predominating. Some rayon nets are imported in the raw state and finished by domestic firms specializing in such operations.

6. Relation of production and imports to consumption

The following table 96 compares domestic production of bobbinet with landed value of imports (foreign value, plus duty and 7½ percent landing charges) and shows their percentage relationships to total consumption.

TABLE 96.—*Bobbinets: Value of domestic production compared with landed value of imports for consumption, census years 1921–31*

Census year	Domestic production [1]	Landed value of imports [2]	Apparent consumption [3]	Percentages of consumption	
				Domestic production	Imports
1921	$334,652	[4] $6,285,970	$6,620,622	5.05	94.95
1923	[5]	[4] 3,429,179	[5]	[5]	[5]
1925	155,726	[4] 3,221,022	3,376,748	4.61	95.39
1927	465,752	[4] 3,691,804	4,157,556	11.20	88.80
1929	836,873	[4] 5,462,789	6,299,662	13.28	86.72
1931	149,655	[4] [6] 3,203,330	3,352,985	4.46	95.54

[1] Bobbinet.
[2] Foreign value, plus duty, and 7½ percent landing charges.
[3] Value of consumption is taken as value of domestic production, plus landed value of imports.
[4] Cotton and flax nets and nettings, veils and veilings, and silk nets and nettings.
[5] Not available.
[6] Includes nets and nettings, veils and veilings of rayon.

7. Sources of imports

Tables 97 and 98 classify imported bobbinets according to the country of origin. Imports of cotton nets and nettings have been separately recorded since 1912, although under the act of 1922 they were combined with small imports of cotton veils and veilings. General imports of nets and nettings of other vegetable fiber than cotton are small and have never been separately recorded. The value of general imports of silk nets and nettings has been recorded separately under the Tariff Act of 1922. Table 98 shows imports of silk nets and nettings from 1922 to 1929. Table 99 shows total imports of cotton nets and nettings, veils and veilings, and silk nets and nettings, together with the countries of their origin from 1922 to 1929.[11]

By far the larger part of domestic imports of cotton nets and nettings has come from Great Britain. Of the total general imports of cotton nets and nettings between 1912 to the end of the year 1929, the United Kingdom supplied 82.93 percent; France, 7.82 percent; and Germany, 6.43 percent. These percentages, however, do not reveal the importance of imports from Germany in 1928 and 1929 (the last year showing importations by countries) or the fact that, although imports from Great Britain into the United States increased appreciably in 1927, 1928, and 1929, those from Germany and France increased even more proportionately and in 1929 Great Britain lost her place as supplier of the bulk of American importation mainly because of the great increase in imports from Germany. In 1929 Great Britain supplied 48.74 percent of total American imports of cotton nets and nettings; Germany, 31.55 percent; and France, 11.25 percent.

It is interesting to note that from 1922 to 1927, inclusive, France exported more silk nets and nettings to the United States than did the United Kingdom and that, although the British exports of silk nets and nettings to the United States increased steadily during this period, they took the lead only in 1928. Of the total imports of silk nets and nettings from September 22, 1922 to December 31, 1929, France supplied 54.21 percent and the United Kingdom 42.69 percent. Again, these figures do not reveal the fact that, although total American importations of silk nets increased almost steadily between 1922 and 1929, the French share of the total decreased with the increase in the British share of the total silk nets imported in 1929. Fifty-three percent were imported from Great Britain and 45.76 percent from France.

Of the total cotton nets and nettings, veils and veilings, and silk nets and nettings imported between September 22, 1922 and December 31, 1929, the United Kingdom supplied 58.60 percent and France 25.79 percent.

[11] Import figures in tables 97 to 99 are given only through the year 1929. Since that date imports of nets and nettings have not been classified according to countries of origin.

