

United States Centennial Commission.

INTERNATIONAL EXHIBITION,
1876.

REPORTS AND AWARDS

GROUP IX.



EDITED BY

FRANCIS A. WALKER,

CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.

1877.

A. 37

B.
144.

IX.



United States Centennial Commission.

INTERNATIONAL EXHIBITION,
1876.

REPORTS AND AWARDS

GROUP IX.



EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

INTERNATIONAL EXHIBITION

1876

REPORTS AND AWARDS

Entered, according to Act of Congress, in the year 1876, by the
CENTENNIAL BOARD OF FINANCE,
In the Office of the Librarian of Congress at Washington.

Technische Universität
Chemnitz
Universitätsbibliothek

WA

B 144-8

~~Gr. IX~~

SYSTEM OF AWARDS

[*Extract from Circular of April 8, 1876.*]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May 1, 1876.*]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

(iii)

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May 24, 1876.*]

“The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

“This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

“Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

“The regulations which have been published divide the work of awards into three parts:

- “1st. The individual work of the Judges.
- “2d. The collective work of the groups of Judges.
- “3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

“Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory.”

GROUP IX.

JUDGES.

AMERICAN.

JOHN L. HAYES, Cambridge, Mass.
ELLIOT C. COWDIN, New York.
CHARLES LE BOUTILLIER, Philadelphia,
Pa.
CHARLES J. ELLIS, Philadelphia, Pa.
J. D. LANG, Vassalboro', Maine.

FOREIGN.

GUSTAV GEBHARD, Germany.
THEODORE BOCHNER, JR., Austria.
HENRY MITCHELL, Great Britain.
MAX WEIGERT, Germany.
LOUIS CHATEL, France.
CARL ARNBERG, Sweden.
HAYAMI KENZO, Japan.
JOHN G. NEESER, Switzerland.
AUGUST BEHMER, Egypt.
ALBERT DANINOS, Turkey.

EDWARD H. KNIGHT was temporarily assigned from Group XXII to assist in examinations of heddles.

GROUP IX.

WOOL AND SILK FABRICS, INCLUDING THE MATERIALS AND THE MACHINERY.

WOVEN AND FELTED GOODS OF WOOL, AND MIXTURES OF WOOL.

CLASS 667.—Wool in the fleece, in bales, and carded.

CLASS 235.—Card wool fabrics,—yarns, broadcloth, doeskins, fancy cassimeres.
Felted goods. Hat bodies.

CLASS 236.—Flannels,—plain flannels, domets, opera and fancy.

CLASS 237.—Blankets, robes, and shawls.

CLASS 238.—Combed wool fabrics,—worsted, yarns, dress goods for women's wear, delaines, serges, poplins, merinoes.

CLASS 239.—Carpets, rugs, etc.,—Brussels, Melton, tapestry, tapestry Brussels, Axminster, Venetian, ingrain, felted carpetings, druggets, rugs, etc.

CLASS 240.—Hair,—alpaca, goat's hair, camel's hair, and other fabrics mixed or unmixed with wool.

CLASS 241.—Printed and embossed woolen cloths, table covers, patent velvets.

CLASS 522.—Machines for the manufacture of woolen goods.

SILK AND SILK FABRICS, AND MIXTURES IN WHICH SILK IS THE PREDOMINATING MATERIAL.

CLASS 242.—Cocoons and raw silk as reeled from the cocoon; thrown or twisted silks in the gum.

CLASS 243.—Thrown or twisted silks, boiled off or dyed; in hanks, skeins, or on spools.

CLASS 244.—Spun silk yarns and fabrics, and the materials from which they are made.

CLASS 245.—Plain woven silks, lutestrings, sarsenets, satins, serges, foulards, tissues for hat and millinery purposes, etc.

CLASS 246.—Figured silk piece goods, woven or printed. Upholstery silks, etc.

CLASS 247.—Crapes, velvets, gauzes, cravats, handkerchiefs, hosiery, knit goods, laces, scarfs, ties, veils, all descriptions of cut and made-up silks.

CLASS 248.—Ribbons,—plain, fancy, and velvet.

CLASS 249.—Bindings,—braids, cords, galloons, ladies' dress trimmings, upholsters', tailors', military, and miscellaneous trimmings.

CLASS 520.—Machines for the manufacture of silk goods.

GROUP IX

WOOL AND SILK FABRICS INCLUDING THE MATERIALS AND THE MACHINERY.

WOVEN AND FINISHED GOODS OF WOOL AND MIXTURES OF WOOL.

Class 60.—Wool in the fleece, in lumps, and combed.
Class 61.—Wool in the fleece, in lumps, and combed, containing foreign substances.
Class 62.—Wool in the fleece, in lumps, and combed, containing foreign substances, and other materials.
Class 63.—Wool in the fleece, in lumps, and combed, containing foreign substances, and other materials, and other fibers mixed or blended with wool.
Class 64.—Wool in the fleece, in lumps, and combed, containing foreign substances, and other materials, and other fibers mixed or blended with wool, and other fibers mixed or blended with wool.
Class 65.—Machinery for the manufacture of woollen goods.

SILK AND SILK FABRICS AND MIXTURES IN WHICH SILK IS THE PREDOMINANT MATERIAL.

Class 66.—Silk in the cocoon, and raw silk as reeled from the cocoon; thrown or twisted silk in the form of yarn.
Class 67.—Silk in the cocoon, and raw silk as reeled from the cocoon; thrown or twisted silk in the form of yarn, or on spindles, or on other machines.
Class 68.—Spun silk yarns and fabrics, and the materials from which they are made.
Class 69.—Thin woven silks, including saris, muslins, gauzes, lawns, and other fabrics.
Class 70.—Thick woven silks, including velvets, plushes, and other fabrics.
Class 71.—Silk in the form of yarn, or on spindles, or on other machines, and other materials.
Class 72.—Machinery for the manufacture of silk goods.

GENERAL REPORT
OF THE
JUDGES OF GROUP IX.

PHILADELPHIA, December, 1876.

PROF. FRANCIS A. WALKER, *Chief of the Bureau of Awards* :

SIR,—In pursuance of instructions from your Bureau, that each group of Judges should submit a report exhibiting a survey of the Exhibition in their particular department, embodying the instructive facts observed and conclusions suggested in their examination, the Judges of Group IX. have authorized the undersigned to present the results of their examination. In the consultations upon the awards to exhibitors, among the members of this group, who represented ten different nationalities, all national distinctions were ignored, and so full was the interchange of opinion among the Judges, and so absolute the harmony of sentiment, that an individual member of the group can hardly fail to express the common opinion.

Respectfully submitted,

JOHN L. HAYES.

GROUP IX.

WOOL AND SILK FABRICS.

CLASS 667.—WOOL IN THE FLEECE, IN BALES, AND CARDED.

Leading all nations in the supply of this material, the group of British colonies in the Southern Hemisphere, known as Australia, makes itself most conspicuous. The colonies of New South Wales, Victoria, South Australia, Queensland, Tasmania, Western Australia, and New Zealand, although separate political organizations, exhibit so marked a nationality in this common production, that we are compelled to consider them as one.

Foreign Judges, who were familiar with the great European Expositions, concur in pronouncing the exhibition of wools by Australia at the International Exhibition of 1876 as surpassing any ever before made. The colonies vied with one another in making their exhibits upon a scale proportionate to their vast power of production. Thus the wools of each exhibitor were shown in bales, in numerous fleeces, and illustrative samples, as produced from ewes, rams, hoggets, and lambs, as unwashed, cold-washed, and hot-water-washed, and as adapted for combing or for clothing purposes. Of course, the characteristic feature of the display was the capacity of Australia for the culture of wool of the Merino breed, adapted to the present exigencies of the manufacturing nations, for the exhibition of wool of other breeds by Australia was comparatively unimportant. The fibre of this breed was shown here in the utmost perfection, both in staple and condition, for all ordinary purposes of manufacture, with a production already of great proportions, yet constantly enlarging. When we consider the wide adaptation of this fibre to the uses both of luxury and necessity, and remember that it was for centuries the monopoly of a single nation, refused even to its colonies; that when Spain relaxed her monopoly, scarcely over a century ago, it was only in favor of the kings of Europe; and that the Merinos procured from Spain by George III., in 1792, in exchange for eight carriage-horses,

were literally the direct source of the Australian wool-husbandry, we must regard the Australian exhibit as one of the most striking illustrations of the world's acquisitions within the last century.

The only deficiency attending this exhibit—one which the high culture and science of these colonies might have easily supplied—was the want of systematized information as to the statistics of wool-production and sheep-husbandry, the methods of improvement, and the details which would be interesting to the practical shepherd. This deficiency, in some respect supplied by the several Commissioners, and by personal inquiries and reference to trustworthy authorities, forbids the fullness of information in this report which the importance of the Australian wool-production demands.

The number of sheep in Australia, according to the latest returns, is stated in the following communications:

“ST. GEORGE'S HOUSE, FAIRMOUNT PARK,
“PHILADELPHIA, September 2, 1876.

“SIR,—With reference to your letter of the 28th ultimo, I beg to send you a copy of a letter which I have just received from Mr. Robinson, Secretary of the New South Wales Commission.

“I have the honor to be, sir, your obedient servant,

“A. J. R. TRENDELL.

“JOHN L. HAYES, ESQ., 11 Pemberton Square, Boston, Mass.”

[Enclosure.—Copy.]

“PHILADELPHIA.

“SIR,—In reply to your letter of yesterday's date, covering a communication from Mr. Hayes, I have the honor to inform you that the number of sheep in the Australian colonies in the year 1874, the latest year for which I have statistics, was as follows:

| | |
|-----------------------------|------------|
| “New South Wales | 22,872,882 |
| Victoria | 11,225,206 |
| South Australia | 6,120,211 |
| Queensland | 7,268,946 |
| Tasmania | 1,714,168 |
| Western Australia | 777,861 |
| New Zealand | 11,704,853 |
| | <hr/> |
| | 61,684,127 |

“The number at the present time would be very much larger, but I regret that I cannot inform Mr. Hayes what is the average rate of yearly increase. The production of wool may be arrived at on the basis of the average clip, which I believe to be $2\frac{3}{4}$ pounds of washed wool for each fleece. If Mr. Hayes consults the export returns of the different colonies, it may be important that he should know that

a large quantity of Queensland-grown wool is exported from Sydney, and that much of the wool grown in New South Wales is shipped from Victoria and South Australia, owing to their exceptional facilities for water and railroad carriage.

"The statistical returns of the different colonies would, without a knowledge of this fact, be very misleading, by the wool-production of Australia being made to appear vastly greater than it is in fact.

"I have the honor, etc.,

"CHAS. ROBINSON, *Secretary,*
"New South Wales Commissioner."

The report of 1870, of H. Schwartz & Co., of London, very high authorities in wool statistics, states the exports of Australian wool in 1875-6 as follows:

| | |
|---------------------------------|------------------|
| Great Britain | 771,786 bales. |
| United States | 5,807 " |
| Continental Countries | 2,414 " |
| Total | <u>780,007</u> " |

This amount, according to their estimates, is equal to 247,700,000 pounds.

The report for 1874, of Mr. Alexander Bruce, the chief inspector of live-stock in New South Wales, declared to be a high authority, gives the following instructive facts in relation to the sheep of that colony, and may be regarded as illustrative of all the colonies:

1. Number.—The number of sheep in the colony in 1874 was 20,709,338, and 22,767,416 in 1875, being an increase in 1875 of 2,058,078.

2. Combing and Clothing—The returns give 6,100,000 combing sheep, and 5,490,000 clothing, while with respect to 6,420,000, it is not stated whether they are combing or clothing, and in many cases owners give no information.

3. Long-wooled and Cross-bred Sheep.—Of these some 125,000 are returned, and they are given as being of the following breeds: Leicesters, 15,881; Lincolns, 9771; Downs and other breeds, 37,583; and Cross-bred sheep, 62,242.

4. How kept.—In 395 cases sheep are returned as depastured in paddocks, in 504 as shepherded, in 88 as both in paddocks and shepherded, and in 381 cases no information is given on this point.

5. Improvement.—On 681 holdings the sheep are reported to be improving, on 43 as deteriorating, on 72 as stationary, and 548 owners make no returns.

6. Stud Sheep.—The returns show that of these sheep there were

23,412 introduced; of which 18,086 were Merinos, 343 Leicesters, 4741 Lincolns, and 42 Downs.

7. Fencing.—It has proved advantageous to inclose flocks within fences on the following accounts: *a.* Improvement.—(1) In the health and soundness of the sheep; (2) in their size and stamina; (3) in the quantity and quality of wool; (4) in the carrying capability of the holding. *b.* Saving.—(1) In expense of management; (2) in the losses arising from shepherding, especially from bad shepherds. *c.* Advantages to Owner.—It relieves him from the trouble of managing shepherds and hut-keepers, and allows him time to attend to the improvement of the breed of his sheep. *d.* General Benefit.—This is stated by owners to be an increase of the value of a run of from 20 to 60 per cent.

8. Lambing.—The general average of shepherded flocks was $72\frac{1}{4}$ per cent.; of paddocked sheep 75 per cent.; and of sheep depastured both ways $74\frac{3}{4}$ per cent.

9. Clip.—The yield of wool per sheep, in 1874, was as follows:

| <i>Greasy.</i> | lbs. | ozs. |
|---|------|------------------|
| The average clip of greasy wool in shepherded sheep was | 4 | $3\frac{4}{10}$ |
| “ “ “ paddocked sheep was | 4 | $15\frac{2}{10}$ |
| “ “ “ both | 4 | $10\frac{7}{10}$ |
| <i>Creek-washed.</i> | | |
| The average clip of shepherded sheep was | 2 | $12\frac{6}{10}$ |
| “ “ “ paddocked | 3 | $4\frac{2}{10}$ |
| “ “ “ both | 2 | $12\frac{4}{10}$ |
| <i>Hot-water-washed.</i> | | |
| The average clip of shepherded sheep was | 2 | $8\frac{2}{10}$ |
| “ “ “ paddocked | 3 | 2 |
| “ “ “ both | 2 | $11\frac{4}{10}$ |
| <i>Scoured.</i> | | |
| The average clip of shepherded sheep was | 2 | $2\frac{2}{10}$ |
| “ “ “ paddocked | 2 | 8 |
| “ “ “ both | 2 | 10 |

10. Difference in Weight between Combing and Clothing.—On this point 1238 owners give no information, 75 “cannot say,” 4 report that there is no difference, 32 that there is a slight difference in favor of combing; 4 put the difference at 8 ounces, 2 at 12 ounces, 1 at 16 ounces, 4 more at more than 16 ounces, and 6 state that combing is the more profitable.

The important facts presented by this statement are, that more than half the sheep produce combing wool; the respective weights of the

greasy, creek-washed, hot-water-washed, and scoured wools; and the positive testimony, which should be specially noted by the California wool-growers, as to the advantages of fencing sheep. It is obvious that this must depend somewhat upon the nature of the feed and general custom of the country, and still more upon whether the flock-masters own the land or pasture at large. In this connection it may be noted that Mr. Bruce elsewhere states that the fence most approved for sheep and cattle is a fence with split posts, one split top-rail, and five wires.

SOUTH AUSTRALIAN WOOL.

The following communication from the Commissioner of another colony, South Australia, gives interesting facts as to the weight of fleeces and extent of the flocks of individual flock-masters:

“PHILADELPHIA,
“MAIN BUILDING, 8th June, 1876.

“TO THE JUDGES OF WOOL, *International Exhibition, 1876*:

“GENTLEMEN,—As Commissioner for South Australia, I have the honor to subjoin a statement of the weight of fleeces of wool examined by you in this court; taking first a copy of the declared weights of some wool in bales seen by you, and of which you have the growers' names, and then appending the weights of fleeces you desired should be weighed in the Main Building.

“1st. *Declared Weights of Wool exhibited all Unwashed.*

“MOORAK WOOL. (W. T. Brown.)

| No. of Bales and Classes of Sheep. | Contents in Fleeces. | Average Weight of Fleece. | | | Age of Sheep. |
|---------------------------------------|-------------------------|------------------------------|------|-----------------|---------------|
| | | lbs. | ozs. | dwt. | |
| No. 1. Ewes | 14 | 7 | 9 | $2\frac{4}{8}$ | 3 years. |
| “ 2. Hoggets | 15 | 7 | 3 | $3\frac{8}{8}$ | 18 mos. |
| “ 3. Lambs | 20 | 2 | 12 | $12\frac{1}{8}$ | 4 “ |
| “ 4. Wethers | 15 | 7 | 6 | $6\frac{6}{8}$ | 2 years. |

“N.B.—40,000 sheep are pastured at Moorak.

“WONOKA WOOL. (Hayward, Armstrong, & Co.)

| No. of Bales and Classes of Sheep. | Contents in Fleeces. | Average Weight of Fleece. | | | Age of Sheep. |
|---------------------------------------|-------------------------|------------------------------|------|-----------------|---------------|
| | | lbs. | ozs. | dwt. | |
| No. 1. Ewes | 14 | 7 | 1 | $2\frac{4}{8}$ | 3 years. |
| “ 2. Hoggets | 13 | 7 | 4 | $14\frac{1}{8}$ | 18 mos. |
| “ 3. Lambs | 20 | 3 | 11 | $3\frac{2}{8}$ | 5 “ |
| “ 4. Wethers | 12 | 8 | | | 3 years. |

“WELPENA WOOL. (Price & Browne.)

| No. of Bales and Classes of Sheep. | Contents in Fleeces. | Average Weight of Fleece. | | | Age of Sheep. |
|------------------------------------|----------------------|---------------------------|------|-----------------|---------------|
| | | lbs. | ozs. | dwt. | |
| No. 1. Ewes | 11 | 7 | 11 | 3 $\frac{2}{8}$ | 3 years. |
| “ 2. Hoggets | 12 | 7 | 5 | 5 $\frac{4}{8}$ | 18 mos. |
| “ 3. Wethers | 10 | 8 | 11 | 3 $\frac{2}{8}$ | 3 years. |
| “ 4. Lambs | 16 | 3 | 7 | | 5 mos. |

“J. KEYNES WOOL.

| No. of Bales and Class of Sheep. | Contents in Fleeces. | Average Weight of Fleece. | | | Age of Sheep. |
|----------------------------------|----------------------|---------------------------|------|------|---------------|
| | | lbs. | ozs. | dwt. | |
| No. 1. Wethers | 15 | 9 | ... | ... | 4 teeth. |

“N.B.—13,000 sheep are kept by Mr. Keynes.

“ALLAN MCFARLANE WOOL (MF).

| No. of Bales and Class of Sheep. | Contents in Fleeces. | Average Weight of Fleece. | | | Age of Sheep. |
|----------------------------------|----------------------|---------------------------|------|------|---------------|
| | | lbs. | ozs. | dwt. | |
| No. 1. Ewe, with lamb | 15 | 6 well sorted. | | | 3 years. |

“N.B.—15,500 sheep are kept by Mr. McFarlane.

“COLLINGROVE WOOL. (J. H. Augas.)

| No. of Bales and Classes of Sheep. | Contents in Fleeces. | Average Weight of Fleece. | | | Age of Sheep. |
|------------------------------------|----------------------|---------------------------|------------------|------|----------------|
| | | lbs. | ozs. | dwt. | |
| No. 1. Ewes | Not stated. | 6 | 1 | 0 | 2 teeth. |
| “ 2. Ewe Hoggets | 25 | 7 | 10 $\frac{1}{4}$ | ... | 2 and 4 teeth. |
| “ 3. Wet Ewes | Not given. | Not given. | | | 4 and 5 “ |
| “ 4. Lambs | “ | “ | | | Not given. |
| “ 5. Lambs | “ | “ | | | “ |

“2d. Weights of Fleeces weighed in the Building, as requested.

“Fleeces exhibited by J. Keynes. (Merino Wool.)

| | | | |
|---------------------------|---------|--------|--------|
| Fleece 1 weighs | 11 lbs. | 6 ozs. | 0 dwt. |
| “ 2 “ | 10 “ | 12 “ | 11 “ |
| “ 3 “ | 10 “ | 11 “ | 8 “ |
| “ 4 “ | 12 “ | 7 “ | 8 “ |

“Fleeces exhibited by J. Murray. (Merino Wool.)

| | | | |
|------------------------|---------|---------|--------|
| No. 1 weighs | 12 lbs. | 11 ozs. | 8 dwt. |
| “ 2 “ | 12 “ | 2 “ | 8 “ |
| “ 3 “ | 15 “ | 11 “ | 0 “ |
| “ 4 “ | 14 “ | 5 “ | 0 “ |
| “ 5 “ | 15 “ | 13 “ | 0 “ |
| “ 6 “ | 15 “ | 3 “ | 8 “ |

“Fleeces exhibited by Thos. Graham. (Mixed, Lincoln and Leicester.)

| | | | |
|------------------------|---------|---------|--------|
| No. 1 weighs | 13 lbs. | 11 ozs. | 0 dwt. |
| “ 2 “ | 11 “ | 6 “ | 12 “ |

| | | | | | | | | |
|--------------|---|---|---|---|---|---------|---------|--------|
| No. 3 weighs | . | . | . | . | . | 11 lbs. | 15 ozs. | 0 dwt. |
| " 4 " | . | . | . | . | . | 12 " | 9 " | 8 " |
| " 5 " | . | . | . | . | . | 10 " | 2 " | 0 " |
| " 6 " | . | . | . | . | . | 13 " | 3 " | 0 " |

"I have the honor to be your obedient servant,
 "SAM. DAVENPORT,
 "*Special Commissioner for South Australia.*"

A brief review of the methods by which the Australian sheep-husbandry has reached its present commanding position, with a presentation of some of the instructive facts in relation to the Merino culture drawn from Australian experience, is justified by the importance of the subject. The principal sources of this review are responses to personal inquiries, or information obtained from or confirmed by the respective colonial Commissioners. Of the works having this sanction, the most important are Mr. Graham's treatise on the *Australian Merino* and the *New South Wales Wool Inquiry*, published in 1871 by the Agricultural Society of New South Wales.

Captain John McArthur, an officer of the British army, who had landed at Sydney in 1790, just two years after it had been formed into a penal settlement, was the first to observe that the fleeces of the hairy Bengal sheep, brought from the Cape of Good Hope, had in some way become sensibly improved. Conceiving the idea that the soil and climate of the settlement were peculiarly adapted for the production of fleeces of the best quality, he induced the importation of a small flock of Merino sheep which had been sent to the Cape of Good Hope by the Dutch Government. In 1803 he took with him to England samples of wool from the crosses which he had made of coarse-wooled ewes with Spanish rams. At that period all the fine cloths of England were made of wool imported from Spain. Fortunately, Captain McArthur arrived in England at a time when the English manufacturers were alarmed lest their wool-supply from Spain should be cut off by a threatened war. Through the influence of these manufacturers Captain McArthur secured assent from the British Secretary of State for the Colonies to his application for a grant of ten thousand acres of land in New South Wales for carrying on the growth of fine wool for export. He also obtained a few Spanish Merinos from the royal flock of George III., these Merinos being the "twin Cabana with the French Imperial Cabana Rambouillet." Having arrived in the colony with his chosen flock, which was placed upon the tract of land secured by his grant, he commenced the reclamation of his estate and the creation of fine-wool flocks, through the persistent use of the George III. rams upon so sorry a lot

of sheep that "long years were taken to eliminate the bad qualities of the pristine animals, on which he bred." For years the only efforts for improvement were made by himself, and so slow was his progress "that it took some twenty-three years" to perfect the pure breed of Australian Merinos. In 1810 the exportation was only 167 pounds; in 1820, 99,415; in 1826, 806,302 pounds. The best growers in the colony "bred from McArthur ewes." "From about 1829 to 1840," says Mr. Graham, "the Australian wool had a character so uniform and fixed that an English wool-broker or sorter could with certainty select by the touch alone, from a bale of others, a Botany Bay fleece, as they were called." The sheep, however, were small, the ewes weighing not more than 30 to 34 pounds each, and the wool wanting in denseness, the animals being bred mainly for fineness, in which they excelled. Smallness of size still appears to be the general character of Australian sheep, as shown by the average yield of unwashed wool per sheep in New South Wales,—4 pounds 9 ounces. After the time of Mr. McArthur, who died in 1834, many breeders, by selecting the largest and best-wooled sheep to breed from every year, and by keeping their runs understocked, or by liberal feeding, imparted size and density of fleece to the Australian Merinos, the ewes of some flocks attaining an average weight of 70 pounds.

After 1835, stud sheep were largely imported from abroad; and attempts were made to improve the Australian Merinos by crosses of the English races,—the Leicesters, Lincolns, and Downs,—not only with signal failure, but with incalculable injury to the most of the Merinos.

The Rambouillet sheep were also largely introduced, but without benefit, in the opinion of Mr. Graham, because without artificial sustenance they were too large for the country. The German sheep, imported at great expense, produced no benefit either in quality of wool or weight of fleece. Recently, Vermont sheep have been introduced, and Mr. Graham says, "of all imported sheep those of our first cousins, the Americans, are the best."

The results of Australian experience would seem to show that climate has less to do with the excellence of Merino wools than is commonly supposed. The "Salt-bush" country (a region of excessive heat) can, and does in some instances, produce as heavy or valuable wool as do any other portions of the colonies; and wool of the Darling Downs within the tropics, grown by a careful and judicious system of selection, is unexceptionable, although known as a "hot country wool." Still, Australia confirms the theory of scientific writers, that the natural region for Merino sheep is the region of the

vine, for the excellent wines of these colonies were among the most characteristic of their productions shown at the Exhibition.

Another lesson taught by the Australian sheep-husbandry, and confirmed by notes taken at the Exhibition, is the advantage of close breeding. Mr. Graham says that for a period of twenty-five years he was engaged in testing the value of in-and-in breeding. By in-breeding he does not mean indiscriminate breeding without selection, but, on the contrary, breeding with judicious selection,—that is, rejecting the faulty sheep, male and female, and breeding only from the perfect. With this qualification, he remarks, “I say that I never saw an entire flock of really good sheep that was not wholly composed of in-bred animals, and I think it scarcely possible to breed good sheep without having recourse to in-breeding.”

It was interesting to observe that these views were confirmed by memoranda attached to Australian fleeces displayed at the Exhibition; memoranda made, of course, without reference to any theory of breeding. Some of these memoranda were as follows:

“Gore & Co., Yandella, Queensland. Combing ewe, bred pure within their own flocks for 21 years; bred in paddocks entirely on indigenous grasses.”

“C. B. Fisher, East Haddington Hill, Darling Downs District, Queensland. This clip has been bred in Adelaide, South Australia, 40 years in-and-in to their own blood, and has been acclimated in Queensland 7 years; pronounced by Chamber of Commerce to be the most essentially combing wool.”

“George Clark, Queensland. Sheep improved by Tasmanian Merinos bred pure for more than 50 years.”

“C. H. Grison, Queensland. Bred within their own blood many years. Undoubtedly one object of this close-breeding with large flock-masters is to preserve the special characteristics of the wool approved by their old controversies.”

It is well known that so uniform are the characteristics in certain flocks, and so high the probity of the growers, that the clips of some proprietors are purchased by the same customers from year to year almost without testing. This uniformity and reliability is one of the great advantages to the manufacturer of having sheep-husbandry pursued on a large scale. He may select from one or two clips with certainty the precise wools adapted to his fabrics. This advantage has already been perceived in purchases from California, where wool-growing in large flocks has begun to be pursued by capitalists, as in Australia, systematically.

Sheep-husbandry being—not even excepting the gold-mining inter-

ests—of the first importance in the Australian colonies, is pursued by capitalists and men of intelligence. Relieved, as the proprietors are, from an expense of northern climates,—that of providing shelter and stores of winter fodder; winter production not being required, and the indigenous grasses being nutritious even when dried,—the principal outlay required in addition to that for stock is for providing an uninterrupted supply of water. The destructive droughts of 1866 have led to provisions for this supply on the broadest scale. Precautionary measures have been taken over the length and breadth of Australia against the failure of water. At enormous expense, dry water-courses have been converted into permanent rivers, reservoirs and tanks have been constructed, wells have been dug and dams made, and the stations so provided with water as to prevent the recurrence of the catastrophe of 1866.

The expense of transportation to the very distant markets making the weight of the dirt and yolk of the wool a serious item, the washing of the wool on the sheep is conducted with a thoroughness nowhere else known. The washed wools, whether cold- or hot-water-washed, extensively exhibited at the Exhibition in bales and cases, could scarcely be distinguished from sound or absolutely clean wools.

Attention is given to every detail connected with the manufacture of wool, as in the shearing. The uniformity of the clipping in fleeces exhibited at the Exhibition, the steps usually made by the shears being scarcely visible, was the subject of favorable comment by our wool-growers; yet the price paid the shearers, reported in the official record of Victoria, is only 14 shillings 4 pence for every hundred animals shorn.

The *Wool Inquiry*, instituted by the Agricultural Society of New South Wales, is illustrative of the high intelligence with which the wool industry of the Australian colonies is pursued. The main subjects of the inquiry were, What descriptions of wool are now likely to be most in demand, and what are the best modes of preparing the wool and putting it in the market? Circulars containing interrogatories, all pertinent to the general question, were addressed to the most eminent wool houses and chambers of commerce of England. Full answers to these interrogatories by thoroughly-informed persons and commercial bodies in England are published in the *Wool Inquiry*. As the readers of this report will be principally those interested in wool-production, we may be permitted to condense some of the most important points presented in these answers.

As to the distinction between combing and clothing Australian wools, writes one of the respondents, Southey, Baline, & Co., "All

wools of Australian production can be used for clothing, but by no means all for combing. There are limits as regards length of staple, in the first place, and other requisites, such as soundness and elasticity, necessary for the latter purpose. It will be clear, therefore, that, within these conditions, no line of distinction can be drawn above or below which it can be said that this or that sample is a clothing-wool and a clothing-wool only, a combing-wool and a combing-wool only."

The committee, in their interrogatories, proposed for combing-wool the following points of excellence, or questions, which should distinguish a true combing-wool, viz., 1st, weight; 2d, color or lustre; 3d, length; 4th, freeness; 5th, fineness; 6th, elasticity; 7th, softness; 8th, soundness; 9th, evenness of fleece; and requested their respondents to divide a thousand points among them according to their respective values.

J. T. Simes & Co. reply: "Soundness is the first requisite in combing descriptions; next, length up to three and a half inches for fine Merino. This desideratum is a most essential one in combing descriptions. We should place the characteristics of a Merino combing-wool in the following order and value: Soundness, 300; length, 250; freeness, 175; weight, 100 (important to growers); evenness, 75; elasticity, 50; fineness, 50. Lustrous color is scarcely an element in Merino combing."

H. Schwartz: "Soundness and quality, not singly but combined, constitute the most valuable feature of a combing-, small growth and softness that of a clothing-wool."

Hazard & Caldicott give the following statement of the relative importance of qualities in combing-wools: Length, 170; density, 60; softness, 80; fineness, 50; elasticity, 90; evenness of fleece, 80; soundness, 170; weight, 150.

A similar question was proposed by the Agricultural Society in relation to the desirable qualities of clothing-wools.

To this Jacomb, Son, & Co. reply: "The chief requisites of a good clothing-wool are fineness, density, softness, and fitting qualifications."

H. Schwartz: "Small growth, softness, etc., combined, constitute the most valuable features of a clothing-wool."

J. T. Simes & Co.: "Clothing-wool may be estimated by the following points: Firmness, 300; softness, 200; density, 150; evenness, 100; elasticity, 100; weight, 100; soundness, 50."

Hazard & Caldicott give the following statement for clothing-wools: Length, 50; density, 140; softness, 80; elasticity, 170; evenness of fleece, 80; soundness, 80; condition, 140; weight, 150.

As to the question whether combing- or clothing-wools are likely

to be in most demand, the answers are substantially that the greater demand at present for combing-wools is due in some measure to the fashion for worsted coatings, but that no one can with certainty forecast the future. As to prices, it is said there is a difference of opinion, but the preponderance is that the best clothing-wools bring the highest prices, although they have less weight. As to shearing and shipping in grease, it is answered that this is almost wholly dependent upon local circumstances, such as the washing facilities at the station, though the washed condition is that most generally acceptable to various buyers and consumers. For uses in which color is an important quality, the unwashed wools stand at a disadvantage, as there is "a greater difficulty in procuring a bright color from wools which have been packed and shipped in the grease." The Bradford Chamber of Commerce decidedly recommends washing as "pecuniarily most advantageous to the grower."

As to cold- or hot-water-washing, the preponderance of opinion appears to be, that there is very little to choose between the two processes where both are efficiently and skillfully applied.

In reply to the question, What proportion of yolk should be retained in the wool? all agree that just sufficient yolk should be retained to give a "kindly handle" to the fleece, the amount being variously put at from 10 to 20 per cent. Webster, Dewall, & Co., say "the sheep should be allowed 48 hours minimum run between washing and shearing, but in cold weather more time might be required. No yolk should be retained, but it should be allowed to rise again after washing to the extent of 20 per cent. After washing, the fleece should be allowed to dry thoroughly on the sheep's back, and only sufficient yolk should be allowed to rise to give the wool a soft and silky feel. In fact, the aim under all circumstances, whatever process of washing may be adopted, ought to be to give this soft, silky handle. The slight quantity of yolk tends to preserve the wool, and cause it to retain its natural elasticity and strength."

In answer to the question as to sorting and skirting and packing, the respondents recommend that "fleeces should be carefully skirted and stripped of all locks, bellies, and stained, burry, or seedy pieces, great care being taken that shanks or kimpny hairs are not folded in the fleece. The pieces should include the pole-lock, belly-piece, skirting, and shank, and any portion towards the extremities which are either stained or badly infested with burr or seed, and by the removal of which the rest of the fleece will remain comparatively free from faults." In respect to the classing of wools, Mr. Schwartze says, "With very superior brands elaborate sorting is desirable. In

the case of medium and good wools, the separation into young wool, first and second combing, first and second clothing, cross-bred lambs, pieces, and locks is all that is required, while with superior and faulty wools plentiful skirting is sufficient."

This long abstract of the *Wool Inquiry* will be excused, as it serves to answer questions directly presented to the observer by the peculiarities of the Australian wool exhibits; while the whole review of the Australian wool industry anticipates many points which would arise in considering the Merino wool-culture of other countries.

It is a natural inquiry whether the Australian wools will continue to increase in the accelerating ratio which has been witnessed in recent years. In the last decade the increase in New South Wales has been threefold, the numbers of sheep in 1866 being 8,132,511, while the returns for the year 1875 reached nearly 25,000,000. The Commissioners of this colony declare in their *Official Catalogue* that if seasons continue propitious, and prices are maintained at anything like the present rates, the probability is very great that another ten years will see New South Wales doubling the number of her sheep, and able to exhibit a return of 40,000,000 or 50,000,000.

ARGENTINE REPUBLIC.

The country ranking second in importance in the supply of the wools of commerce is the Argentine Republic. The number of sheep, as stated by Dr. Oldendorff, the Chief Commissioner of this Republic at the Exhibition, from a numeration made by himself as Commissioner of her Agricultural Department, is 57,501,200, with an annual yield of 216,000,000 pounds of wool, all of which, as there are only one or two wool-manufacturers, may be said to be destined for export.

The details as to the numbers and distribution in the several provinces of this Republic, as furnished by Dr. Oldendorff, from the census of 1876, are as follows:

| | Number. | Value. |
|------------------------|------------|--------------|
| Buenos Ayres | 45,511,358 | \$72,818,172 |
| Entre Rios | 3,000,000 | 3,600,000 |
| Santiago | 1,200,000 | 960,000 |
| Santa Fé | 4,500,000 | 3,600,000 |
| Corrientes | 77,846* | 878,000 |
| Cordova | 1,405,638 | 1,060,000 |
| San Luis | 113,815 | 170,000 |
| Catamarca | 114,420 | 145,000 |

* This probably should have been 770,846, as indicated by the value.

| | Number. | Value. |
|--------------------|------------|--------------|
| La Rioja | 53,932 | \$108,000 |
| Tucuman | 70,000 | 56,000 |
| Mendoza | 53,856 | 94,500 |
| San Juan | 120,200 | 285,000 |
| Jujuy | 514,621 | 331,473 |
| Satta | 64,930 | 46,000 |
| | <hr/> | <hr/> |
| | 57,800,616 | \$84,152,145 |

The chief, though not to our own country the most important, portion of these exports consists of Merino wools. The exhibits of wools from the Argentine Republic, at the Exhibition, with the exception of that of Mr. Samuel B. Hale, scarcely did justice to the importance of this production. The most noticeable feature was the enormous size of some of the fleeces of Merino wool of the Rambouillet and Negretti stock,—one fleece, a pure-bred Negretti ram, grown in eleven months and eighteen days, weighed 31 pounds; other Rambouillet fleeces weighed 25 and 27 pounds. Two pelts were shown from sheep of the same race, one of which measured 5 feet 6 inches in length, and 4 feet in width at the hips, with a staple 9 inches in length. These fleeces, although they may exhibit the recent attempts for improvement, do not illustrate the general character of the Merino wool of this country. The general characteristic of these wools is lightness of fleece, the weight not usually much exceeding three pounds in the grease to the fleece. They are fine, soft, and short, and principally suited for the card, though generally wanting in strength and nerve. Their principal defect, however, is the clinging to the fleece of the *carratilla* or burr from the clover or white medoc on which these sheep feed, which seems to be inseparably connected with the productive lands and best pasturage. Notwithstanding these defects, which are obviated by burring machinery, and more recently by chemical processes applied either to the wool or to the cloth, these wools are in high esteem with the cloth-manufacturers, especially of Belgium and France.

The Argentine Republic vies with Australia in representing the results of the Merino wool-culture in the last century. The raising of fine sheep was not seriously commenced until 1826, when it began with the importation of good Merino animals, with German shepherds, under the direction of Messrs. Hannah & Sheridan, whose establishment still survives. When fairly commenced the production increased with an accelerating ratio. The exports rose from 944 bales in 1832, to 3577 in 1840, an increase of 280 per cent. in eight years. In 1850, it attained 17,069 bales, an increase in ten years of 380 per cent.

This Republic, with a climate where the cold of winter is so moderate as to exhibit no more severe effects than slight hoar-frosts which disappear with the morning's sun, with an extensive seaboard, an internal and arterial system of rivers counted among the finest in the world, and with a soil furnished by a rich and vast alluvial plain on a subsoil of silicious clay, would seem to have a capacity for an unlimited wool-production of Merino wool. It would be well if the same could be said of another branch of wool, the product of the same country,—that proceeding from the indigenous races, or rather the descendants of the coarse Spanish sheep introduced by the conquerors in the middle of the sixteenth century. These wools, proceeding from Churros sheep of Spain which have not been crossed with the Merinos, proceed from flocks found in the Sierra of Cordova, at an altitude of from three thousand to five thousand feet, also from other provinces of the Argentine Republic, as shown at the Exhibition, each known by the name of the province. The wool, long, though coarse, and produced in small fleeces, is in great demand in the United States for the manufacture of carpets. A plateau plain in the province of Cordova, of eight hundred superficial leagues in extent, at an elevation of above ten thousand feet, produces sheep of this race which bear much larger fleeces of long carpet-wools. Some of the pelts were shown at the Exhibition. The tendency is for these wools to constantly increase relatively in value, as they are grown only by the rudest people, who are rather diminishing than increasing in numbers. The question of the future supply of these wools is, therefore, one of serious consideration with carpet-manufacturers.

Three specimens of fleeces, styled "Lana de Lina," were also shown. These are the wools of the cross of the sheep and the goat. They resemble in appearance the wools of the sheep of the several provinces where they were grown, but are more wiry and slippery. Dr. Oldendorff, who is a man of thorough scientific and practical information upon all subjects connected with agriculture, and who has resided in Buenos Ayres for twenty years, being now the head of the agricultural department of the Argentine Republic, says that they are the offspring of the male goat and the ewe, never of the ram and the female goat, and are invariably sterile. The skins, dressed, are called *pellones*, and are used by the natives to cover their saddles. In traveling over the mountains, frequently eight or nine are put upon the saddle, on top of which the driver sits. They serve for his bed and covering as he bivouacs at night.

CAPE OF GOOD HOPE.

The third great source in the Southern Hemisphere of fine wools of commerce is the colony of the Cape of Good Hope. The statistics, as furnished by Mr. Coates, the Commissioner of the colony, are as follows :

| | |
|---|--------------------|
| Number of woolled sheep in 1875 | 10,064,289 |
| Other sheep | 944,050 |
| Angora goats | 972,733 |
| Export of wool in 1874 | 43,000,000 pounds. |

From H. Schwartz & Co.'s report, January 18, 1877, the following statistics in relation to the Cape of Good Hope are obtained :

| Imports. | 1876. | 1875. | 1876. | 1875. |
|------------------|----------------|----------------|------------------|-------------------|
| England . bales, | 169,908 | 174,598 | lbs., 42,054,712 | 44,170,950 |
| Continent . | 1,033 | 997 | | |
| America . | 7,529 | 14,001 | | |
| Total . . . | <u>178,470</u> | <u>189,596</u> | | <u>50,600,000</u> |

The imports into England are chiefly washed. They estimate the number of sheep at 16,000,000.

CHILI.

No facts as to the wool-production of Chili could be obtained at the Exhibition. Statistical reports give its exports of wool for 1872 as 5,773,821 pounds, for 1873 as 4,102,078 pounds, and estimate the whole clip of the country at 3,000,000 kil., or 6,600,000 pounds.

URAGUAY.

An official report of the exports of Montevideo (Uruguay) makes the whole

| | |
|--|------------------|
| Exports of wool | 51,953,854 lbs. |
| Imports from the Argentine Republic to be deducted | <u>7,188,425</u> |
| | 44,768,829 |

Another statement gives the export as 57,042 bales; which, at 900 pounds per bale, the usual size for that country, would be equal to 51,637,800 pounds, from which are to be deducted 7,188,425 pounds imported from the Argentine Republic.

PERU AND BOLIVIA.

There are no sufficient data in relation to these countries. The best estimates give the amount of 6,000,000 pounds for both.

GERMANY AND AUSTRIA.

The exhibits of wool from Germany and Austria were limited to that variety of the Merino fleece commonly known as Silesian, but more properly called Electoral, from the Elector of Saxony, the country in which this wool was first produced. Some beautiful specimens of the Electoral fleeces were exhibited from Germany and Hungary, the latter grown by Hungarian nobles. They illustrated all the characteristic features of the "noble" wool, as it is sometimes called in Germany. The fibres of these wools, according to Mall, measure from 1.4 to 1.8 of a centime of a millimetre in diameter; a centime of a millimetre being equal to $\frac{1}{2540}$ of an inch. Nathusius-Königsborn, in *Das Woolhaar das Schaf*, makes the average measure of 10 hairs 1.79 centimes, 1418 to an inch. Among these hairs one hair measured 1 centime, equal to 2540 to an inch. According to the same author, 18 hairs of a very high-blood ewe average 1.53 centimes, or 1661 to an inch. The finest single hair measured 1.17 centimes, equal to 2164 to an inch. The finest Silesian ram averaged 1.54 centimes. Dr. George May, in *Das Schaf*, Breslau, 1868, in a table of measurements of 55 different kinds of wool, gives the finest, that of a Silesian super-electoral, the very highest Electoral wool, as averaging 0.13 millimetres, equal to 1954 hairs to an inch. The length of these wools rarely surpasses 4 centimetres, and the weight of the average of many flocks' fleeces is scarcely over 1½ pounds. They are used at present only for the fabrication of the most precious of woolen goods, imitation Cashmere shawls, extra fine broadcloths, etc. The thick felts, now made in this country for the hammers on the keys of pianos, are made solely of this wool imported from Silesia. It is admitted that this branch of wool-production is everywhere diminishing. Saxony, the cradle of the race, has scarcely any of the Electoral sheep. Silesia still possesses a considerable number, while others are found in Moravia, Hungary, Prussia, and Poland, which produce all the superfine wools used in Europe. The whole production of the superfine wools of these countries in 1866 is stated by a competent authority as follows:

| | |
|-------------------|----------------|
| Hungary | 560,000 kil. |
| Bohemia | 110,000 |
| Moravia | 55,000 |
| Silesia | 85,000 |
| Total | <u>810,000</u> |

This small production is due to the small weight of the fleeces, the great care which the animals require, prices disproportionate to the

cost of production, and the loss of that distinction which formerly encouraged the growers of the noble wool. Mr. Bochner, of Austria, one of the Judges of this group, is authority for the statement that Count Hunyady, of Hungary, one of the exhibitors of the Electoral fleeces at the Exhibition, produces 12,000 pounds annually of these wools, which he sells at 90 cents, principally in France, for the manufacture of imitation Cashmere shawls; but at these prices there is no profit in the culture. The few growers of this wool in Hungary, who are generally noblemen, continue the production only from motives of pride. Most of the wealthy proprietors, who formerly made a specialty of the production, have abandoned it or allowed their flocks to run down.

In no portion of the world have so much science and intelligence been directed to the Merino sheep-husbandry as in the German states. Saxony was the first to acquire the Spanish Merinos in any considerable number, first receiving them in 1765. In 1774, the pure-blooded progeny of the Spanish importations amounted to 325 head. As the culture of this race extended, there grew with it a desire to increase the characteristic property of the fleeces or the fineness of the fibre. This passion, as it became, for the utmost possible fineness of fibre, irrespective of all other considerations, led insensibly to the methods of breeding which produced a race possessing this attribute in the highest degree, but with a corresponding delicacy of constitution and lightness of fleece. This race, known in this country as the Saxon and in Germany as the Electoral, or Escurial, both names being used indifferently, does not appear to have been the inheritance from any special Spanish Cabañas, but a production of art. The commercial demand produced by the reputation of their wools led the German growers to increase the size of their animals and fleeces. Another race was developed by the side of the one above described, the ideal of which was a robust body producing the largest possible quantity of wool of the utmost fineness consistent with the increased production. This race was called the Negretti, from Count Negretti, the proprietor of one of the most celebrated original Cabañas in Spain. It was also sometimes called the Infantado race, from the Duke of Infantado, another Spanish proprietor; both terms, as in the case of the term Electoral and Escurial, indicating the character of the race and not its special Spanish descent, as it is often erroneously held. The descriptive terms Negretti and Infantado were found at the Exhibition applied to wools of the same general character. While Silesia is still in possession of the largest number of the superfine Electoral sheep to be found in the whole world, Saxony, Pomerania, Mecklen-

burg, and Eastern and Western Prussia in time renounced the Electorals and replaced them by the Negrettis. Thirty or forty years ago Germany attained the utmost production that her land would permit. In 1850, according to personal statements made to the writer by Professor Grothe, the number of sheep in all the German states exceeded 50,000,000; at the present time they do not exceed 25,000,000. Mr. Dodge places the number at 29,000,000. It is said that she is even losing her magnificent Merino breeds; for not only the Electorals, but the Negrettis, are being replaced by the English long-wooled races. What effect this will have upon the once famous broadcloth-manufacture of Germany is an interesting subject of inquiry; while the question suggests itself, what relation this decline of the German fine-wool-industry has to the abolition of the former protective duties on imported wool.

The estimated product of wool in Austria, according to the returns made at the Exhibition, is about 30,000,000 kilogrammes of 66,150,000 pounds. The number of sheep is not given; but at three pounds of wool per head the number would be about 22,000,000. Mr. H. Schwartze and Mr. Dodge give, from returns in 1871, the number of sheep as,—

| | |
|----------------------|------------|
| In Austria | 5,026,398 |
| Hungary | 15,076,997 |
| Total | 20,103,395 |

The distribution of sheep in proportion to the area and population, in 1869, was as follows :

| | Per square Kilometre-area. | Per 1000 Persons. |
|--|-------------------------------|----------------------|
| Dependencies represented in the Reichsrath | 2476 | 367 |
| Dependencies of the Hungarian Crown | 1639 | 341 |
| The Austrian Monarchy | 2043 | 564 |

The largest flocks are found in Hungary. Beautiful superfine clothing-wool was exhibited by Count Alois Karolyr, from flocks bred at Stampfen. This flock numbers 80,000 head. The average length of staple of the fleece is about $1\frac{1}{2}$ inch; the average weight of the shearings, the fleeces being warm- and soap-water-washed, is, winter lambs excepted, $2\frac{3}{4}$ pounds English. The whole clip, 145,000 to 156,000 pounds, is sold abroad, mostly to French manufacturers, for from 74 to 85 cents per pound.

RUSSIA.