TABLE 97.—*Cotton nets and nettings: General imports, 1912–29*

Year	United Kingdom	France	Germany	Belgium	Switzerland	All other	Total
Fiscal:							
1912	$717,145	$175,405	$46,831	$2,654	$3,703	$9,298	$955,036
1913	699,190	167,370	20,056	8,524	2,864	2,528	900,532
1914	1,390,000	180,599	86,455	1,006		1,327	1,659,387
1915	932,692	36,683	25,386	1,052	138	229	996,180
1916	2,063,874	17,845	93		25,713	5,265	2,112,790
1917	2,125,472	40,445	851	74	25,066	18,520	2,210,428
1918	1,682,668	15,395			1,155	27,278	1,726,496
1918 (July 1–Dec. 31)	883,751	8,440				221	892,412
Calendar:							
1919	2,423,391	45,940				297	2,469,628
1920	1,780,204	101,387	7,008	21,803	15,067	20,622	1,946,091
1921	1,644,877	111,960	31,122	4,605	19,121	3,753	1,815,438
1922 (Jan. 1–Sept. 21)	826,159	74,053	33,218	11,269	54,691	17,329	1,016,719
1922 (Sept. 22–Dec. 31)	316,069	28,331	12,709	4,311	20,923	6,629	388,972
1923 [1]	911,084	67,260	116,718	12,838	10,892	20,763	1,139,555
1924 [1]	831,690	113,924	62,648	6,227	10,562	13,213	1,038,264
1925 [1]	795,530	193,985	85,804	6,220	12,543	14,925	1,109,007
1926 [1]	769,861	165,016	84,043	7,888	5,921	14,744	1,047,473
1927 [1]	954,651	219,206	165,018	9,050	14,910	40,361	1,403,196
1928 [1]	912,759	249,243	453,921	10,027	51,796	43,845	1,721,591
1929 [1]	919,985	212,417	595,485	9,595	64,596	85,325	1,887,403

[1] Includes veils and veilings.

TABLE 98.—*Silk nets and nettings: General imports, 1922–29*

Calendar year	United Kingdom	France	All other	Total
1922 (Sept. 22–Dec. 31)	$38,782	$111,991	$2,168	$152,941
1923	160,227	412,930	50,246	623,403
1924	182,538	367,856	11,003	561,397
1925	156,013	244,816	14,442	415,271
1926	220,288	273,115	6,925	500,328
1927	228,315	240,288	23,943	492,546
1928	451,580	360,413	18,229	830,222
1929	458,211	395,547	10,649	864,407

TABLE 99.—*Totals for cotton nets and nettings, veils and veilings and silk nets and nettings: General imports, 1922–29*

Calendar year	United Kingdom	France	All other	Total
1922 (Sept. 22–Dec. 31)	$354,851	$140,322	$46,740	$541,913
1923	1,071,311	480,190	211,457	1,762,958
1924	1,014,228	481,780	103,653	1,599,661
1925	951,543	438,801	133,934	1,524,278
1926	990,149	438,131	119,521	1,547,801
1927	1,182,966	459,494	253,282	1,895,742
1928	1,364,339	609,656	578,118	2,552,113
1929	1,378,196	607,964	765,650	2,751,810

8. Mosquito netting

The use of mosquito netting is very ancient. Writing in 446 B.C., Herodotus said of the Egyptians who lived around marshes:

* * * They contrive in various ways to protect themselves from the mosquitoes, which are very abundant. * * * Every man has a net, with which in the daytime he takes fish, and at night, in whatever bed he sleeps, he throws the net around it, and crawls in underneath; if he should wrap himself up in his clothes or in linen, the mosquitoes would bite through them, but they never attempt to bite through the net.

The coarser grades of bobbinet are now used largely as bed canopies, particularly in sections of the country where mosquitoes or other insect pests are prevalent. Mosquito bars made from bobbinet are preferred to the cheaper but less durable gauze (leno woven cloth) nets; it is estimated that 80 percent of the domestic demand for mosquito bars is made from bobbinet.