The wools of Russia were well illustrated at the Exhibition by numerous fleeces and bales, and admirably arranged samples. The

most interesting were Electoral wools, comparing favorably with the Silesian and Hungarian specimens, samples of the Donskoi carpet-wools, and a series of beautiful samples from the estate of the Grand Duchess Katharine Michailoona, showing the extraordinary length of fibre obtained from sheep of the Rambouillet race. Sheep-husbandry constitutes one of the most important branches of rural economy in the Russian Empire. The full statistics obtained from the Russian Commissioner show that the total number of sheep in the Empire at the present time is 65,387,000,—Europe 49,493,000, Asia 15,894,000,—a number which gives a proportion of 81 sheep to each 100 inhabitants. The distribution of sheep according to the population in the great divisions of Russia is as follows:

| | |
|--|------------|
| The Provinces of Central Asia have per 100 inhabitants . . . | 565 sheep. |
| Caucasus “ “ . . . | 124 “ |
| Siberia “ “ . . . | 90 “ |
| Russia in Europe “ “ . . . | 70 “ |
| Poland “ “ . . . | 65 “ |
| Finland “ “ . . . | 49 “ |

Compared with the other great states of Europe, Russia occupies the fourth place.

| | |
|---|------------|
| Great Britain has per 100 inhabitants | 133 sheep. |
| France “ “ “ | 97 “ |
| Prussia “ “ “ | 93 “ |
| Russia “ “ “ | 81 “ |
| Austria “ “ “ | 47 “ |
| Italy “ “ “ | 38 “ |

The total number is composed of 12,555,000 head of Merinos and 52,832,000 common sheep. The principal domain of the Merinos is comprised in the Government of New Russia, which forms the southeastern portion of the Empire. The Governments of Caucasus, Siberia, and Central Asia have scarcely any, and Finland no Merinos; Georgia and Circassia possess mostly sheep of the ancient Colchian race. Generally considered, the fine-wooled sheep tend to decrease, as the increased price of wheat causes a large conversion of pastures into arable land. Both the Electoral and Negretti races are grown. The small product in wool of the former race, set down at two pounds for the ewe and three pounds for the wethers, has led to extensive crossing with the more vigorous race. The most successful crosses, and those now in most favor, are with Rambouillet rams. The reason given for this predilection is, that “this wool responds best to the exigencies of the present wool-production, since the clothing industry tends to decrease, while that of worsted tissues takes daily more development.”

The culture of Merinos in the southern regions of the Empire is favored by the mildness of climate, the sheep requiring shelter and fodder only about six weeks. The greater part of the flocks is composed of a great number of head, single flocks reaching to fifty, seventy-five, a hundred, and even four hundred thousand head. Mr. Falz Feru, one of the exhibitors of excellent wool of the Government of Tanride, in the Crimea, has 230,000 sheep, all of Spanish blood, occupying 340,000 acres of land. These flocks consist of Negrettis, which appear to have attained in Russia an unusual hardiness, which favors their culture in immense flocks, requiring but little of that care so indispensable for the Electorals.

The great masses of the common sheep are found in the countries of Central Asia, in the Governments of the south coast of Russia in Europe, in the Caucasus, and in Siberia. They consist of four races, Tchoundki, or the fat-tailed sheep, belonging to the nomadic people, the Kalmucks and Kurds. The Valaque, or the Walladean or Zakel sheep, which also abound in Hungary and Moldavia, of a large size, with coarse, lustrous wool. They are found in the Caucasus, or region of the Don, and probably furnish the wool known as Donskoi. The Tsijai, commonly spelt Zijah, meaning Gipsej, or mongrel, with an exterior resembling Merinos, but with longer wool. The Russian race, of a small size with coarse wool, and a sub-race, Retchelof, found at the south of the Government of Poltava, which furnishes the black and white fleeces commonly called Astrakan.

The production of the Merino wool of Russia in the grease is estimated at 1,569,000 poods, equal to 56,484,000 pounds; of common wool at 9,245,000 poods, equal to 332,820,000 pounds, or $6\frac{3}{10}$ pounds to a sheep, the total having an estimated value of 46,357,000 roubles, or 32,449,000 dollars. The exports of wool are of a value of 13,999,534 roubles, supposed to be about 30,000,000 washed, equal to 50,000,000 pounds unwashed. There is a vast domestic consumption of common wools in the household for clothing, for carpets or mats, and for mattresses, while the sheepskins are largely used for clothing.

The enormous production of common wools, most of which, such as those from the broad-tailed and Valaque races, are admirably adapted for the carpet-manufacture, shows that this country will be one of the most important sources for the supply of the raw material for this industry.

FRANCE.

The wools of France had no representation at the Exhibition, except in fabrics and in the products of other countries which have been so largely influenced by an infusion of the blood of the French Merino.

This influence makes it necessary to dwell at some length upon the French wool-industry, since it is one of the lessons of the Exhibition.

The sheep-husbandry of France is unquestionably declining, at least in numbers. President Thiers said in 1870, "Our ovine population has gone down from 40,000,000 to 30,000,000." It is stated on the authority of the Inspector-General of Agriculture, that the number of sheep in France had been reduced from 30,386,000 in 1866, to 24,707,496 in 1876, a loss of 5,678,787 in six years. President Thiers attributes this decline to the absence of protective duties on wool, others to the abuse of an absurd law which allows the municipal councils to prescribe the number of head per *hectare* which each farmer is permitted to keep. The number of Merinos, or their grades producing fine wool, is estimated by M. Sanson at 9,000,000. The other flocks, consisting of indigenous sheep producing coarse wools, and some English mutton-sheep, have no special characteristics worthy of notice.

The wool-industry of France is remarkable for the influence it has had upon the combing-wool manufacture of the world, and consequently upon the sheep-husbandry of all the nations which supply it. Louis XVI. obtained from the King of Spain 200 rams and ewes of the pure race of Leon and Segovia, exactly a century ago, viz., 1776. In 1786 he obtained 367 more, which were the foundation of the famous Rambouillet flock. In 1799 France received, through the treaty of Basle, 5500 animals from the finest flocks of Castile. Sixty sheep-folds were established by Napoleon as accessories to that of Rambouillet, where proprietors could obtain the service of Merino rams free of charge. The directors of the national sheep-folds pursued in breeding precisely the opposite course to that adopted with the same original race in Saxony and with the *Tropeau de Naz* in France. They aimed to increase the size of the frame and the weight of the fleece. With this increased size and weight there was developed a corresponding length of fibre, and a Merino combing-wool was for the first time created. The French manufacturers were the first to avail themselves of this new property of wool which their own territory supplied. National pride stimulated them to create new fabrics from the new material supplied from domestic sources. They invented Mousselines de laine Merinos, cashmeres, *challis*, bareges, and more recently worsted coatings, in a word, all the woolen stuffs of the nineteenth century which distinguish themselves in their physiognomy from the tissues of the preceding centuries. The English and other manufacturing nations in due course followed the French example. Wool, instead of furnishing the ma-

terial for clothing for one sex, as formerly, supplied it for both. The Southern Hemisphere responded to this new and increased demand for Merino wool, and the fine sheep-husbandry of the world was modified to produce the combing-wools required for the new fabrics. To France must be accorded the honor of creating the most characteristic feature of the sheep-husbandry and wool-manufacture of the present century.

The scientific breeders of France, not contenting themselves with producing animals surpassing all others of their race in size and weight of fleece and length of staple, have more recently aimed to develop, together with the special qualities of the Merino fibre, the meat-producing qualities and precocity of development, which formerly were regarded as the exclusive aptitudes of the English races. They have succeeded in transforming the Merino into the most perfect mutton-sheep, having the same precocity and giving as much meat as the South Downs, reputed to be the best producers of flesh, while, at the same time, the total weight of the fleece is increased without augmenting the diameter of the fibre. In a word, the Merino, while becoming a mutton-sheep, preserves all its wool-bearing qualities. This method of development, requiring of course abundant food, should be suggestive to the occupants of the valuable lands in this country contiguous to city markets, where the merely pastoral sheep-husbandry has declined.

We must not pass by another product of French sheep-husbandry, perhaps the most instructive, in a scientific point of view, of any in the Exhibition, as illustrating the wonderful results which skillful breeding may accomplish by happily improving the accidents of nature. The product referred to is the famous Mauchamp wool, admirable specimens of which, both in staple and yarn, were exhibited by Mr. George W. Bond, who had personally visited the creator of this race in France, from whom he obtained his specimens. The characteristics of this wool are that to a fineness equal to that of Merino, and a length of staple which surpasses it, is added a lustre absolutely comparable to that of silk; a lustre so marked that, in a *challis* made with a silk warp and weft of Mauchamp wool, the stuff, which contained only one-eighth of silk and seven-eighths of wool, was as brilliant as if made entirely of silk.

The history of the creation of this race is so instructive that it may be briefly stated. In 1828 there was accidentally produced on the farm Mauchamp, in France, cultivated by M. Graux, a ram from a flock of Merinos, having a head of unusual size and a tail of great length, and also a wool remarkable for its softness, and, above all,

its lustre. M. Graux separated the animal from the flock and used it for reproduction, obtaining some animals similar to the sire and others to the dam. Taking afterwards the animals similar to the sire and crossing them among themselves or with the sire, which served for the type, he succeeded, little by little, in forming a small flock whose wool was perfectly silky. He afterwards succeeded in modifying the forms and the size of the animals, originally quite small, and attained a flock of six hundred head, all furnishing the silky wool. The flock was prosperous at the time of the breaking out of the Franco-Prussian war. Of its history since that period we have no knowledge.

ENGLAND.

The English wools were illustrated at the Exhibition by the beautiful collections of the wools of commerce of Messrs. Bowes, of Liverpool, and Bond, of Boston; and, at a later period, an admirable series of fleeces forwarded from Bradford, through the influence of one of our colleagues, Mr. Mitchell. The names and prices of these wools are given below:

| | | | |
|--------------------------------|------------|---------------------------------|------------|
| Half-bred wether | 15½ pence. | North Hampton hogget | 16½ pence. |
| “ hogget | 16½ “ | Kent wether | 16½ “ |
| Somerset wether | 16½ “ | Northumberland hogget | 17½ “ |
| Lincoln “ | 16 “ | Gloucester hogget | 16 “ |
| North Hampton wether | 15½ “ | “ wether | 15 “ |
| Yorkshire “ | 16½ “ | Somerset “ | 16 “ |
| Half-bred hogget | 16½ “ | Irish hogget | 17½ “ |
| South Down ewe | 16 “ | Devon (lustre) wether | 17½ “ |
| Leicester wether | 16 “ | Hereford “ | 16½ “ |
| Shropshire hogget | 16½ “ | Yorkshire hogget | 19 “ |
| “ “ | 18½ “ | Lincoln “ | 18 “ |

The characteristics of the fibre of all the many English races were well displayed in these collections. It is necessary to say that England produces no Merino sheep, and that all are grown primarily for mutton, and secondarily for the wools, the latter being generally used for combing purposes, and entering into the manufacture of a large class of worsted goods. The wools of English races,—the Leicesters and Lincolns and Cotswolds,—for length, strength, and lustre, present the best type of combing-wool proper, or that used exclusively for combing-wool purposes. The lands being stocked with sheep to their utmost capacity, the numbers of sheep vary but little from year to year, so that returns of a few years back will pretty fairly represent the present production. The Government returns of 1868 show the whole number in England, Wales, Scotland,

and Ireland to be 34,532,000, which are classified by Mr. Graham as follows, according to the leading typical races:

| | |
|---------------------------------------|------------|
| Leicesters and their allies | 12,933,000 |
| Downs | 6,130,000 |
| Cheviots | 4,368,000 |
| Black-faced | 5,101,000 |
| Welsh | 2,000,000 |
| Irish | 4,000,000 |
| | <hr/> |
| | 34,532,000 |

The production of these races is thus estimated:

| | | |
|------------------|---|---|
| Leicesters, | 12,933,000 fleeces at 7 pounds each | 90,531,000 |
| Downs, | 6,130,000 " 4 " | 24,520,000 |
| Cheviots, | 4,368,000 " 3 " | 13,104,000 |
| Black-faced, | 5,100,000 " $2\frac{3}{4}$ " | 14,027,750 |
| Welsh and Irish, | 6,000,000 " averaging 2 pounds | 12,000,000 |
| | <hr/> | |
| | 34,532,000 | Total number of lbs. washed 154,182,750 |

At an average price of 10 pence per pound, the value of the wool-product is £6,425,000. Taking the average age of these sheep at three years, about one-third, or 11,510,000, are killed for mutton annually; averaging the carcass at 65 pounds and the price per pound 8 pence, there are produced annually 748,150,000 pounds of mutton, realizing £25,000,000 per year. This, added to the annual value of wool, £6,425,000, makes the product of British sheep £31,425,000, or \$159,125,000. To this is to be added the value of the manure, which can only be estimated by the fact that it is an indispensable necessity for British husbandry. This estimate is greatly increased when we add the value of wool from slaughtered sheep, say 36,000,000 pounds, and estimate the value of the wool at 15 pence instead of 10 pence, which is nearer the correct figure at the present time.

THE DOMINION OF CANADA.

The long wools of English blood exhibited by Canada attracted the high commendation of the Judges; an exhibit from Hamilton showing Leicester, Cotswold, and South Down wools, and that of crosses of Leicester and Merino, Leicester and South Down, Cotswold and Leicester, Lincoln and Cotswold, justified the popularity of these wools with the worsted-manufacturers of the United States. So prevalent is the culture of the long combing-wools in Canada, and so large their consumption in the United States, where they find their principal market, that the term Canada Wools is in general use to designate the wools of the English type.

We are indebted to the Minister of Agriculture of the Dominion of Canada for the latest official returns, made in 1871, which furnish the following statistics as to sheep and wool production :

| Provinces. | Number of Sheep. | Pounds of Wool. |
|-------------------------|------------------|-------------------|
| Ontario | 1,514,914 | 6,411,305 |
| Quebec | 1,007,800 | 2,763,304 |
| New Brunswick | 234,418 | 796,168 |
| Nova Scotia | 398,377 | 1,132,703 |
| | <u>3,155,509</u> | <u>11,103,480</u> |

OTHER EUROPEAN COUNTRIES.

No exhibits of wool were made by Italy, which, according to Messrs. H. Schwartze & Co., has 6,977,104, and according to Mr. Dodge, 11,000,000 sheep. Portugal, which has about 3,000,000 sheep, made some excellent exhibits, and is declared by her Commissioners to be pursuing sheep-husbandry with a freshly-awakened zeal and energy. Spain, which has, according to both the authorities above mentioned, about 22,000,000 sheep, made a considerable number of exhibits of wool. But the observer could not fail to be struck with the fact that the Merino wools exhibited by the country which was the cradle of the Merino race, showed no evidence of their pristine excellence.

UNITED STATES.

It is a subject of great regret that the wools of the United States were so inadequately represented at the Exhibition. This was in some measure accounted for by the circumstance that the usual shearing had not taken place at the time when, by the rules of the Exhibition, the entry of exhibits was closed. At the request of the Judges of this group, an extension of time was granted to proposed exhibitors of wool, but with little effect. The few beautiful fleeces, especially from Ohio, but more than all the high character of American flannels, blankets, and fancy cassimeres, made exclusively of domestic wool, were sufficient to impress our foreign associates with the value of our wool-product.

The number of sheep in the United States is set down in the Census returns of 1870 at 28,777,951, and the quantity of wool produced at 100,102,387 pounds. It is believed that these returns are incomplete, as they only give an approximation of the number of sheep actually on farms at the dates of the returns, and were imperfect in respect to Texas and the Territories, while the amount of wool is also incomplete, as the returns of fleeces of sheep slaughtered in cities are not given.

The statistician of the Agricultural Department, Mr. Dodge, whom the writer has consulted, and who has made a special study of the subject, estimates the number of the sheep in the United States, in 1876, at not less than 36,000,000, producing, with the additional fleeces of those slaughtered within the past year, 155,000,000 pounds. The sheep of the United States consist, 1st, of what are called the native sheep, which are descendants of the unimproved coarse-wooled English sheep, first introduced. It is not known to what particular type of the English races they originally belonged, although it is known from tradition that certain of the common sheep were held in particular esteem for producing long worsted wools, which were hand-combed and spun in the families of New England for making yarns for worsted stockings. These sheep furnished the stock upon which the Merinos were engrafted. 2d. Descendants from the more recent English races, principally brought immediately from Canada. 3d. The Mexican sheep found in Texas, New Mexico, Colorado, and California, a coarse and sparsely-wooled sheep of Spanish descent, undoubtedly the race known as Charro. 4th. The Merino sheep and other grades. The latter constitute the principal and characteristic sheep of the United States. Six Merinos were introduced to the United States by different persons between 1793 and 1802. In the last-named year Mr. Livingston, the American Minister in France, sent home two pairs of Merinos obtained from the French Government flock. Later, in 1802, Colonel Humphreys, the American Minister in Spain, on his return from his embassy, shipped a flock to the United States, of which twenty-one rams and seventy ewes reached his farm in Connecticut. It is not known whether the Merinos imported prior to these left any descendants, although it is known that the Merinos proceeding from the import of Mr. Livingston sold for enormous prices. The next, and by far the most important acquisition, was secured in 1809-10, through the energy and fortunate position of Mr. William Jarvis, American Consul at Lisbon, in Portugal. In consequence of the invasion of Spain by the French, and the subsequent confiscation and sale by the Junta from celebrated flocks of Merino sheep, Mr. Jarvis was enabled to purchase a large number,—about 3500,—which he sent to this country and sold, except a few hundred, which he placed on his own farm in Wethersfield, Vermont, where they or their descendants have remained ever since. Four of these sheep were presented to Mr. Jefferson, at Monticello, who thus responded: "The four Merinos are now safe with me here, and good preparations are made for their increase the ensuing year. Pursuing the spirit of the liberal donor, I consider them deposited with me for

the general good; and divesting myself of all views of gain, I propose to devote them to the diffusion of the race throughout our State, as far as their increase will permit. I shall send a pair to every county of the State, in rotation, until the whole are possessed of them." In 1810 and 1811 there was an additional importation of about 2500 Merinos, all from the prime flocks of Spain, part of which went to New York and part to Boston. The Merinos arrived at a propitious time for their favorable reception. It was a period when our foreign trade was suspended by the embargo, and our people were driven to supply themselves with fabrics from their own resources. They hailed with eagerness the opportunity of supplying and improving the raw material for the wool-manufacture in which they had embarked. The Spanish races were eagerly sought to improve the common sheep, and flocks of full blood and grades were established in all parts of the country. Although the mania for Merino-growing, which rose so high during the war of 1812 that from 1000 to 1500 dollars was not unfrequently paid for Merino bucks, was checked by the peace of 1815, and the destruction of our wool-manufacture by the flood of importations, while many of the flocks were merged in the common coarse sheep of the country, others were kept pure and separate and the race was firmly established on our soil.

In 1824 a new impulse was given to our wool-manufacture through legislative influences. Factories on a large scale were established for making broadcloths. The fashion of the times required cloths of great firmness, such as were made in England and France from the wools of German Electoral sheep-husbandry, which was then at the height of its prosperity. The necessities of the broadcloth-manufacture required a finer wool than was supplied by Spanish Merinos, as they then were commonly called. Saxon, or Electoral Merinos, were imported in large numbers. The record is preserved of 2963 which were imported in four years. The first aim of the wool-growers thence for a period of fifteen years was to engraft upon their flocks the Saxon blood, though, fortunately, a few never entirely abandoned the old Merinos.

Through the effect of general causes, which insensibly led to the decline of superfine sheep-husbandry in all the Merino wool-producing countries of the world, there commenced in the United States about 1835 a reaction in favor of the neglected old-fashioned Merinos. Intelligent growers abandoned improvement through the Saxon stock, and sought for stock animals those of undoubted descent from the early Spanish importations. From this period the improvement of the American Merinos, as they began to be designated,

especially in weight of fleeces, was rapid. To give an illustration by no means exceptional, in 1835 the choicest flocks yielded $4\frac{1}{2}$ pounds of wool per head. In 1844, flocks of the same proportion yielded 5 pounds 13 ounces of washed wool per head. In 1863, a flock of 157 two-year-old and yearling ewes yielded 7 pounds 2 ounces of fairly washed wool per head. In that year, at the International Exposition of Hamburg, the first prizes for the best heavy-wooled sheep—rams and ewes of 1761 competing animals—were awarded to Mr. Campbell, of Vermont, who exhibited American Merinos. In 1875, a flock of 33 ewes in Michigan produced 318 pounds of washed wool. At the American Wool-Growers' Association, in 1875, the premiums were awarded with the following report:

| | Weight of Sheep. | Weight of Fleece. | Age of Fleece. |
|--|------------------|-------------------|-----------------|
| 1st premium ram | 180½ lbs. | 29 lbs. | 11 mo. 21 days. |
| 2d premium ram | 148 " | 23 " 13 oz. | 1 year 4 " |
| 1st premium ewe | 108 " | 17 " 3 " | 11 mo. 22 " |
| Two-year-old ewe not entered for premium | | 22 " 8 " | 1 year 5 " |

Two races of our Merinos have acquired special celebrity: the Atwood family improved, descended from Colonel Humphreys' importation, and supposed, upon somewhat equivocal authority, to be of the ancient Spanish stock belonging to the Duke Supantado, and the Rich family, supposed to inherit Paular blood. All these alleged descents are believed to be equivocal and uncertain. The Wells and Dickinson, of Ohio, partially descended from Colonel Humphreys' sheep, samples of whose excellent wool were shown at the Exhibition, have had much influence upon the early flocks of the Western States. The most eminent improver of the American Merino was Mr. Edwin Hammond, of Vermont, who bred upon the Atwood stock. Of his work it is enough to say that he effected as marked improvement in the Merino as was made by Bakewell and Elman respectively upon the Leicesters and Downs of England.

We find, in this brief review, the names of Livingston, Humphreys, Jarvis, and Hammond, who are to be specially honored as founders of American sheep-husbandry. To these should be added that of Henry S. Randall, of Cortland Village, New York, recently deceased, at once a practical shepherd and a scholar. His example and his writings, which have contributed so much to elevate the pursuit of wool-growing in this country, are among the best fruits of American sheep-husbandry.

The special application of American wools will be considered under the head of fabrics. We will advert to one general attribute which is universally conceded to them, viz., their soundness and strength of

fibre. This, and perhaps the great development of fleece and weight, are to be attributed less to skill and the character of our soil and climate than to the prevailing system of keeping and the careful and thrifty habits of the people. The flocks, being generally small, are under the personal care of the proprietors. They are housed in winter and regularly and abundantly fed, and consequently produce a healthy and sound fibre. Thus our wools owe their best-distinguishing attribute indirectly to social or moral causes. It would be seen that our Merino wools, as a rule, belong to the class of intermediary wools produced in Europe by the Negretti race, now generally prevalent in most Merino wool-producing countries and increasing in others. Many of our manufacturers complain of the falling off of our fine wool production. The American wool-grower has seen little at the Exhibition to induce him to change his present system. He has found that the cloth-industry of the world is adapting itself to the intermediary wools such as he produces. Even fashion yields to economical necessities. The superfine wool-production is unnatural, artificial, and unprofitable. From the nature of things there can be no reasonable expectation of seeing it revived in this country. So small is the consumption of the superfine wools that what might be imported from abroad would hardly compete with American wools; and if it were possible to distinguish them so that there should be no possibility of fraud or evasion, they might without injury to the wool-grower be placed on the same scale of duties as carpet-wools, neither being advantageously produced here.

The reader would naturally look for particulars as to the distribution of sheep in the several States of our territory, with observations as to the characteristics of the wool in the different States as influenced by soil and climate. These particulars the writer hoped to supply, and with this view addressed letters of inquiry to each of the Commissioners from the wool-growing States. The information obtained was so meagre that he has been compelled to abandon his purpose. The wools of many of our States have characteristic qualities readily recognized by inspection or touch; but the most skilled expert would be unable to define, in language intelligible to the unskilled, differences which to him are perfectly palpable.

The deficiency as to the distribution of sheep in the several States, is approximately supplied by a statement which accompanied an admirable exhibit of samples of wools from most of the States and Territories of the Union, made by Messrs. Fiss, Banes, & Erben, of Philadelphia. This exhibit, made at the special request of the Superintendent of the Agricultural Department of the Exhibition, was

prominent among whom is Mr. George Campbell, of Westminster, are now working in a different direction. They are breeding so as to destroy the wrinkles formerly so popular as indicating a pure blood, but really useless, unsightly and inconvenient in shearing, to diminish the quantity of the yolk, and to make a hardy animal, fitted especially for regenerating the flocks kept in a state of exposure in Colorado and California. Vermont sheep at the Exhibition having attracted the favorable attention of the Commissioners from Australia, the wool-growers of the State subscribed for the purchase of a model ram and ewe, which they have courteously presented to the Agricultural Society of New South Wales.

The most remarkable event in the recent history of our wool-
industry, is the rapid development of the pastoral sheep-husbandry in California and the trans-Missouri States. While in the oldest States wool-growing has been pursued with small flocks, as an adjunct to other husbandry, in these States it has been organized on a grand scale. It is conducted not by farmers, but by exclusive wool-growers, who are at the same time capitalists. There are single proprietors who have flocks exceeding a hundred thousand head in number. In 1868 the Pacific product was 15,000,000 pounds; in 1870, 23,000,000. In 1875 the product of California exceeded 50,000,000. The product for 1876 is stated as follows by E. Grisar & Co.:

| | |
|---|--------------------|
| Spring wool, 94,102 bales, weighing | 28,230,000 pounds. |
| Spring wool shipped direct from the interior | 1,834,919 " |
| Total spring production | 30,064,919 " |
| Fall wool received, 73,952 bales, weighing | 24,031,378 " |
| Fall wool shipped direct from the interior | 204,073 " |
| Total fleece wool | 54,300,370 " |
| Pulled wool shipped direct from San Francisco | 2,250,000 " |
| Total wool production of California in 1876 | 56,550,370 " |

The wool is rapidly improving and is in high demand. The great ranges of pasturage in the Pacific and trans-Missouri States, and the very little winter housing and feeding of forage required, give promise of a development of sheep-husbandry in those territories comparable to that of the Southern Hemisphere.

Conditions not less favorable, which are beginning to attract the attention of experienced wool-growers, exist in the vast area and favorable climate of Texas.

No reference has yet been made to a branch of our sheep-husbandry which promises to take the most prominent place in the older States, that of the long-wooled or mutton races, or their crosses with

Merinos. The culture of these sheep, which are of recent introduction, dating back hardly more than twenty years, has been largely influenced by the contiguity of Canada and the development of our worsted industry within the period mentioned. It has been peculiarly successful on the southern shores of Lake Erie, and in the States adjoining Canada. From returns furnished by the State Commissioners, it appears that of about 11,000 sheep in Wisconsin, about one-quarter are of the long-wooled races. Of 8,000,000 pounds produced in Michigan in 1875, about one-quarter is of the same race. In both States the culture of this wool is declared to be on the increase.

In Oregon, of 2,000,000 pounds produced in 1875, the quantity of long combing-wools was in the same proportion. The exhibits from this State show remarkable success in breeding, actually improving upon the English wools, while the climate shows peculiar adaptation to this product. Kentucky, favored by its blue-grass pastures, is also distinguished for the excellence and abundance of its long combing-wools. It has been proved by the best test, that of actual trial, contrary to the belief formerly prevailing, that our soil and climate are well adapted to these heavy sheep. The high prices of the wools, the increasing demand for good mutton, and the benefits to the soil, cannot fail to induce the farmers of the older sections of the country to follow the example of England. A new feature in our foreign commerce is the recent invention which permits the transportation to great distances of fresh meats, hung on shipboard in apartments suitably prepared, and the favor which American beef and mutton thus introduced have met in England presents unexpected inducements for mutton-growing in our Atlantic States.

Other English races not yet introduced, especially the Cheviot, should be tried. It is believed that this race is specially fitted for the high plateaus of North Carolina, where they would find a climate approximating that of their native locality. The mere acclimation and continuance of the English types is not sufficient. Attempts should be made to create new races of this class of sheep exactly adapted to our climate, manufactures, and conditions of agriculture. No wider field for zoötechnic achievements is offered than in this direction.

This sketch would be incomplete without some reference to the literature of American sheep-husbandry. The most eminent and influential worker upon this subject is Dr. Henry S. Randall, lately deceased, who by his writings and example has done more than any other to elevate what was once a neglected and accidental pursuit of the farmer to a cherished and dignified employment. His *Practical*

Shepherd has been pronounced the best book ever published on any branch of agriculture. Other eminent writers on this subject are Mr. George Geddes, whose contributions have appeared in the *New York Weekly Tribune*; Mr. A. M. Garland, of Illinois, the editor of the sheep department of the *Live Stock Journal*,—at present the fullest and most trustworthy source of information available to American wool-growers; and Messrs. Glenn & Co., of Pennsylvania, contributors to the *Practical Farmer*.

The Bulletin of the National Association of Wool Manufacturers, in six volumes, has notices of much of the foreign literature bearing upon the subject, with discussions of the economical questions connected with American wool-industry. It contains, besides, essays by Mr. George William Bond. Several of the most recent reports of State boards of agriculture contain essays of much value, particularly those of the States of Maine, Vermont, and Georgia. The reports of the National Department occupy the first position as sources of knowledge on the subject of sheep-husbandry.

RÉSUMÉ OF WOOL-PRODUCTION.

Messrs. Helmuth, Schwartze, & Co., of London, in their annual report dated January 18, 1877, say as follows:

“An attempt is made in the following to give a survey of the wool-trade in its largest proportions. Usually the view is confined to one market or to one country, or to colonial- or home-grown wools, as the case may be. Here, however, the circle is expanded to include all wools and all countries, as far as information reaches or even as data exist upon which reasonable guesses may be based. To arrive at such a view, the most obvious way would have been an inquiry into the total quantity of wool produced in the world. But, though we give an estimate of the number of sheep in existence, the figures are in several points too uncertain to allow of any conclusions being built upon them. It is nevertheless possible to obtain a view of the trade in its entirety in another way, viz., by ascertaining not the production of wool which takes place all over the globe, but the quantity worked up by the whole wool-industry, which, so far from being distributed over the whole earth, is in a developed form practically confined to Europe and North America. This has accordingly been done. Europe and North America are the manufacturers for the whole world; and, if the extent of their work can be gauged, an idea is really given of the entire trade. The subject resolves itself into an inquiry, first, of the home-production of these two continents, and

then of their imports, the two together giving the measure of the world. Expressed in millions of pounds' weight we find,—

| | 1875. | 1876. |
|---|-------|-------|
| The home-production of Europe and North America | 830 | 798 |
| The imports into North America | 619 | 419 |
| | <hr/> | <hr/> |
| | 1449 | 1217 |

1449 million pounds then represent the whole supply; and of this total about 57 per cent. were of European and North American home-growth, and about 43 per cent. imported. Apportioning this huge quantity, we find that no less than 351 million pounds, or very nearly a quarter of the whole, fall to the share of the British industry alone; the rest of Europe takes 844 million pounds, or 58 per cent.; North America, 254 million pounds, or $17\frac{1}{2}$ per cent. In 1866, the total consumption of raw wool was 1217 million against 1449 million pounds in 1875, and the average annual increase was consequently about 2 per cent. Of this about 1 per cent. was directly owing to the increase of population, which in Europe and North America rose from 321 to 347 millions in the stated period, the remaining 1 per cent. being due to the employment of wool for new purposes, and to the spread of comfort and wealth generally. Calculated per head of population, the consumption of raw wool, in 1875, was $4\frac{18}{100}$ pounds, or, taking the wool in its cleaned state, $2\frac{35}{100}$ pounds.

“It need not be said that all these figures pretend to no accuracy, but are open to correction; all they lay claim to is this, that, wherever possible, they are based upon the latest authentic returns, and that where such basis was wanting, the estimates have been made with care and with a full consideration of all points involved.”

ESTIMATE OF THE NUMBER OF SHEEP IN THE WORLD.

| | Year of Return. | No. of Sheep. |
|--------------------------|-----------------|---------------|
| United Kingdom | 1876 | 32,252,579 |
| Russia | 1870 | 48,132,000 |
| Sweden | 1873 | 1,695,434 |
| Norway | 1865 | 1,705,394 |
| Denmark | 1871 | 1,842,481 |
| Iceland . . . . . | ..... | 800,000 |
| Germany | 1873 | 24,999,406 |
| Austria | 1871 | 20,103,395 |
| Switzerland | 1866 | 447,001 |
| Holland | 1873 | 901,515 |
| Belgium | 1866 | 586,097 |
| France | 1872 | 24,589,647 |
| Italy | 1874 | 6,977,104 |

| | Year of Return. | No. of Sheep. |
|---|--------------------|---------------|
| Spain | 1865 | 22,054,967 |
| Portugal | 1870 | 2,706,777 |
| Total Europe (excluding Turkey and Greece), about | | 190,000,000 |
| Australasia | 1875 | 62,000,000 |
| Cape | Estimate | 16,000,000 |
| Mexico | " | 16,000,000 |
| River Plate | " | 60,000,000 |
| North America | " | 50,000,000 |
| Remainder of America | " | 6,000,000 |
| Total | | 384,000,000 |
| Turkey, North Africa, Persia, etc., say | | 65,000,000 |
| India and China, say | | 35,000,000 |
| Grand Total | | 484,000,000 |

CONSUMPTION OF WOOL.

It will be observed that in the following tables the production and consumption of the United States are included in that of North America. In order to bring our own consumption into more distinct relief, the writer has requested Mr. George W. Bond to estimate the consumption of wool *per capita* in the United States, as compared with that of Great Britain, and has been favored with a reply. Deeming it unnecessary to confuse the reader with a statement of the complicated calculations by which Mr. Bond formed his estimate, we give simply the results. Of domestic wool and that imported, either in the form of wool or fabrics, the average consumption of the people of Great Britain is set down at three and two-thirds pounds of clean wool per person. The consumption of clean wool in the United States is set down at four and a third pounds per head. Although the tables which follow may surprise enthusiasts, by showing how gradually the consumption of the raw material of the wool-manufacture of the civilized nations increases, it being at the rate of but about 2 per cent. for each year of this last decade, they show progress and stability of progress. They show that wool is holding, and likely to hold, its place among the few great national staples which make up the bulk of commercial commodities; and that a great step towards commercial and industrial independence is made by the nation which has planted a prosperous sheep-husbandry upon her soil.

CONSUMPTION OF RAW WOOL IN EUROPE AND NORTH AMERICA.

In Millions of Pounds Weight (thus 247.7 = 247,700,000 lbs.).

| | 1875 | 1874 | 1873 | 1872 | 1871 | 1870 | 1869 | 1868 | 1867 | 1866 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. | MILLION POUNDS. |
| PRODUCTION OF EUROPE AND NORTH AMERICA. | | | | | | | | | | |
| United Kingdom..... | 162 | 167 | 165 | 156 | 152 | 158 | 165 | 172 | 163 | 145 |
| Continent..... | 462 | 464 | 473 | 475 | 480 | 465 | 490 | 495 | 504 | 504 |
| British North America..... | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 12 | 12 | 12 |
| United States..... | 193 | 178 | 175 | 160 | 146 | 163 | 162 | 177 | 160 | 137 |
| Total Product..... | 830 | 822 | 826 | 804 | 791 | 819 | 829 | 856 | 836 | 798 |
| IMPORTS INTO EUROPE AND NORTH AMERICA. | | | | | | | | | | |
| From Australasia..... | 247.7 | 229 | 192.6 | 185.2 | 183.1 | 175.1 | 158.6 | 155.7 | 131.5 | 114.6 |
| " Cape of Good Hope..... | 50.6 | 48.7 | 48.6 | 58.1 | 59 | 42.8 | 41.8 | 39.3 | 38.6 | 38 |
| " River Plate..... | 207.9 | 208.5 | 230.7 | 212 | 198.7 | 185.2 | 205.6 | 198.8 | 171.8 | 157.2 |
| " West Coast of South America..... | 7.7 | 7.5 | 7.6 | 10.4 | 8.1 | 7 | 8 | 9 | 11.6 | 8.6 |
| " Turkey and North Africa..... | 66.6 | 60.6 | 70.4 | 86.4 | 70.1 | 38.2 | 44 | 52.1 | 51.5 | 62.4 |
| " East India..... | 22.8 | 19.2 | 19.3 | 18.9 | 19.7 | 11.3 | 18.8 | 17.6 | 15.3 | 26.3 |
| " other Countries..... | 4.8 | 5.3 | 4.3 | 5.7 | 5.7 | 5.8 | 5.3 | 5 | 4.1 | 3.9 |
| Imports of Alpaca..... | 4.2 | 4.2 | 4.4 | 3.8 | 3.6 | 3.9 | 3.3 | 1.8 | 3.5 | 3.6 |
| " " Mohair..... | 6.8 | 8 | 6.3 | 6.5 | 8.7 | 3.1 | 4.5 | 7 | 2.7 | 4.4 |
| Total Imports..... | 619.1 | 591 | 584.7 | 587 | 549.7 | 472.4 | 489.9 | 486.3 | 432.6 | 419 |
| Production of Europe and North America..... | 830 | 822 | 826 | 804 | 791 | 819 | 829 | 856 | 836 | 798 |
| Imports..... | 619.1 | 591 | 584.7 | 587 | 549.7 | 472.4 | 489.9 | 486.3 | 432.6 | 419 |
| Grand Total..... | 1449.1 | 1413 | 1410.7 | 1391 | 1340.7 | 1291.4 | 1318.9 | 1342.3 | 1268.6 | 1217 |
| Consumption of United Kingdom..... | 351.3 | 363.6 | 358.5 | 324.1 | 316.7 | 322.7 | 299 | 317.2 | 299.6 | 312.5 |
| " " Continent..... | 843.7 | 812.3 | 816.7 | 793.9 | 763 | 762.2 | 801.2 | 811.1 | 763.7 | 696.5 |
| " " North America..... | 254.1 | 237.1 | 235.5 | 273 | 241 | 206.5 | 218.7 | 214 | 205.3 | 208 |
| Total Consumption of Raw Wool..... | 1449.1 | 1413 | 1410.7 | 1391 | 1340.7 | 1291.4 | 1318.9 | 1342.3 | 1268.6 | 1217 |
| Estimated yield of Clean Wool after Washing..... | 816.2 | 799.3 | 794.3 | 784.2 | 761.1 | 733.8 | 746.4 | 761.3 | 724.4 | 699.2 |

CONSUMPTION OF RAW WOOL IN EUROPE AND NORTH AMERICA.—Continued.

| | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. | PERCENTAGE OF TOTAL CONSUMPTION. |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Production of Europe and North America..... | 57.3 | 58.2 | 58.6 | 57.8 | 59 | 63.4 | 62.8 | 63.8 | 65.9 | 65.5 |
| Imports into " " " " | 42.7 | 41.8 | 41.4 | 42.2 | 41 | 36.6 | 37.2 | 36.2 | 34.1 | 34.5 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Consumption of United Kingdom..... | 24.2 | 25.7 | 25.4 | 23.3 | 25.1 | 25 | 22.7 | 23.6 | 23.6 | 25.7 |
| " " Continent..... | 58.2 | 57.5 | 57.9 | 57.1 | 56.9 | 59 | 60.7 | 60.5 | 60.2 | 57.2 |
| " " North America..... | 17.6 | 16.8 | 16.7 | 19.6 | 18 | 16 | 16.6 | 15.9 | 16.2 | 17.1 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Estimated Population of Europe and North America..... | Millions of People. | Millions of People. | Millions of People. | Millions of People. | Millions of People. | Millions of People. | Millions of People. | Millions of People. | Millions of People. | Millions of People. |
| | 347 | 344 | 347 | 338 | 335 | 333 | 330 | 327 | 324 | 321 |
| Consumption of Raw Wool per head of Population..... | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. | Pounds of Wool. |
| | 4.18 | 4.11 | 4.14 | 4.11 | 4 | 3.88 | 4 | 4.10 | 3.91 | 3.89 |
| " " Clean Wool per head of Population..... | 2.35 | 2.32 | 2.33 | 2.32 | 2.27 | 2.20 | 2.26 | 2.33 | 2.23 | 2.18 |

NOTE.—All figures relating to Europe in these tables exclude Turkey and Greece.

WOOL FABRICS.

CLASS 235.—CARD-WOOL FABRICS,—YARNS, BROADCLOTH, DOESKINS, FANCY CASSIMERES, FELTED GOODS, HAT BODIES.

In considering the different classes of the manufactured products of wool at the Exhibition, it would be inconvenient, if not impracticable, to observe the geographical arrangement pursued in discussing the raw material. The peculiar national distinctions are less marked than in the raw material, and the products of some countries exhibit nothing calling for particular remark. It would be interesting to give the statistics of production of the different countries exhibiting, but these were not obtainable from any sources at our command.

The fabrics of the class now under consideration, with the exception of yarns and hat bodies, may be properly designated as "cloths." The most marked impression made by an examination in detail of the cloths of different countries was the cosmopolitan character of the cloths of all manufacturing nations. Although there are marked distinctions in the kinds of cloths, these seem to bear the impress of the time, or the fashion of the time, rather than of the country of fabrication.

This is especially true of the great mass of cloths for general consumption, which can scarcely be distinguished except by the degrees of perfection in their fabrication. It has been remarked that woollen cloths, by their universal use, have tended to obliterate the outward social distinctions of classes. It was observable at the Exhibition that they served to obscure the distinction of nationalities. This uniformity may be partially due to the supremacy of fashion, made more universal by modern facilities of communication, but equally to the identity of modern machinery, and the influence of the raw material upon manufactures.

In the last and in the early part of the present century, scarcely any fabrics were known under the designation of "cloths," except broadcloths, and twilled fabrics similar in face to broadcloths, called "cassimeres." Each piece was uniform in color. Variety of color and shade was the only element which the manufacturers had at command to satisfy the taste for change or the caprice of fashion. The principal distinctions were in the fineness and perfection of finish.

From the descriptions which remain of the methods of weaving broadcloths in the French convents during the fourteenth century, this fabric would appear to be now substantially the same made four

centuries ago. The only change is in the fineness of the wools used, and the perfection of the face of the goods, due to better processes of shearing and pressing. This fabric will doubtless always occupy the first rank among woolen tissues. In this typical product of the woolen manufacture, the broadcloths from the West of England still occupy the eminent position accorded to them in all other International Exhibitions. The thickness and solidity of these cloths were not less conspicuous than their fineness and beautiful face. This was especially noticeable in the scarlet military cloths. All these cloths bear the designation of *Electoral*, signifying the kind of wool of which they are made; and, in fact, they are made of the highest-priced Silesian wool. The prices at which they were marked corresponded with their quality. The contrast of these goods with certain others made in England for export was remarkable. These fabrics are made chiefly for home consumption by the wealthy classes. For the class of consumers who use these goods, the competition among the manufacturers is in excellence rather than in cheapness. But the Judges had the proof within their own group that the skill required to produce these fine cloths is not an exclusive monopoly. One of our colleagues, Mr. Lang, who commenced the manufacture of broadcloths in 1814, exhibited, though not for competition, samples of blue and black broadcloths, made in 1853, at Vassalboro', Maine. The wool was selected Silesian, costing, with duties and charges, about three dollars per pound. The cloth had one hundred and twenty picks to the inch. The cloth, in fineness and perfection of finish, was admitted to surpass even the West of England broadcloths.

The comparatively low position of the United States in the manufacture of *fine* broadcloths cannot be denied. It was manifested by the absence of any notable exhibits, except by a single establishment, the Burlington Mills, of Vermont. Their exhibits showed that our apparent inferiority in this manufacture was not due to any want of skill or capacity, but to other causes. This mill produces annually some \$300,000 in value of broadcloth, and it is known that another mill in Massachusetts, which did not exhibit, has shown equal proofs of its skill in this manufacture. The products of the mill first referred to would undoubtedly suffer in comparison with the West of England standards, for the goods, beautiful in face and fineness, were lacking in weight. But they were intentionally made to conform to the prevailing fashion of the higher standard of the German light weight goods, with which they bore a favorable comparison. It would be erroneous to make the position of the broadcloth industry a reproach against the American woolen manufacturer.

The same apparent decline, though perhaps not in the same degree, is witnessed in most other manufacturing nations. Superfine broadcloths are now used only by a limited class, and by that class rarely, except for dress coats, which last for years. The coats are made by fashionable tailors, who, as a rule, prefer foreign cloths. As the fine cloths are principally used by the easy classes, the duties upon the fine foreign cloths are no impediment to their consumption, while the specific or weight duty is less onerous upon them than upon common cloths.

The capacity to manufacture the finest broadcloths in this country was proved, many years ago, by the celebrated Middlesex Mills of Lowell, Massachusetts,—in age, influence, and continuity of excellence standing at the very front of our cloth-mills. In ceasing to give prominence to the fine broadcloth manufacture, it has manifested no failure in skill, but simply an adaptation to the wants of the times.

The diminution in the American manufacture of fine broadcloths has been attributed to the effect of the tariff of 1846. It has also been materially influenced by the constantly diminishing domestic supply of superfine wools, the Saxon wool-culture, as we have seen, having nearly ceased; for it is well established that an abundant domestic supply of raw material is one of the most potent of the influences which give a special character to the manufactures of a country. But the principal cause of the decline referred to is the popular demand for other fabrics, hereafter more fully referred to. In a word, our manufacturers have ceased, as a rule, to make fine broadcloths, because they find ample and more profitable employment for their looms in the production of the lower cloths which enter into general consumption. It has been observed that a similar decline, or more strictly speaking, diminution, of the fine-cloth manufacture is observed in other countries. Although a few excellent broadcloths and satins, or doeskins of remarkable beauty, were exhibited by Belgium and Germany, the Judges of large experience in dealing with woolen fabrics failed to find, in the exhibits of Belgium and especially of Germany, that competition for excellence in the production of superfine cloths which they had been led to expect from the former reputation of Belgian and German manufacturers. In the production of plain-faced goods of a lower grade, adapted for special uses,—such as blue and gray uniforms for soldiers, police officers, newsboys, and watchmen,—there were evidences of much progress, both in fabrication and cheapness, on the part of American manufacturers. Our regular soldiers, wearing American fabrics, are declared by our army authorities to be better clothed than any in the world. The beauty

of the uniforms of our volunteer troops, many thousands of whom were in procession on the Centennial Fourth of July, was specially noted by the foreign Judges. The production of blue police cloths has become an extensive branch of our manufacture, and the cloths are marked for their cheapness, durability of dye, and solidity of fabric.

The period of 1836 was an epoch in the cloth industry of the world and of the century. It was the commencement of the change which has produced a character of the cloth fabrics, for general consumption throughout the world, which was one of the most conspicuous features of the Exhibition.

In 1834, M. Bonjean, a prominent wool-manufacturer in Sedan, France, and an *élève* of the Polytechnic School, conceived the idea of modifying the plain cloths hitherto universally made, by uniting upon the same stuff different tints or patterns of tissue. This he was able to effect by the Jacquard loom. It was evident that the variety of stuffs which could be thus made was as unlimited as fancy. Hence he styled his woolens fancy cassimeres. These cloths, put on the market, and displayed at public exhibitions, instantly struck the popular taste, and were imitated, at first in France, and then in all other manufacturing nations. Their introduction into this country is an illustration of the benefits flowing from National Exhibitions. In 1840 an American gentleman, arriving directly from Paris, visited Mr. Samuel Lawrence, then agent of the Middlesex Mills at Lowell, Massachusetts. In the words of Mr. Lawrence, "He had an overcoat woven in diamond figures, of great beauty; said he saw it at an Exhibition, at Paris; Bonjean & Son, of Sedan, were the manufacturers. He gave me a small bit from the inside of the collar." With this bit as an example of what was to be done, Mr. Lawrence applied to Mr. George Crompton to adapt machinery for this tissue, already devised in cotton fabrics; and the result was the invention of the Crompton loom, upon which fancy cassimeres have since been woven, not only in this country, but in Sweden, Germany, Austria, and Belgium. From this statement, it would seem that fancy cassimeres were first made in this country at Lowell. But it should be observed that the honor of the first introduction is also claimed by the New England Mills of Rockville, Connecticut. The new cloths were adapted to the natural change which had begun to take place in the culture of wools. They required soundness, length, and strength, rather than the softness and fineness which had been the essential qualities of clothing-wools. The more abundant supply of the intermediary wools has continued to favor the production of the fancy woven

cloths; and from their great predominance at the Exhibition, and in the business suits commonly worn, it would seem that they comprise from three-quarters to nine-tenths of all the cloths made at the present day.

In the class of fancy woven cloths,—including not only fancy cassimeres, but clothes for overcoatings and worsted coatings,—the manufacturers of Elbeuf and Sedan sustained at the Exhibition their long-established reputation for novelty of design and perfection of fabrication; and Belgium was not far behind. The fine and thin cassimeres of Belgium, called “Batistes,” made for consumption in tropical countries in the place of cotton and linen fabrics, were conspicuous for their beauty. Among the British exhibits,—besides some fancy cloths exhibited by West of England manufacturers, woven by a novel process analogous to knitting,—certain solid and substantial fancy cloths, made in Ireland, of Cheviot wool, with double and twisted yarns, received special commendation, and are worthy of imitation here.

The writer may be permitted to speak of the admiration and surprise expressed by the foreign Judges of this group, at the first inspection of the American fancy cassimeres. The goods of our exhibitors, it may be remarked, were arranged with good taste, in costly but not obtrusive cases, which served to enhance their favorable impression. The Swedish Judge, Mr. Carl Arnberg, a practical wool-manufacturer of large observation, will pardon the repetition of his precise language addressed to the writer: “You know that the best fancy cassimeres in the world have been made at Sedan and Elbeuf in France. If these goods were placed by the side of the Elbeuf cassimeres, you could not tell one from the other, and the goods could not be bought at Elbeuf for the prices marked here.” It was conceded by all the Judges that our fancy cassimeres, in material, fabrication, and design, had attained the highest standard of this fabric. No single mill or State could claim the palm; for the honors were divided between a mill in Utica, New York, one in Pittsfield, Massachusetts, and three mills in Rockville, Connecticut, while other mills so nearly approached them as to make their special mention almost invidious. This favorable impression of our foreign associates was confirmed by visits which they made to some of the mills which had exhibited. They shared the opinion expressed to the writer by Professor Grothe, of Germany, author of the most complete modern treatise on the card-wool manufacture, that the American mills which he had just visited were in possession of the best and most recent processes, improvements, and machines known in Europe, and were admirable in their

administration. It is due to our wool-growers to say that the cloths so highly commended were made generally of American wool, Australian wool being used in some cases, not from preference, but to eke out the short supply of the domestic stock.