The qualities of bobbinet imported for mosquito bars are 17/18, 20/21, 21/22, 23, 24, and 27 holes; 80 to 85 percent of the importation for mosquito bars consists of the 20/21 and 21/22 holes. The Government standard for mosquito bars is 182 meshes per square inch, equal to 27 quality.

VII. FOREIGN PRODUCTION OF BOBBINETS

1. England

The manufacture of bobbinets, as also the manufacture of laces on the Levers and Nottingham lace-curtain machines, commenced at Nottingham where the machines were invented and perfected. The bobbinet machine, invented in Nottingham by Heathcoat in 1809, was the first lace-making machine to be invented, the Levers and Nottingham lace-curtain machine being adaptations of Heathcoat's bobbinet machine.

The English bobbinet industry is centered chiefly in Nottingham and the surrounding towns of Beeston, Draycott, Derby, Heanor, Long Eaton, Melbourne, Sandiacre, and Stapleford. A branch of the industry, however, was moved to the west of England in 1811 when Heathcoat, in order to escape the Luddite Riots in Nottingham caused by the displacement of workers by the introduction of machines removed his mill to Tiverton, Devon. Other mills were established in adjacent towns; at the present time the west of England branch of the trade is located in Chard, Ilminster, Tiverton, and Barnstaple.[12]

Although in the last 50 years strong rivals have appeared to contest, and some successfully, English superiority in the production of Nottingham lace curtains and Levers laces, the English have retained a wide margin of superiority in the production of bobbinets both as regards volume and economy of production. The English industry operates 2,600 of the approximately 4,000 bobbinet machines in existence and supplies the great bulk of the world demand for cotton bobbinets. Of these 2,600 machines, 230 are operated at Derby, 767 in western England, and the remainder in Nottingham and the surrounding district.

In the manufacture of bobbinets the English industry enjoys the advantage of mass production—an advantage usually associated with the United States. The product is one which lends itself readily to mass production. Cotton bobbinets are of standard qualities and the demand for them is relatively little affected by fashion. Silk bobbinets cater more to the fashion trade.

English production units are large. One firm operates 430 machines and several firms operate over 100 machines each. The larger English firms build their own machines, make their own bobbins and carriages, and "prepare" their own yarns; all yarns necessary for the manufacture

[12] The mill which Heathcoat built is still in existence and specializes in fine-quality goods; some of the machines are narrow and old, dating from 1830; they are of fine gages, ranging to 16-point and use cotton yarns as fine as 270/2 and silk yarns as fine as 11/13 deniers. This mill is driven by water power from the River Exe.

of bobbinets are manufactured in Great Britain. Some few firms sell in the brown only; others put their products through every process. One English firm, which specializes in silk nets, makes bridal veils with edges embroidered by its own Cornely machines.

As with Levers laces, the maker of bobbinet chiefly sells his lace in the brown to a finisher, who is called the "manufacturer". The finisher sends out the net to two different establishments for bleaching and dressing; the "finishing" which he performs consists merely of cutting and boxing the nets in the required lengths. The finisher markets the nets.

English bobbinet manufacturers are strongly organized, 44 of the manufacturing firms being members of the British Plain Net Manufacturers Association. Net finishers are members of the Nottingham Lace and Net Finishers Association, and dressers are members of the Lace and Net Dressers Association.

Twisthands in English bobbinet mills are organized in the Union of Plain Net Makers which has been in existence since 1846

(*a*) *Production.*—British census figures for nets and nettings represent chiefly the value of the production of lace in the brown as sold to the finisher; further, they do not include nets and nettings made of other materials than cotton [13] but include all nets made on all net machines including the Mechlin machine. The results are production figures as follows but inadequate for discussion of "bobbinet": 1907, £1,093,000; 1912, £785,000; 1924, £903,000; 1930, £597,000.