It is proper in this connection to depart from the strict arrangement of the classification to consider a class of fabrics which, though made of combed wool, are really cloths, and are directly allied with the card-wool fabrics just reviewed. The Exhibition showed that the most formidable rivals of the fancy cassimeres are the fabrics known as worsted coatings. Being woven in the fancy loom, either Jacquard or Crompton, and made for the same purposes and by the same manufacturers as the cassimeres, they differ from them only in the respect that the cassimeres are made of carded and the worsted cloth of combed wool. This fabric, created in France, in the introduction of its fabrication to this country affords another illustration of the benefit of International Exhibitions. Mr. E. R. Mudge, of Boston, being Commissioner of the United States at the Exposition of Paris of 1867, was impressed with this fabric then exhibited, and then much worn both in London and Paris, as a novelty. Seeing that it was made of combed Merino wool, he directed inquiries to ascertain if suitable wools for this fabric could be abundantly furnished by American fleeces. Satisfying himself affirmatively upon this point, he imported and introduced the requisite machinery for combing and spinning the wools at the Washington Mills, in Lawrence, Massachusetts, of which he is a leading director. This establishment succeeded so well in the fabrication of these stuffs, and they proved so popular when thrown upon the market, that the introducer soon found a host of rivals and imitators. A new industry at once sprung up,—that of combing and spinning the wools into worsted yarns, for supplying the many fancy cassimere-mills which desired to weave these fabrics. One of the most conspicuous displays at the Exhibition was that of the United Spinners' Association of Philadelphia, comprising eight distinct establishments, all exclusively devoted to making Merino combing-wool worsteds for worsted coatings and for suspenders and india-rubber goods, and producing an annual product of \$1,500,000. The perfection of the yarns was fully recognized by the experts in the group of Judges. They were made almost exclusively of American Merino wool, which the exhibitors declared to have proved preferable for their purpose to even the best Australian wools, being "kinder, more elastic, and stronger." Here was a new industry founded scarcely six years ago, and a palpable demonstration of new and unsuspected qualities of excellence in American wools,—a de-

monstration most gratifying to those who, twelve years ago, had pointed out these qualities to incredulous manufacturers.

The American worsted coatings were extensively exhibited. The excellence attained in so short a period was a matter of surprise. While the fine diagonals of Sedan were not equaled, the American exhibit, as a whole, compared favorably with those from abroad. In the fabrics for overcoatings, Moscows, Kerseys, Castor beavers, and Elysians, there was the same general resemblance in the stuffs from different countries, already spoken of as forming one of the characteristic features of the woolen manufacture of the present day. All the kinds made abroad, with the exception of special novelties,—like the beautiful *peau d'ours*, a species of Moscow coating made at Dussen, in Germany, and the delicately soft Montagnac overcoatings of Sedan,—are made in this country; and our fabrics did not suffer by comparison.

The value of a manufacture is shown less in costly fabrics than in the common cloths combining utility and cheapness. Commendation was given to a mill established as an accessory to the largest iron-making establishment in Pennsylvania, in which the women and children of the operatives obtained employment, and which furnished cloths, marked for their soundness and cheapness, for the workmen. Many of the combinations of wool with cotton or union cloths were noticeable for cheapness and utility, such as the Kentucky jeans with cotton warps and wool filling, in much esteem for cheapness and wearing qualities in the agricultural districts in the Southern and Western States. The repellents, or water-proof cloths, show another union fabric.

FELTED GOODS.

The exhibits of felted goods, quite numerous and varied from the United States, were few and barely incidental from foreign nations; and those which were seen were Oriental in their origin or affinities. They were incidentally seen in the national fez of Turkey, so enduring in fabric and pleasing as well as enduring in its madder-red color; in *filts* of exquisite softness to the touch, made of camel's hair, forming the ground for costly Turkish embroidery (a material deserving more extensive use for this purpose); and the thick Russian felts made up into boots and gaiters,—the only foot-covering, according to Mr. Bielsky, the Commissioner for Russia, capable of resisting the cold of a Siberian winter. These articles also deserve imitation. It is believed that felted cloth was the most natural and the first stuff employed by man. We cannot reflect without pride that the first invention of primitive man in the textile arts, originating in Asia, the

cradle of the race, and still in use among the ruder tribes of the East, remained without progress for centuries, until revised, amplified, and made tributary to domestic comfort and the arts in all civilized communities, by our own countrymen and in our own times. M. Kœpelin, a French expert, speaks thus, in the *Annales du Genie Civil* of 1869, of this fabric: "In spite of the simplicity of its fabrication, and in spite of the antiquity of its origin, felting was for a long time abandoned to the lesser industries. It is only within thirty years that the mechanical fabrication of felted cloths has been essayed. Many fruitless attempts in this direction were made in France and other countries; and it is only to the spirit of invention of two Americans, Wells and Williams, that we owe the processes now in use, and which have not been materially modified since the epoch of their discovery." Their processes, he says, were applied in France and England, and are used in the latter country for making printed felt carpets, exported in vast quantities all parts of the world, and popular from their great cheapness.

No other published notice of this interesting invention has come within the notice of the writer. He has fortunately come into possession of other facts in relation to the introduction of this important fabric, creditable alike to American ingenuity and British enterprise, which seem worthy of a detailed notice, because not hitherto known to the public. The facts are derived from a personal communication by a gentleman hereafter mentioned.

Thomas Robinson Williams, of Newport, Rhode Island, connected with the Hazard family of that State, so well known as wool-manufacturers, invented the process of making felt cloth of commercial length, at Rhode Island, about 1820. About 1824, he went to England, for the purpose of introducing this invention, and also one for making hat bodies, in which he was associated with a Mr. Wells. He took out a patent in England in 1830. He succeeded in enlisting the co-operation of capitalists, who, about 1838, erected a factory in Leeds, with a capital and plant of £250,000, the designation of the proprietors being the Victoria Cloth Company. Meeting with immediate success in the fabrication, the enterprise created a great excitement in manufacturing circles, as it threatened to revolutionize the whole system of cloth-making. The principal editors of the London papers visited the establishment, and vied with each other in descriptions of the new art. The Queen gave extensive orders for the stuffs, and the Mistress of the Robes—the Duchess of Sutherland—furnished the grand staircase and vestibule of her London residence with a crimson carpet of the Williams felting, draping the windows

of the hall with a thinner fabric of the same make. In the full tide of its success, the vast establishment was destroyed by an incendiary fire. It was uninsured; and Williams, whose whole property was in it, died from grief and disappointment. In the mean time, a patent for making felt cloths of a commercial length, by an entirely dissimilar process, had been taken out by Joseph Waite, of Leeds, the use of which in England was enjoined by the courts, as conflicting with Williams's patent. Mr. J. Burrows Hyde, of New York, our informant as to these facts, a gentleman of science and enterprise, bought both the Waite patent and the Williams patent in this country, and sold the rights to the Bay State (now Washington) Mills, at Lawrence, Massachusetts, about 1853. For many years this mill enjoyed nearly the complete monopoly of this fabrication in this country, to its great profit. The exceptions to this monopoly were a fabrication of felt cloths, not of commercial lengths, conducted in Norwalk, Connecticut, under the Bishop patent, and the manufacture of hat bodies, conducted under the Wells patents. The Williams and Waite patents having expired in Europe and this country, the manufacture has attained the wide and vast extension of the present day.

While few foreign exhibits of this fabric were noted, the American felts appeared in innumerable forms. They appeared as printed and embossed piano-cloths and as ladies' skirts; as floor-cloths printed by a Philadelphia establishment, with highly artistic designs; as a material for sheathing roofs, vessels, and iron buildings; combined with asbestos, as non-conducting envelopes for steam-boilers and hot-air pipes; for lining rubber fabrics (being the only material which stretches equally in all directions); in soles for shoes and in gun-wads, in masses of several inches in thickness, for polishing wheels and buffers for jewelers; in other forms, for polishing cabinet-work and marble; and, in a high-cost material, for hammers of piano-keys. Conspicuous among these exhibits were the felts for polishing, made by Charles N. Bacon, of Winchester, Massachusetts, which possessed a thickness, compactness, and adaptation to special purposes which has never been surpassed. In the common felts the raw material is hair, or the cheapest Mexican wool, and in the others, as before said, the finest wool from Silesia. These were interesting illustrations of the almost infinite uses which may be derived from a single attribute of a fibre, all resulting from the serratures in the filament of wool and hair, which give them their felting power.

Allied to these goods, though not strictly felts, are the feltings used in paper-making, which are woven fabrics highly felted. The enor-

mous extension of our paper-manufacture has of late years stimulated a supply from domestic sources of this indispensable material for paper-making, not long since obtained from abroad. Exhibits of paper felts were made by several mills. A letter from Messrs. Rice, Kendall, & Co., paper-manufacturers and dealers in paper-makers' supplies,—the head of the firm being the present Governor of Massachusetts,—expresses the general character of the American felts, although having in view the product of a special mill. "We have introduced them," they say, "into paper-mills making all the finer qualities of bond- or writing-paper; also best and ordinary book-, news-, Manila-, tissue-, straw-, and sheathing-paper; also printers' and woolen manufacturers' press-boards, leathers, and binders' boards, and wood-pulp; and have had many high recommendations from the manufacturers regarding their wear and suitable quality. . . . We feel confident that they (the American felt-makers named) are able to manufacture anything in the line of feltings used by the various manufacturers of paper; and, judging from our former experience as importers of felts, they have made many improvements in them." It is curious that the art of joining the two extremities to make an endless felt is kept a secret by the fortunate possessors, for the use of which manufacturers pay a royalty.

Although no hat bodies—another form of felted goods—were exhibited, several special machines for forming hat bodies were shown, illustrating how completely the handicraft had been substituted by machinery. There is hardly a process in the manufacture which is not now done automatically, a single establishment turning off eight hundred dozen of hats daily. The hatter, as a separate artisan, has disappeared. Fifty years ago there was one in every village. A hatter's bow having been recently required in a patent trial, a diligent search could not find one in the country.

CLASS 236.—PLAIN FLANNELS, DOMETTS, OPERA AND FANCY.

The flannel-manufacture, almost exclusively represented at the Exhibition by American exhibits, has attained an enormous development in the United States, as illustrated by the fact that an auction sale, in July last, by a single house representing 157 sets in different mills, netted \$2,500,000. Flannel being the first stage in the manufacture of plain cloth, it constitutes one of the principal products of the smaller mills in the new States; while, in the older manufacturing States, mills employing from ten to fifty sets are exclusively engaged in its manufacture. The great domestic demand for these goods may be attributed to the rigor of our climate, or to the fact

that the masses of our population are liberal in providing themselves with the fabric so essential for personal comfort. Flannels find their consumption not only in men's garments,—for which purpose their use has vastly increased through better hygienic knowledge,—but in garments for children, linings for overcoats, blouses for workmen, fatigue uniforms for soldiers and police officers, and coats for summer wear.

It is some twenty or thirty years since the American fabric excluded foreign flannels from our market, with the single exception of opera flannels, which no longer exist. The primary cause of the success in this manufacture has been the peculiar adaptation of American wools for this fabric. This adaptation consists in their spinning qualities, their soundness and elasticity, and the medium fineness, producing the requisite softness, without too much felting quality to cause an undue shrinkage of the goods.

By an examination of a line or series of samples of different grades of English flannels, in comparison with a line of American flannels corresponding in grade and price, it was observed that the English flannels are more highly fulled, and less finished in the face, than the American goods. The American fabrics have the yarns more closely twisted, in order to prevent shrinkage, and the fabric is smoother and more slightly in face. The difference in intrinsic value could not be proven, the different styles being adapted to the tastes of different markets. A large exportation is now being made to Canada.

With the command of their own markets, American manufacturers have adapted their fabrics to the wants of consumers. In 1835 the domett flannels, an original fabric composed of a cotton warp with a filling of wool, came into use as a substitute for the linsey-woolen stuffs, originally of household manufacture, worn by working women for under-petticoats. Having the merit of shrinking but little in washing, it still holds its place as a characteristic American fabric. The red flannels have found a vast consumption among the working population, especially lumbermen and frontiersmen, the pliability of the fabric giving freedom to the limbs. Formerly the red color, less brilliant than now used, was given by a madder dye, subsequently by *lac*; while at present the brilliant and fast scarlet of the cochineal is in almost universal use, the price of cochineal having been reduced to half of its former rate by the introduction of the aniline dyes. The consumption of blue flannels by the army and navy forms another important outlet for this class of fabrics. They form the under-garments for all the men in both services, and the summer undress coats in the former. The regulations of the services require that these flan-

nels should have a twilled weave, and be both wool- and indigo-dyed. The regulations of the Government have tended to keep alive the skill in indigo-dyeing, which, from its costliness, threatened to disappear before cheaper processes. The excellence attained in the army and navy flannels led the way to a more perfected fabric. About 1859 appeared, either through the Middlesex or Washington Mills,—for the honor is claimed by both, and the products of both vie with each other in celebrity,—the blue flannel coating, indigo- and wool-dyed, and having a three-leaved twill. This fabric—sheared and finished like cloth, but retaining the lightness and pliability of the flannel texture, forming an admirable material for summer garments—is distinctly American in origin and character. It has a large domestic consumption, and has become an article of export to South America.

Opera flannels—a name given abroad, from one of its original uses, to a light flannel more highly gigged and finished than the ordinary article, being piece-dyed uniformly, in many fancy colors, and hot-pressed—were first introduced into this country by the Bay State Mills. They have, however, gained their command of the American market principally through the fabrication of a manufacturer of Ware, Massachusetts, now deceased. He commenced the manufacture in 1858, making in that year four thousand pieces. In 1871 his establishment made and sold, of this single fabric, one hundred and twenty thousand pieces, or nearly two million yards. At this time foreign importations of this fabric had entirely ceased. The thorough cleansing of the fabric to receive the dye, and the requisite skill to give the numerous colors and shades desired, are the principal difficulties which the manufacturers have to encounter, single manufacturers keeping all the time a hundred or more distinct shades and colors in stock. American opera flannels were abundantly and tastefully displayed at the Exhibition by several mills. Nothing surpassed them in variety and perfection of hues and shades, except, perhaps, the masterpieces of the French dye-houses,—the exquisite merinos of Rheims and Paris. It is noteworthy that these fabrics are made wholly of American wool, the quality known as XX being used for medium, and picklock (selected from choice flocks) for the finest grades.

American flannels of a still higher grade exhibited were the all-wool gauze and silk-warped flannels. The credit of the introduction of the fine flannel manufacture belongs to the Ballardvale Mills, in Andover, Massachusetts, this mill being the first which made fine yarns by double spinning. In some of these fabrics, made expressly for the Exhibition, there were one hundred and thirty picks to the

inch. The yarns for filling were spun in such fineness that they attained 46,500 yards in length to the pound, the warps reaching 34,500 yards. Among the uses of these fine flannels is their application for lining coffins and for burial shrouds. It is known that the wealthy classes in England, in the last century, rebelled against a law requiring all persons to be buried in flannels. Improvements in manufacture have caused a fabric, which was then obnoxious from its coarseness, to be now specially adapted for burial habiliments, through its softness and fineness.

Another variety of flannel, which has wholly replaced the French fabric formerly largely imported, is the fancy flannel still called French plaid. The fabrics of this variety consist of plaids, or broken plaids and checks, and are dyed in the wool. The great bulk consists in two colors combined, scarlet and white and blue and white. They are largely used for shirts and children's garments. The printed flannels for children, formerly in use, have almost wholly disappeared.

CLASS 237.—BLANKETS, ROBES, AND SHAWLS.

The last observation made under the preceding class also applies to the first article in this class. The American medium or grade merino wools are no less fitted for flannels than for blankets. They compose the raw material of the great bulk of the blankets which enter into our consumption, although noils, from carpet- and combing-wools, are used to some extent. The lowest grades of blankets, composed of shoddy, hair, and the cheapest wool, which are salable abroad, cannot be disposed of here. Even the lowest of our consumers, the savage Indians,—who are supplied with blankets by our Government, according to the statement of one of our colleagues, who is a member of the Indian Peace Commission,—are skillful judges of the quality of blankets. The standard Indian blankets shown at the Exhibition presented all the requisites of a substantial and useful article.

Many mills are exclusively devoted to the production of blankets, principally those of medium qualities for the consumption of the millions. Some Eastern manufacturers, who have made blankets for forty years, have a yearly production exceeding \$1,000,000 in value, and one establishment in Minnesota a production of nearly \$400,000 annually. The substantial quality of these medium goods, and in some the cleanness of the stock and freedom from grease, were especially noticeable.

No wool fabrics at the Exhibition, of our own production, attracted so much admiration from the foreign Judges as the highest grades of

American blankets. The credit of the introduction of this eminently characteristic fabric is due to the Mission Mills of California, established in 1858. Nothing comparable with these blankets in weight, thickness, softness, and perfection of face had ever before been attempted, and it is impossible to conceive of a more luxurious bed-covering. The beauty of the fabric was not less a matter of surprise to our foreign visitors than the luxurious tastes of a people which could make blankets costing from thirty to fifty dollars a pair salable. The California blankets of this grade are made with a filling of Australian wool, the warps being of California wool. Blankets of no less beauty and perfection were exhibited by a Minnesota mill, and these were made exclusively of wool grown in that State.

Totally different in style and material, but not less admirable, were blankets exhibited by Austria and the Netherlands. Those exhibited by a Netherlands manufacturer were especially noticeable. The wool was of a coarser quality than that used in the California blankets, and the pile of unusual length. They were woven in great variety of colors, and with tasteful designs, in the Jacquard loom, and are highly worthy of imitation by our manufacturers.

An ample field for the application of color is found in the manufacture of rail-car blankets, and especially of carriage, railway, and lap robes. All the European styles of these articles have been adopted here, besides other articles of this class, of still more extensive use, such as the admirable horse-cloths and blankets not long since exclusively furnished by England, which find complete imitation, if not improvement, in our own manufactures.

In the important class of shawls, we naturally observe those most nearly allied in material and texture to the fabrics which we have been considering. The manufacture of the all-wool plaid shawls—formerly known in this country as the Bay State Shawl, from the mill which introduced it—originated in Massachusetts about 1848. Favored by the easy application of the cassimere twill to this fabric, and the facility with which the design is made and varied through the alternate concurrence of the warp and woof, and still further aided by the adaptation of medium American wools to this fabric, it at once attained perfection. The shawls of the Bay State Mills exhibited at the first International Exhibition, that of 1851, were pronounced by French experts as “quite remarkable for the lightness and softness of the stuff;” and shawls exhibited by the same mill at the Paris Exposition of 1867 were commended for the same qualities, as well as for their moderate price. This manufacture has now immense production. Still, the English and Scotch shawls, made of

coarser Cheviot wools, and of a thicker texture, would be preferred for many uses.

No attempts to make the highest qualities of shawls have been made in this country, partly for the same reason that the French, who had perfectly succeeded in making the cashmere shawls, were compelled to abandon the manufacture, because the French ladies preferred an inferior but genuine Indian shawl to a better article of French fabrication. Exquisite shawls, but of precisely the same texture as the Indian shawls, were exhibited by Lyons manufacturers. The material is the finest and most costly Electoral wool. The prices range from \$30 to \$150. The only rivals of the French in this class of shawls are houses in Vienna, whose products were also exhibited. None but the initiated could determine the difference between these two national products. The French, however, assert that the Austrian products are copied from their own, but that the delicacy of the originals is lost, saying, "One may transplant a tree, but not the soil and the air which give flavor to its fruits." It is asserted that the silky Mauchamp wool, previously mentioned, forms a material for the finest shawls, really surpassing the cashmere of the East.

Admirable shawls made of wool or worsted, in India designs, have become celebrated under the name of Paisley shawls, from the place of their manufacture in Scotland. None of the Scotch shawls of this class were exhibited, but this style of fabrication was represented by shawls of India designs, made by Messrs. Martin Landenberger & Sons, of Philadelphia, the material being American combing-wool. These shawls, well made and in excellent taste, are woven in the power Jacquard loom, at prices so moderate as to insure a large popular consumption.

CLASS 238. — COMBED WOOL FABRICS, WORSTED, YARNS, DRESS GOODS FOR WOMEN'S WEAR. DELAINES, SERGES, POPLINS, MERINOS.

This class includes, with the exception of carpets, all the multitudinous fabrics recognized in England as the products of the worsted industry. It forms the second of the two grand divisions of the wool-industry. Through the variety of its products, the skill demanded in their fabrication, the capital and number of persons employed in the great manufacturing nations of Europe, and the rapidity of its development during the last century, this division has become the most important branch of the woollen manufacture.

So important a class could not fail to be largely represented in an exhibition of the products of the world; but the student of textile

industry was obliged to regret an incompleteness in the series of these fabrics, especially from the two leading nations in this industry,—France and England,—and a deficiency in the labeling of many which were exhibited, so as to show their proper names and composition. We were disappointed in the expectation that the Exhibition would shed full light upon the difficult subject of the nomenclature and composition of the infinite variety of worsted fabrics. We use the word “worsted”—which, although not strictly accurate, is the most convenient English term—to designate the fabrics in question.

To render our future remarks intelligible to unskilled readers, we are compelled to enter at once upon the subject of the names and distinguishing characteristics of worsted fabrics, an inquiry demanded by the popular ignorance on the subject, which prevails to no little extent even among the dealers in the articles in question. In no department of practical knowledge is there so much confusion in the meaning and application of names. The names of the fabrics have rarely any etymological signification. They are usually given arbitrarily by the first introducer of the article, and, if they are successful, become applied to articles quite different from the original fabrics, and especially to imitations in cheaper materials. Fabrics substantially the same are constantly reappearing under different names. It is still possible, though difficult, to obtain some order out of this apparent confusion, and to bring the different varieties of these fabrics into an arrangement which approaches a scientific classification.

The leading basis of this classification is the character of the weave, or, as it is styled by the French, the *armure* of the fabric, the word *armure* signifying the system of harnesses with which the loom is *armed*, or provided, to produce a definite issue. These *armures* consist of four fundamental or classical forms, from which all the varieties of simple tissues are derived. 1. That of *taffeta*. In this, the most simple form of tissue, there are only two harnesses, forming a simple interlacement of the threads of the warp and weft. This is the weave of broadcloth, cotton shirtings and sheetings, and mousselines de laine. 2. The twilled or *Batavia* weave, produced by four harnesses. 3. The *serge* tissue, produced by three harnesses. 4. The *satın* weave, produced by five or more harnesses, the effect of which is to bring the threads of the weft to the face. Different effects are produced from derivatives of these fundamental tissues. Thus, in the most simple,—that of cloth or taffetas,—varied effects are produced by the greater or less torsion of the threads, and the direction in which they are twisted; by variations in the size of the threads of the warp or weft compared with each other; by making the same weft pass alter-

nately over two threads and one thread of the warp, making a "rep" or corded tissue. Still other variations are made by the different materials of the warp and weft, by having them of pure wool and of a single color, or mixed with silk, mohair, or China-grass, or by having the threads printed in different tints. The four fundamental regular interlacements before described, which form the base or ground of even the most complicated tissues, are further varied by having combinations of crossings of the threads which occur at variable places at each course of the thread across the web, forming figured, brocade, or damasked effects, which are produced by the Jacquard loom. Another variation is made by having two warps, one to form the ground of the tissue, and the other made to pass over wires to form a loop, making the velvet or pile fabrics. There are still to be added the highly-important differences of character, equally obvious to the touch and the eye, produced by the character of wool used, whether fine and soft (like merino and cashmere), or hard and lustrous (like English combing-wool and mohair).

These remarks will enable the reader more readily to understand the classification of fabrics condensed from M. Alcan (the highest authority upon this subject), and published in his treatise on working wools, in 1866. As the American importation of worsted dress goods is principally from France, the catalogue is not less valuable because limited to French fabrics. For the same reason the French names are retained.

WORSTED STUFFS OF FINE WOOL.

| NAMES OF STUFFS. | ARMURE. | WARP. | WEFT. | OBSERVATIONS. |
|-------------------------|---------------------------------|--|-----------------------------|---|
| Manteau..... | Taffetas..... | Wool carded.. | Wool carded.. | { Made of long-combed wool, and wide for furniture. |
| Reps | " | Wool | Fine wool..... | |
| Turquoise..... | Serge..... | " | Wool | { Made from 8 to 50 picks to the centimetre. Its use universal. Piece-dyed. |
| Merinos..... | Batavia or twill on both sides. | Fine wool..... | " | |
| Cashmere..... | Twilled on one side. | " | " | { The warp double. |
| Drap d'été..... | " | " | " | |
| Mousselines..... | Taffeta | " | " | { " " " " |
| Mouletteons..... | Satin | Wool..... | " | |
| Popeline or poplin..... | | Various materials. | English wool. | { Generally printed. |
| Barège..... | Gauze or open taffeta. | Cotton..... | " | |
| Challis..... | " | Silk grège..... | Merino wool.. | { The weft highly twisted and gas serged; a kind of close barège. |
| Grenadine..... | " | Silk grège, organzine, or cotton. | English combing-wool. | |
| Mozambique..... | Gauze and taffeta. . | Cotton..... | " | { The same weave as the preceding, but differing in material. |
| Crape of Spain..... | " | Silk grège..... | Merino wool.. | |
| Llanos..... | " | Cotton..... | Mohair, or mixed with silk. | { The warps are printed or <i>chinés</i> . |
| Grisaille..... | Taffeta | Cotton chappe or fancy. | English..... | |
| Toile de Saxe..... | " | Cotton, simple, or double and twisted. | " | { The stuff has a peculiar elasticity, due to the close spinning of the warp. |
| Circassienne..... | " | Silk grège..... | Mohair, or silk and mohair. | |
| Cretonne..... | " | Cotton, double and twisted. | Wool | { For furniture. |
| Jupons..... | " | Simple cotton | Carded wool.. | |
| Vode | " | Wool | | { " " " " |
| Valencias..... | " | Silk chappe .. | Combed wool. | |
| Damask..... | Figured or fancy..... | Wool or silk.. | Wool | { " " " " |
| Bolivar | Taffeta | Wool | " | |
| Alpaga..... | " | Cotton..... | Lincoln wool. | { " " " " |
| Popeline satin..... | " | Wool and silk grège. | Knit wool..... | |
| Taffetas | " | Silk..... | Merino wool.. | { " " " " |
| Biarets | Corded or cannel..... | Merino wool.. | " | |
| Épinglé..... | Taffeta and corded.. | " | " | { " " " " |
| Alpine..... | Serge 2 and 1..... | Silk..... | " | |
| Drap d'Alpes..... | Serge..... | Fancy | " | { " " " " |
| Anacosti..... | " | Wool | " | |
| Batavia..... | " | " | " | { " " " " |
| Epengline..... | " | Silk..... | " | |
| Tamise reps..... | Corded..... | Wool | " | { " " " " |
| Veloutine..... | " | Fancy..... | " | |
| Drap d'Alma..... | " | Wool..... | " | |

There are no means of obtaining the names of other French fabrics, or the new names of the same fabrics introduced since the above list was published, except from the dealers in these articles. We have to

thank Messrs. Hovey & Co., of Boston, for a series of samples of French fabrics, with the following names:

| | |
|-------------------------------|--|
| Velours | All wool. |
| Empress | All wool. |
| Chambéry gauze | Silk and goat's hair. |
| Mousseline de bege | |
| Cashmere de bege | All wool. |
| Merino tulle | All wool. |
| Pongee | Silk and wool. |
| Mohair glacé | Goat's hair and cotton. |
| Vigogne | Silk and wool and all wool. |
| Serge | All wool. |
| Basket | All wool, fancy. |
| Matelasse | Silk and wool. |
| Diagonals | All wool and silk wool. |
| Imperial silk serge | Silk and wool. |
| Algerine | All wool. |
| Armure | Silk and wool. |
| Turenne cloth | Cotton and wool. |
| Drap d'Alma | Silk and wool. |
| Sicilienne | Silk and wool. |
| Bombazine | Silk and wool. |
| Tamise | All wool. |
| Chinchilla | Camel's hair. |
| Mexican cloth | Silk and wool. |
| Knickerbockers | { Wool with irregular spots of different colors and materials. |
| French camel's hair | Cashmere goat's wool. |
| Satine | All wool, with satin weave. |
| Australian crape | Cotton and wool. |
| Drap de Nationelle | All wool. |
| Parametta cloth | Silk and wool. |
| Henrietta cloth | Silk and wool. |
| Hernani | Silk and wool. |
| Damasks | { Wool, silk and wool, and wool and cotton, in infinite varieties for furniture, woven on the Jacquard loom. |
| Brocades | |

Some of the general features of the French fabrication of dress and furniture stuffs may here be appropriately considered. The influence of the possession by France of Merino wool upon the character of her dress fabrics has already been referred to in this report. In the spinning of fine Merino wools, and weaving them into dress goods, France takes precedence of all nations.

The most important contribution to this success was the invention, by Heilman, of Mulhouse, of a method of mechanical combing, adapted to the short fibres of Merino wool as well as to the long staple formerly regarded as exclusively combing-wool. Mainly through this invention, France, to use Mr. Alcan's words, "marched, in the early

part of this century, with the step of a giant. The means of fabrication were so ameliorated, in the short space of a quarter of a century, that the spinning of Merino wools attained a fineness and regularity once impossible with the best hand-spinning. The machines turned out lengths of yarn of 200,000 metres to the kilogramme, from a kind of wool which, twenty-five years before, would scarcely have produced 50,000 metres; and the price of the unit of weight of an identical article had descended from eighty to fourteen francs, although the prices of labor had increased." Among the exhibits of the house of Auguste Seydoux, illustrating the material from which their famous merinos, cashmeres, and challis are made, were worsted yarns of Australian combed wool of the fineness of 109,120 yards to one pound. It is unnecessary to enlarge upon the beauty and perfection of the merinos, cashmeres d'Écosse, and challis exhibited at Philadelphia. They are recognized throughout the world as inimitable, and as exhibiting the most perfect fabrics in the whole range of the textile industry.

Another reason for the French success in these fabrics is the specialization of different branches, and the fabrication of the same article, the spinning, weaving, and finishing forming the three great groups. This division of the fabrication into groups, according to Alcan, "facilitates the labor, concentrates the aptitudes, regulates the production, and contributes to ameliorate the results and the economical conditions. Specialization renders the industry accessible to all,—to moderate fortunes as well as heavy capital." The adoption of this system is now taking place in Philadelphia, with marked beneficial results. Another cause must always give France the pre-eminence. The *arbiter elegantiarum* of the world in the fabrics of taste, she can impose, by her imperial sway upon the followers of fashion throughout the world, the fabrics which she has created, leaving the other nations to supply imitations to the less fastidious masses.

England, who did not do justice to herself by her display of worsted fabrics at Philadelphia, has attained success in another direction. She aims to supply the world with worsted fabrics adapted for the consumption of the million. In extent of production and cheapness of fabrication she leads all other nations. It would be presumptuous to attempt, in the space allotted to this paper, even a sketch of her vast worsted-manufacture, while its characteristics, and the names of its principal fabrics, can be intimated, at least, under the head of our own worsted-manufacture, which is in the main copied from that of England. A feature of some of the higher classes of her worsted fabrics displayed at the Exhibition should not be passed without

notice. With the fashions at present prevailing, there is an extremely limited application of the arts of design in fabrics destined for personal wear. Even the printing of dress goods of wool and mixed materials, which offered a wide field for the application of art, has greatly declined, as the costumes of the present day obtain variety by the use of different hues of plain fabrics. An ample field for the application of art is found in stuffs for furniture, carpets, and hangings for rooms,—the furniture and curtain stuffs of worsted, or worsted and silk. The reps, damasks, and brocades showed the wonderful artistic progress effected by her schools of design and her teachers in practical art, such as Jones, Hulme, Morris, and Dresser. The displays of the Royal School of Art Needlework showed that the highest amateur taste of the kingdom is being brought into the service of the decorative arts, furnishing models and stimulus to the practical manufacturers. Through these influences, the designs for decorative fabrics have a style distinctly recognized as that of the "English school," in which mediæval motives are revived, plant-forms are conventionalized, while the natural treatment of foliage and flowers, and the artificial luxuriance of the *Renaissance* designs, are equally abjured. In the decoration of furniture stuffs of their own style the English are without rivals.

Before proceeding to a sketch of the worsted-manufacture of the United States, which we shall give from purely original inquiries, it will be proper to refer to one of the most important steps in the progress of the worsted-manufacture in this country, to which our own industry owes its importance. All-wool mousselines de laine were perfected in France in 1831. In 1833 a fabric first appeared in France which was a copy of the wool mousselines, with the difference that the warps were made of cotton. The English adopted this manufacture, at Bradford, in 1834-35. No event of the century has done more for female comfort and for the industry of wool than the introduction of the cotton warp. Cotton, instead of being the rival, became the most important auxiliary of wool, and has added vastly to its consumption. The *generic* name of cotton delaines, although now but little used, may be conveniently retained to express the whole class of these fabrics. They are practically the same as a woollen fabric, being so covered with wool that the presence of cotton can be observed only by the closest inspection. Their cheapness and durability make their introduction an invaluable boon to women of moderate means. Their fabrication constitutes the chief feature of the manufacture of the great cities of Bradford, in England, and Roubaix, in France.

THE PRINCIPAL COTTON WARPED, WORSTED FABRICS MADE IN BRADFORD AND THE UNITED STATES.

| NAMES. | WEAVE. | WEFT. | WARP. | OBSERVATIONS. |
|--------------------|----------------------------|---|---------|--|
| Delaines..... | Taffeta..... | Medium wool..... | Cotton. | Printed. |
| Baréges..... | Gauze..... | "..... | " | A gauze weave. |
| Reps..... | Double-threaded taffeta... | "..... | " | Printed. |
| Cashmeres*..... | Twilled..... | XX Merino wool..... | " | Made in imitation of cashmeres d'Écosse, all wool. |
| Alpaca†..... | Taffeta..... | Long-lustre wool..... | " | Weft originally made of alpaca. |
| Brilliantine..... | "..... | Fine mohair..... | " | Usually black, the warps dyed before weaving. |
| Lustres..... | "..... | An alpaca of lower grade.. | " | |
| Fancy alpaca ... | "..... | Figured fancy weave..... | " | |
| Brocade..... | "..... | A corded ground with a figure..... | " | |
| Poplin..... | "..... | Long-combing wool..... | " | A corded effect produced by the size of the warp. |
| Debaige..... | "..... | A fabric with weft of black and white wool mixed... | " | |
| Melange..... | "..... | The same, plain..... | " | |
| Italian cloths.... | "..... | ..... | " |  |

The first attempt to fabricate delaines in the United States was made in a mill at Ballardvale, in the town of Andover and State of Massachusetts, about 1844, by John Marland, agent of the company. It is worthy of note as illustrating (what will hereafter be more conspicuous) how naturally and by direct descent the new industry arose and spread, that the mill at Ballardvale had been organized to make fine flannels, being first to fabricate flannels in the country. The transition was natural to delaines, which, as first made, had much of a flannel character. About 1844 this establishment imported worsted machinery from England and made some delaines for printing and others for dyeing. They also introduced hand-combers, and made their own warps. The wools for the printed delaines were all combed by hand. The goods were first printed by blocks at North Andover, and afterwards on the machines of the Hamilton Manufacturing Company, at Lowell. The fabrication was very successful, although the goods were inferior to those now made. The principal difficulty encountered was that of introducing the fabrics into the American market, which was accomplished only by simulating foreign marks and disguising the boxes, to conceal the domestic source. This mill was subsequently leased to Mr. Jeremiah S. Young, who successfully continued the worsted-manufacture.

The success at Ballardvale induced one of the oldest of the cotton-

* Called "Coburgs" in England.

† Same fabrics originally called in England "Orleans."

manufacturing establishments—the Amoskeag Company, at Manchester, New Hampshire—to try the new fabric. A mill owned by this company at Hookset, in New Hampshire, was devoted to an experimental trial, and Mr. Marland received an interest for conducting the manufacture, which was commenced with about 200 looms. The goods were printed at Greenwich, in Rhode Island. The fabrication was continued at Hookset for six or seven years, with a product of about 38,000 yards per week. The goods sold in the gray at about 14 cents per yard; wool sorts, which now cost 60 cents, costing but 36 cents, and cotton about 10 cents, per pound.

About 1845, certain of the stockholders of the Amoskeag Company organized the company now known as the Manchester Mills, situated in the town of that name, purchased a site and power from the Amoskeag Company, and built an extensive factory expressly for the purpose of making delaines. The cotton warps were originally made at Hookset. The first delaines were made at Manchester by carding, the wool-combers not being introduced until 1855, the Noble comber finally taking the place of the inferior combers of American invention first used. This company continued to improve its machinery and enlarge its production, which now reaches 250,000 pieces annually, of fifty yards each, the products having a reputation equal to that of any in the market.

The Hamilton Woolen Company, at Southbridge, Massachusetts, was originally established for the manufacture of cloths. About 1845 the leading stockholders of this company, who had been selling agents of the Amoskeag Company, seeing the success at Hookset, resolved upon converting the mill at Southbridge into a worsted-factory. It met at first with little success, until its management was undertaken by Mr. Ballard, in 1846, who is still the treasurer of the company. The products of this mill, in printed delaines and reps, received deserved commendation at the Exhibition.

The line of descent in our worsted-manufacture, which we have traced from the establishment at Ballardvale, was continued in the Pacific Mills, its first treasurer and the constructor of its works being Mr. Young, before referred to, a brother-in-law of Mr. Marland, who had gained his practical experience at Ballardvale. As this establishment is the largest in this country, and, as it is believed, in the world, where all the branches of the worsted fabrication are carried on within the walls of a single proprietorship, its exceptional importance will justify a somewhat extended notice of its history and operations.

The Pacific Mills are situated in Lawrence, Massachusetts, on the Merrimac River, twenty-six miles from Boston. The enterprise was

started by the Essex Company, Mr. Abbott Lawrence being president and Mr. Young treasurer of the company. It was incorporated in 1853, under its present name, with a capital of \$2,000,000, for the purpose of making ladies' dress goods from wool wholly, from cotton wholly, and from wool and cotton combined; and was provided with all the appliances of manufacture, including print- and dye-works. The construction of the works having exceeded the amount of capital paid in, the establishment found itself, in the very first years of its existence, on the brink of failure. This failure was arrested by the munificence of Mr. Abbott Lawrence, who, on his private responsibility, advanced several hundred thousand dollars to meet the emergencies of the mill, thus adding to his title for recognition as one of the great founders of the manufactures of New England. A hardly less important work of Mr. Lawrence was securing for the treasurership of the mills, vacated through the declining health of Mr. Young, the services of Mr. J. Wiley Edmands, who had been educated in his house. Mr. Edmands took the treasurership and the responsible management of the mills in June, 1855. For the subsequent two or three years, the establishment, although actually making money, was only sustained by borrowing largely. In 1857 the leading commission houses of New England succumbed under the pressure of the well-known panic of that period. The Pacific Mills were compelled to ask an extension of credit for six months, to which every creditor assented. In 1858 the stockholders were called upon to furnish an additional capital of \$500,000, of which all but \$75,000 was secured. The stock representing this amount, not secured, was sold at public auction, in 1859, at from \$1320 to \$1342 per share, the par value being \$1000; although, in 1857, two years previously, many shares had been sold at prices ranging from \$75 to \$200. During the first year of the war, 1861, the mills lost money, the product then being about 11,000,000 yards of dress goods, cotton and woollen. In 1870 the product reached 45,000,000 yards; and, for several years since that date, the annual sales, including the cloths purchased for printing, have reached about 65,000,000 yards. Of this, about sixty per cent. are stuff or worsted goods. Estimating our population at 45,000,000, and that one-third of this population (15,000,000) consists of women and girls, the Pacific Mills, which have all their consumption at home, supply not less than four yards of dress goods to each person of our population wearing these fabrics.

The following statistics of this establishment will give a better idea of the magnitude of its operations:

| | |
|---|-----------|
| Number of mills and buildings | 12 |
| Acres of flooring in buildings | 41 |
| Cotton spindles | 135,000 |
| Worsted spindles | 25,000 |
| Number of looms | 4,500 |
| Pounds cotton used per week | 116,000 |
| Pounds fleece wool used per week | 65,000 |
| Yards of cloth printed or dyed per week, more than | 1,000,000 |
| Printing-machines,—from two to sixteen colors | 24 |
| Tons of coal used per year | 23,000 |
| Number of steam-boilers in all (32,000 horse-power) | 50 |
| Number of steam-engines (1200 horse-power) | 37 |
| Number of turbine-wheels (2000 horse-power) | 11 |
| Cost of gas per year (5000 burners) | \$35,000 |
| Cost of labor per month | \$160,000 |
| Average daily earnings, women and girls | 98 cents. |
| Average daily earnings, men and boys | \$1.40 |
| Persons employed, women and girls, 3534 } | 5,300 |
| Persons employed, men and boys, 1766 } | |
| Number of houses for work-people | 275 |

To this it may be added, that the raw materials for dyeing and printing require an annual expenditure of \$400,000; the consumption of potato starch is 500 tons a year, or the product of 125,000 bushels of potatoes; the wool consumed requires the fleeces of 10,000 sheep each week; while to all these are to be added the food and clothing of 5300 operatives, and their dependants (at least twice as many more), and the items of transportation of raw material and manufactured products.

The company has never ceased its care for the welfare of its operatives, and their improvement morally and intellectually. It early founded a library, with reading-rooms, which contains nearly seven thousand volumes, and is open to the work-people and their families, and has actually an average of seven hundred daily readers. It has established a relief society for work-people temporarily ill, to which the operatives and the company contribute, as well as a "Home," or hospital, provided with physicians and matrons, where those seriously ill can be better provided for than in the boarding-houses of the company, or even in their own homes. As the result of this recognition by the company of its moral responsibilities, there has been no disposition on the part of its operatives to organize strikes, all difficulties which have arisen having been amicably arranged. This moral work of the company was suitably recognized at the Paris Exposition of 1867, by the tribute to the company of one of the ten awards granted, among five hundred contestants, to the individuals or associations "who in a series of years had accomplished the most to secure har-

mony between employers and their work-people, and most successfully advanced their material, intellectual, and moral welfare."

This mill has been selected as illustrative of our highest achievements in the department to which it belongs. We would by no means have it inferred that its products are superior to those of mills of less magnitude. The Manchester Mills, with an annual product of dress goods of 250,000 pieces of fifty yards each; the Hamilton Woolen Company, with a product of 800,000 pieces, and the Washington Mills, with a product of 2,000,000 pieces, manufacture worsted fabrics of no less excellence. It is due to the last establishment to say, that it was the first in this country to manufacture certain all-wool dress fabrics formerly obtained exclusively from France. Some of these fabrics which it was the first to introduce, such as the all-wool matelasses, are made not only by this establishment, but by Messrs. Martin Landenberger & Co. and Thomas Dolan & Co., of Philadelphia, and have high repute in our markets.

A very important class of dress fabrics was not undertaken in this country until 1872,—that of black alpacas, mohairs, and brilliantines. It was, not long since, believed that these goods could not be successfully made elsewhere than in Bradford, England. The Arlington Mills, of Lawrence, Massachusetts, were the first in this country to overcome the difficulties of this fabrication, and have since made a specialty of this branch of manufacture; these goods forming a large part of their annual production of five million yards. The black alpacas, mohairs, and brilliantines exhibited in great variety by this company, as well as by the Farr Alpaca Company, of Holyoke, were fabrics equal in all respects to the productions of the best manufacturers in the old-established seats of the worsted-industry in Europe.

Reference must be made to other worsted fabrics not included in the category of dress goods.

The manufacture of lastings, which are made from long-combing wools of English blood, has until recently been regarded as an exclusive English monopoly, and the English lastings at the Exhibition well sustained their traditional reputation. All attempts in this country failed until after 1867, when the Lowell Manufacturing Company first successfully achieved the fabrication of this article. They were followed by the Peacedale Manufacturing Company, of Rhode Island, and others; and at present the American shoe-manufacturers are largely supplied by lastings of domestic production.

Before the late war, English bunting, made like lastings of long-combing wools, formed the sole material for our national flags. The United States Bunting Company, of Lowell, first successfully achieved

the manufacture of bunting. Its exhibits at Philadelphia showed not only excellent fabrics in bunting and moreens, but a marked improvement in the construction of the national flags.

In tapestries and upholstery stuffs of worsted or worsted mixed with cotton and silk, there was but one prominent American exhibition,—that made by Messrs. Kelty & Co., of New York; but this, in tastefulness of design and excellence of fabrication, was encouraging as to our future success in this attractive department.

CLASS 239.—CARPETS, RUGS, ETC.—BRUSSELS, WILTON, TAPESTRY BRUSSELS, AND VELVETS, AXMINSTER, VENETIAN, INGRAIN, FELTED CARPETS, DRUGGETS, RUGS, ETC.

Among the surroundings of our homes there are none which bring so palpably before our eyes the arts of design of remote centuries and distant peoples as carpets. Originating in Persia at a period almost on the verge of history, and among a people of the ancient Aryan stock, among whose descendants in the centre, south, and east of that country are found the present chief seats of the textile industry of Persia, the carpet-manufacture was carried from thence to India, and to Arabia and Turkey. Carpets were introduced into Europe by the Crusades. Their manufacture in Europe was first undertaken in France, under the patronage of Henry IV.; and the manufacturing of carpets, under royal patronage, was founded at Beauvais, by Colbert, and still exists. Carpets in Europe, like china or porcelain, descended to the homes of the people from palaces, and the influence of original designs for royal establishments may still be seen in the gorgeous patterns of French carpets.

There were ample opportunities at the Exhibition for studying this, the most attractive department in the whole range of the textile industry, as it is the only one in which the arts of design have still unrestricted sway, and where the value of the fabric is controlled mainly by artistic considerations. Persia, India, Turkey, France, Germany, Austria, England, Scotland, and the United States, each exhibited its characteristic fabrics, and no important national product or variety of fabric in this department was without representation. We will briefly refer to the different national products, arranging them in the order of their origin, and availing ourselves of the artistic suggestions of Redgrave, Dresser, and Major R. Murdock Smith, under the light of whose illustrations they were observed.

The carpets of Persia first claim notice, specimens of which were supplied by Messrs. Sloane, of New York, our observation having been enlarged by a study of Persian carpets and rugs directly imported

by them, making a museum of Persian art in this department not surpassed by the collection at Kensington.

The Persian carpets, or rather rugs, are made chiefly in Kurdistan, Khorassan, Feraghan, and Kerman (our principal authority for these statements being the notes on Persian art by Major R. Murdock Smith, R.E.), each district producing a distinctive kind in texture and style. The finest are those of Kurdistan. In these carpets the pattern does not represent flowers, bouquets, or other objects, thrown up in relief from a uniform ground, like so many of the inappropriate designs of Europe, but looks more like a layer of flowers strewn on the ground, or a field of wild-flowers in spring. The borders are always well marked, and usually of brighter colors than the centre.

Besides the ordinary "Kali," or pile carpet, others called "Do-ru" are made at Kurdistan. These are smooth, without pile, and alike on both sides, and are used in traveling for spreading upon the ground.

The carpets of Feraghan resemble those of Kurdistan in style, although the texture is looser and the pattern simpler. They are, consequently, cheaper and in more general use. Fine Kurdistan carpets cost from three to four pounds per square yard. The Feraghan carpets cost from fifteen to eighteen shillings.

The Khorassan carpets are somewhat superior in texture to those of Feraghan, but the patterns are usually more realistic. Kerman carpets are next in value to those of Kurdistan, but the designs are usually still more realistic than those of Khorassan. Besides flowers, figures of men and animals are not uncommon.

According to Major Smith, the carpets of every description are made without even the simplest machinery, the loom being simply a frame on which the work is stretched. The woof consists of short threads woven into the warp by the fingers, without a shuttle. When a row of the woof is thus completed, a sort of comb is inserted into the warp and pressed or hammered against the loose rows of woof yarns until they are sufficiently tightened to the rest of the web. The pile is formed by merely clipping the ends of the woof until an even surface is obtained. The weaver sits with the reversed side of the web towards him; so that he depends solely upon his memory for the formation of the pattern.

The Persian carpets are usually somewhat long and narrow,—a form adopted because more easily woven, while it is adapted to the usual narrow dimensions of the Persian houses. The space for carpets on the floor of these Persian apartments is still further narrowed by the habit of laying strips of felt at the upper end and along the sides of the room, the narrow carpet occupying the middle space.

The spreading of Oriental rugs upon plain felt carpets, now somewhat in vogue, is an unconscious adoption of Persian fashions.

In an artistic point of view, the Persian carpets show an excellence so marked that the educated observer cannot have a moment's doubt as to their superiority over all other Oriental products of their class. They are distinguished by their subdued tones and the harmonies of their various colors. Various as they are, there are certain forms repeated in all designs, so that the national characteristics are clearly marked to those familiar with them.

Indian carpets (some beautiful specimens of which were shown in the Exhibition) are made in large single pieces adapted for covering floors of considerable space. Those exhibited, remarkably illustrated the characteristics of design pointed out by Mr. Redgrave. They had a great variety of colors, but so evenly distributed, and each so well balanced by its complementary and harmonizing hue, that the general effect was rich and agreeable. The effect at a distance was a somewhat foxy tone, in consequence of the free admission of warm neutrals, as brown and brownish purple; white and yellow are but sparingly introduced to define the geometrical arrangement of the forms. The forms consisted largely of highly conventionalized flowers and plant motives, all geometrically constructed. These carpets were much more agreeable in tone than the real Turkey carpets at present so much in vogue.