(*b*) *Exports.*—Great Britain is by far the largest exporter of nets and nettings. Until the year 1929 Great Britain's exports of cotton bobbinets to the United States constituted the great bulk of American importation, but in 1929 increased importations from France and Germany placed Great Britain's share slightly below the 50-percent mark. It is estimated that 85 percent of British cotton-net exports to the United States consist of wash-blondes of 36-, 40-, and 42-hole quality. The following table 100 shows British exports of cotton net from 1920 to 1933. Clearly those exports declined almost steadily until 1932 when they showed an improvement. Reports from the industry in 1933 indicate great activity in the manufacture of nets and nettings. Although British exports of cotton nets declined from 1920 to 1931, exports of silk nets while not separately recorded are known to have increased. American importations of silk nets increased steadily during the period.

TABLE 100.—*British exports of cotton net, 1920–33*

Year	Exports	Year	Exports
1920	£4,366,564	1927	£747,165
1921	1,186,438	1928	703,912
1922	1,134,343	1929	683,592
1923	922,346	1930	596,596
1924	916,302	1931	445,893
1925	839,045	1932	600,627
1926	668,010	1933	644,813

[13] The value of silk net produced was first stated in 1930, as £82,000, that of artificial silk net as £169,000 and that of artificial silk mixed with other materials as £250,000.

The extent of distribution of Great Britain's exports of cotton nets during the year 1932 are shown in table 101.

TABLE 101.—*British exports of cotton nets, by countries, calendar year 1932*

Foreign countries	Value	British possessions	Value
United States of America	£219,922	Australia	£62,487
Egypt	51,636	British India	54,261
Switzerland	26,807	Canada	21,575
Argentine Republic	20,627	Union of South Africa and Southwest Africa Territory	10,392
China (exclusive of Hong Kong, Macao, and leased territories)	10,572	Irish Free State	10,379
Japan (including Formosa and Japanese leased territories in China)	9,676	New Zealand	8,823
Germany	7,500	British West India Islands	6,573
Java	5,702	Ceylon and dependencies	5,413
Netherlands	4,875	Straits Settlements and dependencies (including Labuan)	4,583
Cuba	2,512	Other British possessions	21,029
France	2,461		
Spain	2,239	Total British possessions	205,515
Venezuela	1,993		
Other foreign countries	28,590	Grand total	600,627
Total foreign countries	395,112		

British imports and exports of foreign cotton nets have always been negligible.

(*c*) *The safeguarding duties applied to bobbinet.*—Cotton nets and nettings were among the cotton laces granted the protection of the British Safeguarding Duties in 1925. The Lace Committee held that the condition of the industry and the very small importations of nets and nettings did not demand protection, but it recommended their inclusion among the protected laces because of the administrative difficulties which would arise from their exclusion.

2. France

The bobbinet industry of France is divided into two distinct branches, the one centered in Caudry and its environs,[14] producing cotton nets and nettings, and the other in Lyons and vicinity, manufacturing silk nets and nettings.

The bobbinet industry came to France from England in 1816 and was established in Caudry in 1829. The number of bobbinet machines in Caudry and vicinity was 556 in 1914, but many of these were destroyed during the war. In 1930 there were 320 bobbinet machines in the Caudry area, most of which are very modern and therefore highly productive. These machines range up to 370 inches in width, with gages between 7 and 13 points. They produce chiefly cotton nets and nettings. French production of cotton bobbinets has never approximated that of England in quantity or value, and in exports to the United States, France has run a very poor second to England.

Until recent years the industry at Lyons was the most important producer of silk bobbinets and predominated in exports to the United States. During the period 1920 to 1933, however, French production and exportation of silk bobbinets declined steadily, as shown in the table below, while British production and exportation increased steadily. In 1933 French exports of silk bobbinets were relatively unimportant. French statistics do not show exports of cotton bobbinet.

[14] Busigny, Clary, Inchy-Beaumont, Quièvy, and Selvigny.