The Turkish or Smyrna carpets, which were well illustrated, in the best specimens are generally designed with a flat (that is, without perspective) border of flowers of the natural size, and with a centre of larger plant-forms conventionalized, often to such an extent as to obscure the forms. The colors are negative shades of a medium or half tint, as regards light, and tending rather to dark, with scarcely any contrast, and therefore a little sombre in character. Three hues largely pervade the surface,—green, red, and blue. These are not pure, but negative, so that the general effect is cool, though rich. These remarks refer to the best types of the Smyrna carpets. There are others, especially such as are now so extensively imported and sold at auction in our principal cities, which are marked by violent contrasts,—a predominance of yellows and harsh violets. This deterioration may be accounted for by the fact that many carpets are now made in special manufactories, and that the modern carpets do not exhibit the traditional and inherited taste found in the ancient household fabrication.

It is certain that by far the best specimens of the pure Turkish style are found in what are called the Smyrna styles, made in large estab-

lishments in Germany and the Netherlands. Among them, the large carpets and smaller rugs made by the Royal Carpet Company of Deventer, Netherlands, were conspicuous for the taste of their designs, and chasteness as well as richness of color. Nothing more fitting for the repose of a library could be desired than one of these carpets. As they are made by hand, the high price of labor in this country will not admit of their fabrication here. In looking at the best types of all the Oriental carpets, we cannot fail to be struck with the wisdom displayed by the Orientals in adopting negative tones for decorating the floors of their apartments. No people exhibit greater richness of upholstery and costume than those of Persia and India. In the subdued colors of their carpets, they have adopted the best means for enhancing and supporting the splendors of their furniture and the richness of their personal decorations.

The French carpets were represented by magnificent Axminsters, woven for large rooms, in a single piece. The most conspicuous was one representing a wonderful exuberance of tropical forms, in birds, flowers, and foliage; this fabric admitting the employment of an unlimited variety of hues, tones, and shades. The spectator, however, could not fail to be impressed with the thought that it was better fitted to be hung, as it was, as a drapery for a vast hall, than to be seen horizontally, and trodden under foot. This same impression was given by the Aubusson carpets, than which no fabric of wool can be intrinsically more perfect as works of art. They are, in fact, but tapestries for floors, and are fitted only for palaces or rooms decorated and furnished in the luxurious style of the *Renaissance*. Even here they would seem to detract from the splendors of paintings and decorations adorning the walls. It seems difficult to eradicate the old ideas of florid decoration from French designers. It is a curious fact that the English now find in France the readiest sale for carpets designed under the influence of the modern English schools of art.

It would be useless to describe what is so well known,—the character of English and Scotch Jacquard Brussels, Wilton tapestry, and Axminster carpets exhibited, and it would be presumptuous to praise them. It is enough to say that they, as a matter of course, proved themselves to be, in texture and design, the worthiest models for our own manufacturers to imitate, and, if possible, to surpass. The observer could not fail to be amused by the singular mistake made by some of the largest English exhibitors, in displaying fabrics designed for adaptation to their own conceptions of American tastes. They seem not to have been aware that representations of lions, tigers, architectural panels, and huge bouquets are as offensive to the American

as to the English educated eye. Recognizing this mistake, an eminent English carpet-manufacturer remarked to one of our own at the Exhibition, "We seem to be playing at cross-purposes; while we are manufacturing for the supposed American taste, you manufacture for our own."

The carpet-manufacture of the United States has become so characteristic a feature of the American textile industry, that this report would be incomplete without a brief sketch of the steps by which it has reached its vast development. In the middle of the last century, a carpet was regarded as a curiosity in our most luxurious city of that period, Philadelphia; but, as early as 1791, a carpet-manufactory was established by Mr. William Sprague, which attracted so much attention as to induce Mr. Hamilton, in his famous report on manufactures, of that date, to recommend a duty on imported carpets, as an encouragement to home industry. The census of 1810 has been referred to as an authority for the statement that, in that year, 9984 yards of carpet and coverlid, worth \$7500, were made in Philadelphia. The value indicates either the small proportion of carpets made or their very low value. No exact dates as to the further extension of this manufacture appear until 1825, at which time it seems that Mr. Alexander Wright, a native of Scotland,—who with others had previously started a small establishment for making carpets in Medway, Massachusetts,—visited a small carpet-factory in Philadelphia to learn the mysteries of the art. Meeting with no success, he went to Scotland, where he purchased looms, with which he returned to this country, accompanied by Glaude and William Wilson, who were employed by him to aid in operating his machinery, and who subsequently made considerable improvements in the Jacquard attachments to carpet-looms. The location of the works not being favorable, the property was sold to Mr. Frederick Cabot and Mr. Patrick T. Jackson, well known as among the founders of the cotton-manufacture of New England. In 1828, Messrs. Cabot & Jackson sold the mill and machinery at Medway to the Lowell Manufacturing Company, which had been recently organized for the manufacture of carpets and cotton goods, the carpet machinery in the mean time being kept in operation until the mill at Lowell was completed. It should be observed that carpet-weaving at Medway, as well as that first undertaken at Lowell, was done on hand-looms.

It is within the personal recollection of the writer, that at about this time the manufacture of ingrain carpets was undertaken at Great Falls, in New Hampshire, by power, the apparatus for making the figure automatically being a large cylinder or drum, upon which pins

or blocks were placed corresponding to the pattern to be woven, the cylinder operating like that of a music-box. This apparatus was also used at Little Falls, in New Jersey. This, as well as other automatic devices tried elsewhere, was finally abandoned, as operating less favorably than the hand-loom. In 1844 the hand-loom, both in Europe and this country, was universally used for making carpets.

The system was revolutionized by an American invention, which marks the period of its introduction as the most important epoch in the whole history of the carpet-manufacture. Mr. E. B. Bigelow, of Boston, Massachusetts, in 1842, conceived a series of devices for making the carpet-loom automatic, so that the costly labor of men might be dispensed with, and the whole process of weaving might be conducted by women or boys. After applying in vain to several parties engaged in the manufacture for the pecuniary means necessary for the costly experiment which he proposed, he succeeded in gaining the attention of Mr. George W. Lyman, treasurer of the Lowell Manufacturing Company, through whose influence the construction of an establishment with the newly-invented machinery was undertaken by the company, at a cost of many hundred thousand dollars. Mr. Bigelow was also seconded by Mr. Wright, the superintendent of the company, in the practical details of the adaptation of the invention. In 1845 the successful weaving of ingrain carpets by power had been demonstrated at Lowell, and its ultimate general use had become a fixed necessity of the manufacture.

Since this successful experiment at Lowell, the manufacture of ingrain carpets in this country has been marked by a constantly extending development. The important establishment at Thomsonville, Connecticut, now known as the Hartford Carpet Company, which used hand-loomers concurrently with the Lowell Company, adopted Mr. Bigelow's invention. Each of these two is unsurpassed by any in the world making similar products, in the amount of production and excellence of fabrics; while many more recent and smaller establishments have their special excellences of fabric.

The patents for the inventions of weaving Jacquard Brussels and Wilton carpets, although offered to the Lowell Company, were not accepted, and it became necessary, finally, for Mr. Bigelow to utilize his own inventions. The result was the establishment of a factory at Clintonville, now Clinton, Massachusetts, in 1848, which was operated with success; and ultimately, of the organization, in 1854, of the Bigelow Carpet Company, which became the possessor of the works and franchise of the concern just mentioned. This establishment, the growth of more than a quarter of a century, is now the largest in the

world for the manufacture of Jacquard Brussels and Wilton carpets, in which the several processes of worsted spinning, dyeing, and weaving are united in one concern.

The American claim to the honor of this achievement of inventing the power-loom for weaving Jacquard Brussels and Wilton carpets is fixed by foreign recognition. The supplementary report of the jury at the World's Fair in London, 1851, where the inventor's carpets were exhibited, says,—

“The specimens of Brussels carpeting exhibited by Mr. Bigelow, woven by a power-loom invented and patented by him, are better and more perfectly woven than any hand-loom goods that have come under the notice of the jury. This, however, is but a small part of their merit, or rather that of Mr. Bigelow, who has completely triumphed over the numerous obstacles that presented themselves, and succeeded in substituting steam-power for manual labor in the manufacture of fine-frame Brussels carpets. Several patents have been taken out by different inventors in this country [Great Britain] for effecting the same object. But as yet none of them have been brought into successful or extensive operation; and the honor of this achievement, one of great practical difficulty as well as of great commercial value, must be awarded to a native of the United States.”

Axminster carpets, adapted only for the most luxurious use, until recently made exclusively in France and England, are still woven in those countries on hand-looms. A patent for weaving these carpets by power, the invention of Alexander Smith and Halcyon Skinner, of New York, was granted in 1856. On account of the civil war, and the destruction by fire of the establishment where the invention was first applied, it did not come into considerable use before 1867, when the factory was rebuilt and the machinery set at work. The product of the establishment under the proprietorship of Alexander Smith & Sons is about 200,000 yards a year,—an amount believed to be equal to the entire annual production of the same kind of goods in France, and more than is made in Great Britain. One of these power-looms, attended by one competent woman, will produce in a day an amount equal to the product of ten English or French hand-looms, attended by as many men. The loom is not adapted for weaving the wide, single-piece carpets made in the foreign hand-looms; but this inconvenience is almost wholly obviated by the perfect selvage and matching of the figures of the narrow pieces, which may also be applied to floors of any dimensions.

Tapestry carpets, known as tapestry Brussels and tapestry velvets, form a very important branch of the carpet-manufacture of England

and the United States. This style of carpet, of quite recent invention, is particularly adapted to the popular demand for brilliant effects at moderate prices, for there is no form of carpet in which so good an appearance can be secured at so low a cost. In all other carpets the yarns are dyed. The principle of the fabrication of these carpets consists in *printing* the colors upon the warps in such a manner that when the warps are woven they form the desired figure. In this style of carpet the room for the application of color and design is unlimited.

The method of printing the warps, which constitutes the essential feature of the tapestry carpets, was the invention of Mr. Whitock, of Edinburgh, Scotland, about 1838. The invention met with little success until the right to apply it in England was secured by Mr. John Crossley, of Halifax, England, about 1842. With his characteristic energy and skill he made the fabrication a perfect success, and the establishment founded by him still makes the largest production of this fabric of any in the world.

In 1846, Mr. John Johnson, an Englishman, educated in Crossley's establishment, and who had himself put up the first machinery for this branch of fabrication at Halifax, came to this country, and established the manufacture of tapestry carpets at Newark, New Jersey, running about twenty-five hand-loom. He was facilitated in his enterprise here by the fact that Whitock had taken out no patents in this country. Mr. Johnson subsequently removed his establishment to Troy, New York, where the manufacture was carried on for two or three years under his direction, though not in his name. In the autumn of 1855 the machinery was purchased by a company, of which Mr. M. H. Simpson was the principal stockholder, and removed to Roxbury, Massachusetts, in 1856. The great inventive power of Mr. Simpson, seconded by the experience of Mr. Johnson, has secured for the Roxbury Carpet Company the prominence in this manufacture displayed by its beautiful fabrics at the Exhibition. This company has by no means the monopoly of this manufacture in this country. Its claims for excellence are contested by Messrs. Higgins & Co., of New York; Alexander Smith & Sons, of Yonkers; Stephen Sanford, of Amsterdam, New Jersey; Messrs. Dobson, of Philadelphia; and others.

The progress made in the manufacture since its first introduction is remarkable. The product of the first hand-loom was but five yards per loom per day. In 1856 the product of the Roxbury Carpet Company for each loom per day was sixteen yards. At present the average product of each of the one hundred and fourteen looms employed

is forty-nine and a half yards per day. This is largely due to the invention of the power-loom of Mr. Bigelow, the principles of whose inventions are applied in weaving these fabrics.

Particular reference has hitherto been made only to the carpet-manufacture of New England and New York, which is characterized by its few vast establishments. The city of Philadelphia, alone, surpasses all other parts of the country combined in the extent and variety of the carpets which issue from its looms. A prominent characteristic of the Philadelphia manufacture is the diffusion of the industry in small establishments. Philadelphia, with its cheap homes, its abundant and cheap market, and the faculty which it seems to possess above all other cities of appropriating the talents of the artisans who resort to it, is the paradise of the skilled workman. There, as nowhere else in this country, the loom of the handicraft carpet-weaver still finds abundant occupation through the smaller manufacturers, who employ his skill, and furnish the raw material to be worked up by the weaver and his family in their own houses. The carpet-manufacture of Philadelphia is distinguished for its success in making sightly and useful carpets out of cheap materials, adapted for the most modest homes, and its carpet-makers are among the few American manufacturers who have been able to profitably export their products.

While small establishments form the rule in the carpet-manufacture of this city, there is one under an individual proprietorship of comparatively recent foundation,—that of Messrs. John & James Dobson,—which employs between two and three thousand workmen, principally in carpets. There are also notable exceptions to the general rule of manufacturing the cheaper products, Messrs. McCallum, Crease, & Sloane having exhibited ingrain carpets of the highest class (which, in design and fabrication, compared favorably with the best in the Exhibition), and the Messrs. Bromley, Venetian carpets illustrating the best merits of that class.

We have not attempted, in any other department, to exhibit the present amount of production; but the carpet-manufacture is so prominent a feature of our textile industry that we have taken pains to obtain, from original sources, the amount of production in 1875.

The Carpet Association of Philadelphia has furnished Mr. Lorin Blodgett, for his work on the industries of that city, the statistics of its carpet-manufacture in 1875. The report for 1875 claims the total value of the carpets manufactured in that city to be \$19,000,000, and that the increase of machinery since 1869, in the form of mills, steam-power looms, etc., was more than one hundred per cent. Returns

furnished to us by the following establishments outside of Philadelphia, viz., the Bigelow Carpet Company, the Hartford Carpet Company, E. S. Higgins & Co., the Lowell Manufacturing Company, and the Roxbury Carpet Company, show that the actual value of carpets made by these companies was \$11,126,168. We feel authorized in estimating the product of other mills out of Philadelphia, not enumerated, at \$2,000,000.

RÉSUMÉ OF AMERICAN PRODUCT IN 1875.

| | |
|---|--------------|
| In Philadelphia | \$19,000,000 |
| Other mills enumerated | 11,376,168 |
| Not enumerated | 2,000,000 |
| Total value of American production of carpets in 1875 . | \$32,376,168 |

The principal exhibitors of American carpets, by displaying them together in a series of alcoves, made their united exhibits in this department unusually imposing, and the proofs of our attainments in this manufacture were observed with no little surprise. It was manifest, from the absence of rival foreign exhibitors, that, in respect to the carpets of the cheaper and medium qualities, up to two- and three-ply ingrains, the competition is confined to our own manufacturers. Even rival English manufacturers generously admitted that, in the production of Jacquard Brussels, tapestries, Wiltons, and narrow Axminsters, we have nothing to learn from them either in design or fabrication.

CLASS 240.—HAIR, ALPACA, GOAT'S HAIR, AND OTHER FABRICS, MIXED OR UNMIXED WITH WOOL.

Of the materials other than wool proper composing fabrics, but ranked with it because possessing the same general properties, the first in value is the product of the goat of Thibet, commonly called the Cashmere goat,—a distinct variety inhabiting the elevated regions north of the Himalayas. This variety, whose origin is obscure, has affinities with the Angora race. Its size is quite large. The horns are flattened, straight, and black, and slightly divergent at the extremities. The ears are large, flat, and pendent. The exterior fleece or hair, which is long, silky, and lustrous, is divided on the back, and falls down upon the flanks in wavy masses. Beneath the hair, there is developed in autumn a short and exceedingly fine down, called *pushm*, from which the cashmere shawls are fabricated. The quantity of *pushm* obtained from a single animal is quite small, never exceeding one hundred and eight grammes, and usually much less, to the individual. The separation of the kemp or coarse hair from the

pushm, which is indispensable for making the shawl-yarns, is a work of great labor. The raw or unprepared pushm, it is said, costs in India about seventy-five cents per pound; but the labor of separating the kemp, at the low rate of four cents a day, is so great as to bring the cost of the pure pushm up to seven or eight dollars per pound.

Well-arranged specimens of the pushm, as well as magnificent samples of the shawls fabricated from this material, were shown in the India collections. One in the Exhibition, imported by an English house, was valued at \$1137. The prices of shawls, actually of Indian fabrication, descend as low as \$20. The inferior shawls are made in Kerman, in Persia, as well as in India, from the material called "koork," proceeding from a particular kind of white goat, distinct from the Thibetian animal. Numerous flocks of these goats are kept at Kerman. They are cultivated in the same manner as the Merinos formerly were in Spain, being *transhumant*,—or feeding in the valleys in winter, and on the distant mountain-plateaus in summer. A large part of the Kerman koork is annually exported to Upper India, where it is manufactured into false India shawls. It is the koork, and not the pure cashmere pushm, as is commonly supposed, which forms the material of the richest of the Persian carpets, a magnificent specimen of which is in the collection of the Boston Art Museum; and an inferior one from Khorassan, now in Messrs. Sloane's warehouse in New York, although but six feet by four in size, is valued at \$275.

The fabrication of cashmere shawls in Europe has been attempted only by the French. The peculiar Indian texture called "espouline" was perfectly achieved in Paris in 1834, four thousand workmen being employed, while some four hundred goats were imported from Thibet. But it was found that the raw material, expensive as it is, formed not more than one-tenth of the cost of a shawl; that the French workman could not compete with the Indian weaver, working at less than one-fifth of his wages; and that ladies of fashion would pay twice as much for a genuine India shawl as for a French article really superior in texture and design. The manufacture has, therefore, been abandoned. Since the monopoly of the East India Company has ceased, the French have reconciled themselves to the loss of this manufacture by making Paris the principal *entrepôt* in Europe of the India shawl trade. The inferior pushm or koork, from which the kemp is not separated, is at present largely used by the French in the fabrication of cashmere dress fabrics.

The next analogous material, in value and importance, occupying the place of wool, is mohair,—the product of the Angora goat. As this material could not be properly discussed under the head of wool,

in the first part of this report,—while it is rapidly becoming an important object of American production,—it may not inappropriately receive consideration in this connection.

The Angora goat (descended, as proved by modern naturalists, from a distinct wild species of Thibet,—the Falconer's goat, *Caprus Falconeri*), it is supposed, was carried by the migration of pastoral tribes from Thibet, in the eleventh and thirteenth centuries, to the country in Asia Minor near Angora,—the ancient Ancyra,—where they principally abound, and from which the recent diffusion has taken place. Their existence was not made known to Europe until 1655, and the first full description of them was given by the celebrated botanist Tournefort, the master of Linnæus. But so little was popularly known of them, that some of the old dictionaries define mohair as the hair of a Turkish dog. The chief supply for commerce still comes from Asia Minor, the country being in the Turkish territory. The superbly mounted specimens of these animals in the Turkish department must be remembered by all visitors at the Exhibition.

The many attempts made to acclimate the Angora goat in various parts of Europe have met with signal failure, the generally prevailing moist climate being unlike that of their native habitat. The first importation into the United States, consisting of eight animals from Asia Minor, was made in 1849, by Dr. J. P. Davis. Other importations were made by Mr. Diehl. These and their descendants were distributed principally in the Southern States. Mr. Winthrop W. Chenery, of Belmont, Massachusetts, an eminent merchant and stock-raiser, imported about three hundred pure-blood animals, and introduced the first full-blooded animals of this race into California. Mr. A. Eutichides, a native of Greece, came to this country from Asia Minor in 1869, bringing a flock of Angora goats with him. A part of this flock was sent to California; the rest of the flock, numbering fifty-four, in 1875, is now in the possession of Mr. F. S. Fulmer, of Spring Mills, Appomattox County, Virginia, and has been kept perfectly pure. A flock of several thousand pure and grade animals of this race is upon an island in California, and several thousand are stated to be scattered through Oregon. The acclimation of the race, so difficult elsewhere, has been perfectly accomplished in the comparatively dry climate of this country, especially in the high regions of the South and the interior. The only obstacle to success is the greediness of breeders, who are too apt to sell grade animals for breeding purposes. It is only by the constant use of absolutely pure bucks that merchantable mohair can be procured. For further information on this subject the reader is referred to a monograph on the *Angora*

Goat, its Origin, Culture, and Products, by the writer, published in vol. xi. of the *Proceedings of the Boston Natural History Society*, and in vol. vi. of the *United States Reports of the Exposition at Paris, of 1867*.

Mohair, the fleece of the Angora goat, is not a mere substitute for wool, but occupies its own place in the textile fabrics. It has the aspect, feel, and lustre of silk, without its suppleness. It differs materially from wool in the want of the felting quality; so that the stuffs made of it have the fibres distinctly separated, and are always brilliant. On account of the stiffness of the fibre, it is rarely woven alone; that is, when it is used for the filling, the warp is usually of cotton, silk, or wool, or the reverse. The distinguishing qualities of the fibre are lustre, elasticity, and wonderful durability. The qualities of lustre and durability, particularly, fit this material for its chief use,—the manufacture of Utrecht velvets, commonly called “furniture plush,” the finest qualities of which are composed principally of mohair, the pile being formed of mohair warps, which are cut in the same manner as silk warps in velvet. Upon passing the finger lightly over the best Utrecht velvets, the rigidity and elasticity of the fibre will be distinctly perceived. The fibre springs back to its original uprightness when the pressure is removed. The best mohair plushes are almost indestructible, and are now in general use by all the principal railroads, as the most enduring of all coverings for railroad seats. The English have attained the greatest success in spinning mohair, and the French and German manufacturers use English yarns. In the manufacture of Utrecht velvets, the city of Amiens, in France, holds a marked precedence, and the plushes exhibited by her manufacturers, in Philadelphia, of all hues, plain and figured, well sustained her reputation. Another analogous application of mohair is for forming the pile of imitation seal-skins. Some of these fabrics, exhibited by manufacturers of Huddersfield, England, were of special beauty, the resemblance to real fur being quite striking. Admirable imitations in mohair of the Astrakhan lamb-skin furs were exhibited by the same manufacturers. Similar goods, made by one of our associate Judges, Dr. Weigert,—who, by his position, was precluded from an award,—received high commendation. Mohair forms an essential material in the best carriage and lap robes, with a long and lustrous pile. Some exhibited were made to resemble the skins of tigers, leopards, and other animals; and others were printed. Among the last, some made by a manufacturer in Sandford, Maine, were conspicuous for excellent texture and design. Another application of mohair is for the fabrication of braids for binding, which have the lustre of silk, but far greater durability. Excellent specimens of this

fabrication were exhibited by T. M. Dale, of Newark, New Jersey. Still another important application of this material is in the fabrication of black dress goods, resembling alpacas, the mohair being woven with cotton warps. They are called mohair lustres, or brilliantines. Beautiful exhibits of this admirable fabric were made by the Arlington Mills and the Farr Alpaca Company. Mohair is also used in France in the manufacture of laces, which are substituted for the silk laces of Valenciennes and Chantilly. These, however, do not come within the consideration of this group.

The soft fibre of the vicuña of South America, composing fabrics which are peculiarly agreeable in feel, was exhibited in very pleasing shawls made by English and California manufacturers. But the most interesting of the new fabrics were the cloths made of camel's down, which have recently come into extensive use in Russia.

The Roumianstoff Cloth Manufactory of General Siloverstoff, situated in the Volga Province of Russia, exhibited beautiful plaids, blankets, and other tissues, adapted for the most luxurious consumption, manufactured from picked camel's hair and goat's down. These products find a ready sale in Paris. More interesting still was a stout and leather-like, though soft, cloth, without nap, made from a mixture of Merino, Russian, and Kirghese wool, with camel's down, called "half-merino." This is dyed a pale yellow tint, and finds an extensive sale among the Asiatic tribes under the name of *jeltiak*. These tribes, from time immemorial, have dressed in yellow cloth made exclusively of undyed camel's hair. The appearance of a dyed cloth in which the camel's hair was mixed with wool, acquiring greater strength, yet having the same color, has caused the Asiatics to substitute the *jeltiak* for the original camel's-hair fabric. This cloth has now great repute among the Caucasian Armenians, and the Persians living on the coasts of the Caspian Sea. The success of this manufacture is in a measure due to the invention of a particular apparatus by means of which the soft and downy parts are separated from the fleeces of coarse Siberian and Kirghese sheep and goats, the down of the Siberian goat producing stuffs remarkable for their softness and lightness.

The celebrated Montagnac coatings, first made in France about twenty years ago by processes patented by the inventor whose name they bear, had beautiful illustrations at the Exhibition, from Sedan. They are sometimes called cloth-velvets. The pile of the surface is usually furnished by fibres of cashmere wool, incorporated in the yarns of the fabric, and they are straight and perpendicular to the surface, the cloth having the aspect of a silk-velvet, but with a softness

peculiar to the cashmere fibre. The pile is developed on the surface by *battage*, or beating the moistened cloth with elastic rods.