TABLE 102.—*French exports of silk net, 1920–33* [1]

Year	Exports	Year	Exports
	Francs		*Francs*
1920	61, 297, 500	1927	7, 442, 000
1921	47, 292, 000	1928	21, 626, 000
1922	49, 941, 000	1929	16, 556, 000
1923	61, 802, 000	1930	16, 636, 000
1924	49, 858, 000	1931	9, 721, 000
1925	23, 782, 000	1932	7, 111, 000
1926	9, 363, 000	1933	5, 729, 000

[1] No values given by countries.

The number of bobbinet machines in the Lyons District is not available; however, it is known that they are about as numerous as those producing cotton bobbinet in the Caudry area.

3. Germany

In the number of bobbinet machines operated, Germany ranks second to England. There are approximately 1,000 bobbinet machines in the country; in 1925 they were quoted as 944 machines exclusive of a few firms from whom data were not obtainable.[15] These machines range in gage from 5½ to 15 points, and in width from 100 to 300 inches; they use cotton yarns from 20/2 to 220/2. The German industry is scattered over the towns of Chemnitz, Dresden, Falkenstein, Mehltheuer, Plaue near Flöka, Plauen, and Schneeberg.

The German production of bobbinet is chiefly of cotton. Their production is for home consumption and for the embroidery trade at Plauen; large quantities of bobbinet for the use of the embroidery trade formerly were imported from England, but this trade is now largely supplied by the domestic industry.

German exports of cotton nets and nettings to the United States were unimportant previous to 1928 and 1929. In 1929 Germany supplied 31.55 percent of the total cotton nets and nettings imported into the United States.

TABLE 103.—*Exports of nets and nettings from Germany, 1924–33*

[Value in reichmarks]

Year	Cotton	Silk	Year	Cotton	Silk
1924	1, 580, 000	142, 000	1929	2, 181, 000	512, 000
1925	1, 914, 000	149, 000	1930	1, 264, 000	417, 000
1926	1, 678, 000	80, 000	1931	935, 000	252, 000
1927	1, 839, 000	92, 000	1932	478, 000	74, 000
1928	1, 773, 000	264, 000	1933	300, 000	64, 000

Identification of German pattern numbers.—The German estimate of quality is the point number of the machine multiplied by 3.74 and the diagonal angle of the hole is 30°.[16] German manufacturers designate coarse qualities from 16 to 23, as pea tulle; medium fine qualities, from 24 to 35 as curtain tulle, and fine qualities from 30 to 56, as lace tulle. The pattern number conveys very definite information as to gage, warp yarn, bobbin yarn, and quality according to the following system:

[15] Report of the British Department of Overseas Trade, June 17, 1925.
[16] Melliand's Textilberichte, October, 1924, p. 655.

TABLE 104.—*Derivation of pattern number of German bobbinet from factors inherent in the article*

Gage	Figure	Warp yarn	Figure	Bobbin yarn	Figure	Quality	Figure	Pattern number
8	8	40/2	4	40/2	4	24	24	84424
8	8	50/2	5	[1] 60/2	6	25	25	85625
9	9	100/2	0	50/2	5	27	27	90527
10	0	120/2	2	[1] 60/1	6	35	35	02635
11	1	120/2	2	[1] 60/1	6	35	35	12635
12	2	140/2	4	[1] 60/1	6	40	40	24640
13	3	180/2	8	180/2	18	44	44	381844
14	4	190/2	9	200/2	20	46	46	492046

[1] The same figure represents 60/2 and 60/1, and there is no indication of which yarn is utilized.

4. Other countries

St. Gall is the center of the embroidered lace-curtain industry in Switzerland. Until 1912 Switzerland imported from England all cotton bobbinets used as the groundwork for its embroidery. In 1912 2 bobbinet factories were started near St. Gall; 1 has since been closed and 1, with 30 machines, is in operation in the town of Münchwilen. The controlling interest in this mill is held by members of the St. Gall Syndicate of Embroidered Curtain Manufacturers and, although the syndicate uses the bulk of the production, a certain proportion of it is exported to foreign countries, notably to the Philippines; these nets are chiefly of fine mesh, and colors and black predominate.

There are small plants of bobbinet machines in Turin and Vienna, and a few elsewhere in Europe.

VIII. WAGE DATA

1. Payments to workers in domestic bobbinet mills

Twisthands in domestic bobbinet mills are paid according to a rack-price card, which is simpler than the Levers lace and Nottingham lace-curtain rack-price cards in that it is based upon only four relatively simple factors: Gage and width of the machine, material, and yarn count. Inasmuch as most domestic bobbinets are of cotton, the "material" factor presents little difficulty. Quality receives no consideration as it is identified with the gage of the machine and the yarn counts.

Table 105 reproduces the card under which twisthands in bobbinet mills are paid. These are basic rates established in the year 1915. The rates were increased by 61 percent from February 1923 to August 1, 1932, and since the latter date the increase on the basic rates has been 51 percent. The domestic industry being small and usually carried on in conjunction with the manufacture of other laces, the actual rates paid to twisthands vary from mill to mill above or below the basic rack-price. The average weekly wage for a domestic bobbinet twisthand working 2 machines simultaneously is reported by 3 manufacturers to be approximately $41.50.

The basic rate for time work was reduced in 1932 to 67½ cents per hour. The twisthand is paid by time-rate for periods when the machine is stopped for entering the warps or for cutting out.

TABLE 105.—*Prices per rack paid in domestic bobbinet mills*

[Rates in cents]

Width in inches	Quarters	5-point	6-point	7-point	8-point	9-point	10-point	11-point	12-point	13-point	14-point	15-point
225	25	4.41	4.67	4.94	5.20	5.46	5.72	5.99	6.25	6.51	6.77	7.04
234	26	4.52	4.78	5.04	5.30	5.57	5.83	6.09	6.35	6.62	6.88	7.14
243	27	4.62	4.88	5.15	5.41	5.67	5.93	6.20	6.46	6.72	6.98	7.25
252	28	4.73	4.99	5.25	5.51	5.78	6.04	6.30	6.56	6.83	7.09	7.35
261	29	4.83	5.09	5.36	5.62	5.88	6.14	6.41	6.67	6.93	7.19	7.46
270	30	4.94	5.20	5.46	5.72	5.99	6.24	6.51	6.77	7.04	7.30	7.56
279	31	5.04	5.30	5.57	5.83	6.09	6.35	6.62	6.88	7.14	7.40	7.67
288	32	5.15	5.41	5.67	5.93	6.20	6.46	6.72	6.98	7.25	7.51	7.77
297	33	5.25	5.51	5.78	6.04	6.30	6.56	6.83	7.09	7.35	7.61	7.88
306	34	5.36	5.62	5.88	6.14	6.41	6.67	6.93	7.19	7.46	7.72	7.98
315	35	5.46	5.72	5.99	6.24	6.51	6.77	7.04	7.30	7.56	7.82	8.09
324	36	5.56	5.83	6.09	6.35	6.62	6.87	7.14	7.40	7.67	7.93	8.19
333	37	5.67	5.93	6.20	6.46	6.72	6.98	7.25	7.51	7.77	8.03	8.30
342	38	5.78	6.04	6.30	6.56	6.83	7.09	7.35	7.61	7.88	8.14	8.40
351	39	5.88	6.14	6.41	6.67	6.93	7.19	7.45	7.72	7.98	8.24	8.51
360	40	5.99	6.24	6.51	6.77	7.04	7.30	7.55	7.82	8.09	8.35	8.61

1. Standard for width and gage not quoted on this card, 297-inch, 8-point machine (6.04) for rack.
2. Gages to rise and fall ¼ of a cent per gage.
3. Width to rise and fall 1/10 of a cent for every quarter (9 inches), 5 inches or over to be paid for as a full quarter; under 5 inches not to be paid for.
4. Breakdowns: When ordered to go on time work on one machine while making racks on another, half time to be paid.
5. Threading warps 10 hours time work.
6. Cotton, 40's, 2-fold to be paid ¼ of a cent per rack extra. Cotton 30's, 2-fold, to be paid ½ of a cent per rack extra. Cotton, 20's, 2-fold, to be paid 1 cent per rack extra. The foregoing to be applied to cotton in bobbins only.
7. Singles cotton used on warp or bobbin ¼ of a cent per rack extra.
8. Silk or a mixture of silk and cotton to be paid 1¼ cents per rack extra.

The basic rates in the foregoing table were increased by 61 percent from February 1923 until Aug. 1, 1932. Since the latter date the increase has been 51 percent.

Auxiliary workers in domestic bobbinet mills are paid partly by timework and partly by piecework, there being no consistency in method or rate of payment in a single mill or between mills. In table 107, which compares auxiliary wages in representative domestic and British bobbinet mills, there appear approximate figures relating to the payment of auxiliary workers in domestic mills.

2. Comparison of domestic with British wage rates

The bobbinet machine is the original basic lace machine, and the British Union of Plain Net Makers is the oldest in the lace industry, having been established in 1846.

The British rack-price list for bobbinet twisthands is much more complex than the list in use in domestic mills, the two cards differing radically. The British card quotes rates per 100 racks; it recognizes machine widths from 114 to 304 inches, rates being quoted by multiples of 10 inches from the narrowest to the widest; further, it recognizes gages from 6- to 15-point. Different rates are quoted for mosquito nets, plain nets, Brussels, or ex-twist and mock-Brussels, cotton Mechlins, sport nets, plain silk nets, and silk Mechlins. The classifications indicate the gage, quality, and yarn count to be used in brass bobbins, and, in spotted nets, the number of machine motions required to make the spot. Timework is paid in British mills at a rate per hour equal to the amount paid for 4 racks for each of the 2 machines worked by the twisthand. The entering of warps is paid on a piecework basis; in one district the equivalent of a given number of racks is paid and in other districts a definite rate per 1000 threads. Wages paid to twisthands in the bobbinet district in the west of England are 2½ percent less than the wage rate paid in Nottingham, this amount being deducted by agreement to offset the freight rates on yarn from Manchester. In Nottingham, 1 learner is allowed for every 6 men. The learner during 3 years receives a percentage of the full rack-price and the remainder of what he earns is paid to the teacher.

The basic rates now governing payment to twist hands in the bobbinet industry were revised and amended in 1899, 1901, 1905, and the present cards were established in 1909 and revised in 1922. The rates of payment for auxiliary workers were established in 1906, and the regulations for the payment of Mechlin and rolling locker carriage straighteners in 1908.

The plain-net price card also regulates the price for slip-winding cotton yarns as well as for warping, threading, and brass-bobbin winding.

The card for the payment for making bobbinets in the United States contains prices for machines which range in width from 225 to 360 inches, and advance by multiples of 9 inches, or quarters. An average of prices paid in England on machinery of nine of the same widths as those quoted in the United States industry card, in comparison with the average of prices paid in domestic mills is shown in table 106. Conversion of the pound sterling is made at par, $4.8665.

TABLE 106.—*Average rack prices paid in England and in the United States for making bobbinets, 1933*

Gage	Average price per rack paid in England	Average price per rack paid in the United States	Excess of domestic price over English price	Gage	Average price per rack paid in England	Average price per rack paid in the United States	Excess of domestic price over English price
			Percent				*Percent*
6	$0.0361	$0.0769	113	12	$0.0420	$0.1007	140
7	.0371	.0809	118	13	.0434	.1047	141
8	.0381	.0848	123	14	.0454	.1086	139
9	.0390	.0881	126	15	.0473	.1126	138
10	.0395	.0927	135				
11	.0405	.0968	139	Average	.0454	.1052	132

Comparison of the rates paid in the domestic and in the English industries for auxiliary processes is shown in table 107.