Formerly, only the long hair of the cashmere goat and camel were used, besides wool, for making pile fabrics. In 1850, Mr. Benjamin Crosland, of Huddersfield, England, invented or rediscovered a process by which the short hairs of the cow and calf could be used in the manufacture of imitation seal-skins. The main feature of his process consisted in boiling the fabrics for a long time in water, which develops the lustre of the fibre. These fabrics were for a long time imported into the United States under the pretence that they contained no wool, being thus subjected to a less duty. A rigorous microscopic examination by the National Academy of Sciences, made quite recently, under the direction of the Secretary of the Treasury, seems to have established the fact that the short hairs of the cow and calf are spun with at least enough wool to carry the fibre,—a successful spinning seeming otherwise impracticable. The cow-hair seal-skins, which are an important specialty in England, were illustrated by beautiful specimens at the Exhibition.

Another animal product, which is not strictly a textile fibre, because it cannot be spun like those above referred to, must be considered in this connection,—that is, horse-hair, the material of the fabric ordinarily known as "haircloth." This material, as a covering for furniture, a century ago was held in high consideration. The wife of Benjamin Franklin, describing the furniture of her mansion in Philadelphia, says it was covered with black haircloth, "as handsome as *padisoy*" (Padua silk). Modern fashion has driven this material from fashionable drawing-rooms, but its durability still causes it to be retained in unambitious apartments. There were two conspicuous exhibits of this material. Ranking first in elegance was an exhibit made by Edward Webb & Son, Worcester, England. These haircloths were woven in stripes of rich blues, scarlets, and crimsons, with whites, and in simple but rich colors, brocaded and figured. They possessed all the elegance which could be given to this material, and for certain purposes, as for summer apartments and houses in tropical regions, possess adaptations found in no other upholstery materials.

The Pawtucket Haircloth Company, of Rhode Island, made an exhibit of this fabric, the peculiarity of which was that it is the result of the first successful weaving of haircloth by power, the hand-loom being, so far as known, used by all other manufacturers of this fabric at home or abroad. The success of the company referred to is due to their achievement of the work of picking up, and applying automatically, each individual hair which is to compose the texture of a

hair filling, interlaced by a warp of cotton thread. This is accomplished by a little machine which could be packed in a box two inches square. This machine, which is detachable for repairs, is attached to a loom, both the machine and loom being operated by power, and it forms the pivot upon which the whole manufacture turns. It is essential that the machine should pick up but one hair at a time. To accomplish this, the picker in the machine has a groove or slit invisible to the naked eye, so that the whole of this manufacture turns upon a point which can only be seen with a microscope. The loom is so adjusted that the movement of the web is arrested until the picker lifts up its hair. The end of the hair is seized by a rod, the end of which operates like a thumb and finger, and is carried transversely between the warps. This little apparatus is attached to four hundred distinct looms in the establishment of the company. One girl tends ten looms, and this one girl, by means of this machinery, does the work requiring twenty operatives on hand-loom. By means of these appliances, this single establishment, employing only 150 work-people, produces 600,000 yards of haircloth per annum, each loom weaving five yards per day. It consumes annually 450,000 pounds of horse-hair, equivalent to the tails of 600,000 horses. The large exhibit showed the unquestionable superiority of the machine-made goods to the ordinary hand-loom fabrics.

All the classes assigned to the Judges of this group, in the department of wool, have now been considered, except that of wool machinery. While all the varieties of wool fabrics were well illustrated, the wool machinery exhibited but very few of the modern appliances by which the fabrics are made. The fullest description of the machines exhibited would give but a faint idea of the improved machines now in use. To describe even those exhibited would require space and means not at our disposal, and would be unsuited to the popular object of these reports.



SILK AND SILK FABRICS.

BY JOHN L. HAYES.

Silk with its fabrics, by the value of the raw material, corresponding to an equal weight of silver, its tenacity equal to that of iron, and its lustre surpassed only by that of the precious metals and stones; by the splendor of its fabrics, their relations to the decorative arts, their influence upon painting, heraldry, and the ceremonies of the church, their place as a means of exchange in early commerce, and the correspondence of their production in Western Europe with the decline of Oriental power,—would seem to claim a more extended notice than we have given to the homelier fibre and fabrics which have thus far occupied our attention. But the popular interest attaching to silk and its fabrics has made knowledge of the subject so general that we could hope to add little to the common stock of information as to the sources of this fibre or the history of its Oriental and European fabrication. Besides, we do not forget that the principal source of the popular knowledge of this subject in this country is the exhaustive report prepared by Mr. Cowdin, the Chairman of this group, in his former official position as an American Commissioner at the Paris Exposition of 1867, and that it would be vain to expect to glean from a field which had been so thoroughly reaped and harvested.

The writer will confine himself, in this portion of his report, to a brief sketch of the more general impressions made by the foreign exhibits of fabrics of silk,—omitting notices of the raw material, and not attempting any analysis or minute comparison of foreign fabrics,—and to a notice, more extended, of American products.

Before proceeding with these sketches, it is but an act of duty for the writer to refer, as he can without indelicacy, to the character of the work performed by the subdivision of the Judges of Group IX. intrusted with the examination of silk. They consisted of Mr. Gustav Gebhard, a practical manufacturer of Elberfeld, Germany, one of the most celebrated and extensive fabricants in Europe, whose facility for work in this department was aided by his rare command of all the Continental languages; Mr. Louis Chatel, an eminent manufacturer of Lyons, who, confined to his chamber by an unfortunate accident, still insisted upon having samples of all the fabrics under examination submitted to him in his chamber; Mr. Hayami Kenzo, an accomplished Japanese gentleman, the Government Director of silk-reeling establishments in his own country; Mr. August Behmer, an Egyptian

gentleman, familiar with the production of raw silk; Mr. John G. Neeser, a Swiss gentleman; and Messrs. Cowdin and Le Boutillier, Americans,—the latter three of very large experience in the silk trade. All the exhibits were carefully inspected in the cases by the Judges of the subdivision, and submitted to subsequent examination and tests through samples. The sewing-silks and twists exhibited were submitted to rigorous tests by machines and otherwise, to determine their smoothness and tenacity; careful notes being taken of these experiments. Brief as the awards are in this subdivision, their value is greatly enhanced by the high character of the Judges and their conscientious and rigorous examination. To American exhibitors in this department, especially, will the high awards they have received from foreign manufacturers, from whom even mention is praise, be of peculiar value. The writer, instructed, as he could not fail to be, by daily intercourse with his accomplished associates, and guided in his observations by their direction, has less diffidence in offering the notes which follow.

FRANCE.

France, as occupying the first position among the silk-manufacturing nations, having had a production in 1874 of \$116,000,000, and an export of \$95,000,000,—a production three times as great as Germany, which next follows her,—commands the first notice. The principal French display of silks, being in a somewhat secluded court, was made more pleasing from the exclusion of other objects, and the brilliancy of the fabrics was enhanced by the extreme simplicity of the cases inclosing them. No section of the Exhibition was more attractive than this court, displaying as it did the models of perfection in the most luxurious department of the textile industry, and the most brilliant and artistic products which the weaver's art can create. In this court were gathered the substantial proofs of that aspiration for ideal excellence in the material, fabrication, and artistic form of her products, which has given to France the crown of industrial glory. With all the pleasure conveyed to the eye and senses by graceful designs and infinitely varied colors, by gorgeous decoration and unexpected combinations of material or color, perhaps the chief satisfaction derived from the inspection of the products of this court resulted from the consciousness that they were the best results hitherto attainable by human effort in one great department of industry. Another vivid impression made by this court was that the industry it displayed was the product of an æsthetic culture, general and special, without example in the world, and of influences such as have existed in no other nation. The industry was planted by the royal foresight of

King Henry of Navarre, and sustained by the political economy of Colbert. It grew up in the genial atmosphere of the most splendid courts of Europe. The chemistry of Berthollet and Dumas furnished dyes for its fabrics; the traditions of the Renaissance and the pencil of Watteau gave it designs; and Chevreuil imparted to it the secrets of harmonizing and contrasting colors. While, in later periods, the protective influences of the Government (whether empire or republic) have never been wanting, the pre-eminence of the silk-manufacture of France has been sustained by a working population who have inherited the traditions and secrets of manipulation from generations of artisans, and by art schools for workmen, which Lyons was the first city in the world to inaugurate.

The visitors at the Exhibition, whose imagination had been excited by the learned researches of Michel upon the precious stuffs of the Middle Ages, or the splendidly-colored plates of the characteristic silken tissues of every period recently published in Paris, might have experienced some disappointment at the comparatively small display of the figured brocades, damasks, and velvets so conspicuous in the personal costumes of the earlier periods. Mainly, as is asserted, through the influence of the Franco-Prussian war, which plunged France into mourning, the figured and brocaded stuffs were replaced by plain fabrics in personal costumes, although now beginning to reappear. It may not be generally known that it is in the perfect fabrication of the plain stuffs, especially the plain black silks, that the highest art of the manufacturer consists, as no inequality of thread or unevenness of tissue or dye can be concealed by the figure. Of the plain tissues of this description in this section recognized by the expert Judges as of incomparable excellence, it is useless to attempt a description. To be appreciated, they must be seen or worn.

There was no lack of fabrics whose beauty was due to design and color. Conspicuous among them were printed foulards, upon which the arts of design and of impression would seem to have been exhausted. The miraculous power of the Jacquard loom to produce the most complicated designs was most tastefully and appropriately shown in a woven representation in silk, upon a background of tissue, about two feet long and as many broad, of the mulberry in leaves and fruit, with the silk-worm and moth in every stage of development; the colors exquisitely shaded, the mulberry branch being intertwined with a ribbon bearing the significant motto, *vestit, ornat, ditat*.

Although decoration is sparsely used in stuffs for dresses, it still finds an infinite field for application in stuffs for upholstery, and especially in fabrics for church vestments. Antiquarian learning seems

to have exhausted itself in seeking examples and authorities in the past for forms and colors of ecclesiastical vestments. Silk, gold, silver, and jewels glitter on the copes, the chasubles, the mitres, the stoles, and altar-cloths, of the church more prodigally, and combined with higher skill, than they could have done in the most splendid period of mediæval history. It is said that in some of these tissues the workman can weave not more than an inch in a day, and the prices sometimes attain the enormous sum of three hundred dollars per yard. The most brilliant display of these fabrics, as well as those for upholstery purposes, was made by Messrs. Tasiman & Chatel; the latter being a Judge, the exhibit was precluded from an official award. Their magnificence equaled all that the imagination could conceive. An interesting feature of some of these fabrics was a reproduction of Oriental types, illustrating the views maintained by the learned M. Michel, that the figures on heraldic coats of arms were derived from silk-stuffs of the East, of which the representation of animals—such as lions, leopards, eagles, griffins, etc.—formed the ordinary ornament. On one of the fabrics exhibited by Mr. Chatel, with a background of gold and red, was interwoven, so as to cover the surface, repeated figures of elephants, horses, falcons, cocks, dogs, deer, and mounted horsemen; all designed conventionally, or in heraldic style.

To illustrate the extent and variety of the silk products and producers of France, as well as to pay a deserved tribute to the typical silk-manufacturers of the world, we subjoin a list of the principal French exhibitors, with the products:

| | |
|---|--------------------------------------|
| Black silks | C. J. Bonnet's Sons & Co., Lyons. |
| Black silks | Jaubert, Audras, & Co., Lyons. |
| Black silks | Tapissier Son & Debry, Lyons. |
| Black silks | Gourd, Croisat Son, & Dabost, Lyons. |
| Black silks | Antoine Guinet & Co., Lyons. |
| Black and colored velvets | Gautier, Bellon, & Co., Lyons. |
| Black velvets and colored silks | J. P. Million & Servier, Lyons. |
| Black velvets | Font, Chambeyron, & Benoit, Lyons. |
| Black silk velvets | C. J. Servant & Co., Lyons. |
| Black dyed silks | Gillet & Son, Lyons. |
| Dress silks and novelties | Poncet, Senior & Junior, Lyons. |
| Colored silk goods | Faye & Thévenin, Lyons. |
| Silk goods | Sevène, Barral, & Co., Lyons. |
| Damask silks and novelties | Bresson-Agnès & Co., Lyons. |
| Colored failles and gros-grains | Bardon & Ritton, Lyons. |
| Striped and fancy silks | Mauvernay & Co., Lyons. |
| Siciliennes | Audibert, Monin, & Co., Lyons. |
| Poplins | J. Drogue & A. Monnord, Lyons. |
| Foulards | A. L. Trapadoux & Co., Lyons. |
| Foulards | Jandin & Duval, Lyons. |

| | |
|---|-----------------------------------|
| Foulards | Gondard, Cirlot, & Martel, Lyons. |
| Hatters' plushes | Huber & Co., Paris. |
| Black and colored satins | Brosset-Heckel & Co., Lyons. |
| Hatters' plushes | J. B. Martin, Tarare. |
| Crapes | Montessuy & Chomer, Lyons. |
| Umbrella silks | Alex. Giraud & Co., Lyons. |
| Velvet ribbons | F. Brioude, St. Etienne. |
| Velvet ribbons | Giron Brothers, St. Etienne. |
| Sewing-silks | Benoit, Tabard, & Co., Lyons. |
| Silk gauzes and bolting-cloth | L. Dornon, Lyons. |
| Bolting cloth | L. R. Gascou, Montauban. |
| Raw and sewing-silk | Joseph Puydebart, Lyons. |

GERMANY.

Germany, although ranking second in the production of manufactured silk,—having had a production of the value of \$38,000,000 in 1874,—was represented by few exhibitors, awards having been made but to four exhibitors; viz., to Escales & Hatry, of Saargemünd, for silk plushes for hatters' use, of remarkable perfection in color and finish; to Gressard & Co., of Hilden, for foulards of high excellence; to Carl Mez & Sons, of Freiburg, Baden, for sewing-silks of great beauty in color and finish; Massing Brothers & Co., Püttlingen, for hatters' plushes of high excellence.

But the paucity of exhibitors from Germany was atoned for by the beauty of exhibits made by Mr. Gustav Gebhard, of Elberfeld, who, on account of his position as Judge, was precluded from an award. In the absence of the notes promised by Mr. Gebhard, we are compelled to trust only to our own memoranda and impressions. The products of the establishment represented are understood to be furnished by the labor of some four thousand persons, not employed (as with us) in a single establishment, but working hand-loom in their own houses. The goods, exhibited in two very large cases, and most tastefully arranged, consisted of figured velvets, satins, and brocades, many of them executed in silver and gold. A striking feature of the exhibit was the designation by cards of the markets for which the several fabrics were specially destined. India, Siam, Batavia, Constantinople, had each their special fabrics, in which the characteristic features of the native productions of different Oriental countries were reproduced, doubtless with cheaper materials, but with attractive effects.

INDIA.

The reference to copies of Oriental fabrics leads us naturally to the original fabrics of silk which were exhibited from the East. The India Museum's most attractive and instructive exhibit contained

beautiful specimens of India silks. Conspicuous among them was a brocade long scarf, or *Kincob*, from Benares, in which, from silver leaves placed on a dark or deep-red ground, spring gold flowers with black centres. Another brocade, of wonderful beauty and exquisite texture, is composed of a gold ground, varied or shaded by delicate shades of silk, in low tones of blue and red. The figures in these brocades are all conventionalized. Still another attractive fabric was a fine silk gauze, embroidered with gold in flattened or hammered scales.

More instructive to the student of textiles than the few large and brilliant samples of fabrics was the collection, made under the direction of the East India Museum, of the splendid volumes, albums, and framed samples of all the textile fabrics of India, in which the wonderful variety and perfection of the native silk fabrics of India are admirably displayed. The expense of a series of these samples (about two thousand dollars) forbids their possession by individuals; but none of our industrial or art museums should fail to have these admirable models of industrial art-work.

NETHERLANDS COLONIES.

Among the silk fabrics shown at the Exhibition, there was nothing surpassing the scarf-like brocades from Sumatra and Java, exhibited in the collection of the Netherlands colonies. They belong to the native princes, and were lent for the purpose of exhibition in Philadelphia. They were all of native production. A model of a rude loom was exhibited, upon which they are said to have been woven. But it seems inconceivable that such fabrics could have been produced by such rude mechanism. The ends of the scarfs are fringed with flat tassels of silver, rudely made and unpolished. The fabric is of silk of a dull red tone, shot with gold thread. The terminal borders are well marked and broad. The designs are arabesques of a geometrical construction,—no figures of flowers or animals being introduced,—but of a most subtle and ingenious character. Although the texture is nearly covered with gold, it is scarcely apparent; and the general tone of the fabric is low and subdued. This subdued effect is produced by the neutral tone of the silk, and the manner in which the design is made to spread all over the texture.

CHINA AND JAPAN.

Japan and China, although leading all other nations in the supply of raw material, and in silken embroideries unequalled, were inferior in the artistic character of their woven goods to India and Java. The plain colored satins of China were of excellent manufacture; and

a fine exhibit consisted of colored and figured silks, which were declared by the Judges to be marked improvements over former productions of that country. Among the exhibits from Japan, the most conspicuous for excellence were the silk crapes, white, dyed, and printed; the dyed cherries and scarlets being notable for the perfection and brilliancy of their hues, while others were most skillfully shaded. Productions of silk from cocoons of worms feeding on the walnut, and others from worms feeding on the oak, were interesting. The most curious of the Japanese fabrics were brocades of great apparent richness, on account of the gold woven in the tissue; gold flowers and leaves being intermingled with scarlet flowers upon an indigo-blue ground. The threads of gold forming the warp, upon close examination were found to consist of exceedingly narrow or thread-like strips of paper, gilded, but only on one side; the gilded side being invariably brought to the surface in the tissue. It was observed by experts that this effect could only be produced in hand-looms.

TURKEY, EGYPT, TUNIS.

The less remote Oriental nations—Turkey, Tunis, and Egypt—showed that they had not lost the arts of silk fabrication which they once enjoyed in supreme perfection. The damasks and brocades, woven in silk alone, or mixed with gold and silver, though Oriental and characteristic in design, in many cases exhibited excellent taste and workmanship.

RUSSIA.

Russia, combining Oriental sentiment and traditions with the art and technical skill of Western Europe, made exhibits of silk fabrics which worthily attracted universal admiration. We refer particularly to the damasks and brocades of silk, gold, and silver, the latter literally "cloths of gold and silver," made in Moscow and St. Petersburg, and the sacerdotal vestments in gold and silver tissues made in the same cities. These tissues, vying with the best productions of Lyons in execution, have a characteristic interest and beauty, derived from the traditional splendors of the Greek Church. Some of the rich fabrics were especially noticeable from the pure Byzantine character of the design, employing religious symbols, which Ruskin has pointed out, in his *Stones of Venice*, as characteristic of the earliest Christian or Byzantine decoration. The notable exhibitors of these magnificent stuffs were A. & W. Sapojinkoff, Moscow; John Sytof, St. Petersburg; Mosjookhin & Sons, Moscow; and F. A. Jevargeif, St. Petersburg.

The ordinary silk fabrics exhibited by Russia were of high excellence. Among those deserving special mention are Sergius Zoobkof, of Khomootovo, Moscow, for rich colored failles; Alexis Fomitchev, Moscow, for rich figured failles and silk cashmeres; Kondrashev Brothers, Grebenevo, Moscow, for plain black and colored failles and upholstery damasks; Emilianoff & Rochefort, and Zolotaref & Ribakoff, Moscow, for silk and wool dress goods; Shelaief Brothers, Moscow, for black and colored satins.

Mr. A. Néboltine, a Russian statistician, says, "We commenced in the last century to manufacture silk in Russia; but it is only during the present century, and above all since 1830, under the influence of a protective tariff, that this fabrication has become developed, or acquired any considerable importance." He shows that in 1872 there were 460 silk-factories, 15,800 workmen, and an annual production of 10,300,000 roubles, including the production of trans-Caucasia, which is more of a domestic than manufacturing character; and that the importation of foreign silks in 1871 was of a value of 6,293,935 roubles, or a little more than half that of the national fabrication.

SWITZERLAND.

Returning to the more prosaic regions of the European silk-manufacture, we find that Switzerland best represents the fabrication adapted to the ordinary commercial demands of modern times. Zurich, the chief centre of the fabrication, occupies the same position in the silk-manufacture that Bradford does in the worsted and Verviers in woolen industry. She manufactures for export and for the million. Economy of production is the first object. Although provided with very cheap labor, Switzerland has led other nations in the application of labor-saving machinery, and she has chiefly furnished the models for the best machinery used in this country, both in the manipulation and dyeing of silk. She excels in the combination of cheaper materials, such as cotton with silk; the silk being thrown upon the surface, and the cotton forming the back, as in cotton-backed satins and marcelines. Although producing the higher classes of dress silks, black and colored, in great perfection, as evinced in the beautiful exhibit of Baumann, Aelter, & Co., of Zurich, the characteristic of the Swiss manufacture is the adaptation, for popular consumption, of fabrics which are made attractive by taste in design, excellence in execution, and reasonableness of price. An interesting evidence of the confidence of the Swiss manufacturers in holding their own ground against foreign rivals is the circumstance that the Swiss Commissioner, alone among foreign representatives, caused a series of albums,

most beautifully arranged, containing samples of all the silk-products exhibited by his country, to be presented to the principal industrial museums and associations of this country. One of these albums the writer has now before him. In this album there are no rich brocades, damasks, or velvets, and nothing conspicuous in an artistic point of view. The fine gros-grains and failles, black and colored, exhibit great regularity and perfection of execution. The figured silks are marked for the simplicity and delicacy of their designs; the fine stripes, so difficult of execution, being perfect. The few brocades are tasteful, but not showy. The marcelines and the satins, with either cotton-tram or chain, are very effective, especially in the materials for cravats. We must not omit a product in which silk, ordinarily ministering only to luxury, contributes to the first of necessities. It forms the material for bolting-cloth used in the manufacture of wheat flour. In the manufacture of this fabric the Swiss have attained the utmost perfection. The leading exhibitors, with their products, were :

| | |
|---|---|
| Black and colored failles and taffetas | . Adlischweil Silk Goods Factory, Adlischweil, near Zurich. |
| Black and colored gros-grains and failles | . Beaumann, Aelter, & Co., Zurich. |
| Black and colored failles | . S. Rutschi & Co., Zurich. |
| Marcelines | . Ryffel & Co., Staefa and Zurich. |
| Colored and figured dress-silks | . Emil Schaerer & Co., Zurich. |
| Colored failles and changeables | . J. Schwarzenbach-Landis, Thalweil, near Zurich. |
| Plain, striped, and check dress-silks | . Joh. Stapfer's Sons, Horgen, Zurich. |
| Cotton-back satins | . Stunzi & Sons, Horgen, Zurich. |
| Dress-silks | . Baumann & Streuli, Horgen, Zurich. |
| Low-priced cravat materials | . Jansen, Bodek, & Hertz, Reisbach. |
| Black and colored gros-grains and brocades | . William Schroeder & Co., Zurich. |
| Silk bolting-cloths | . Meyer Brothers, Zurich. |
| Silk bolting-cloths | . Heidegger, Wegmann, & Co., Seefeld, Zurich. |
| Silk bolting-cloths | . Ruff Huber, Zurich. |
| Silk bolting-cloths | . Egli & Sennhauser, Zurich. |
| Silk bolting-cloths | . Homberger Brothers, Wetzikon. |

AUSTRIA.

Austria, which more properly should have been considered in connection with Germany, exhibited black silks well adapted from their low price to a large consumption, cotton-back velvets, and silk velvets, black, colored, and white, of excellent manufacture. The prominent exhibitors were :

| | |
|-------------------------------|-------------------------------|
| Black silks | . S. Trebitsch & Son, Vienna. |
| Cotton-back velvets | . Carl Hetzer & Sons, Vienna. |

| | |
|----------------------------|---------------------------------|
| Fancy silks | C. G. Hornbostel & Co., Vienna. |
| All-silk velvets | F. Reichert's Sons, Vienna. |
| Hatters' ribbons | J. Swartz & Son, Vienna. |

GREAT BRITAIN.

Great Britain failed to make any adequate representation of her manufacture, although it counts by millions of pounds sterling in value. There were only four well-marked exhibits. Pin Brothers & Co. did high credit to Ireland, by a splendid display of their black and colored hand-woven plain silk poplins, which are celebrated throughout the world, and by furniture damasks of fine effect. Norris & Co. made an excellent display of upholstery silks, which were specially noticeable for admirably executed designs, in great variety, all conceived in the spirit of the modern English school. Admirably executed figured and emblematical ribbons were exhibited by Thomas Stevens, of Coventry, as well as an excellent silk loom of quite original construction. There were two excellent exhibits of sewing-silks.

ITALY.

Italy, who, in the fourteenth and fifteenth centuries, supplied all Europe with the richest fabrics of silk, equally disappointed the visitor at the Exhibition by her display of fabrics in this department; only a single exhibit of figured velvets from Milan being noticeable. A series of rich antique stuffs in the Castellani collection, however, gave the visitor some conception of the ancient splendors of the silk fabrication of Italy.

SPAIN.

The political condition of Spain prevented her from making the display of which she would have been otherwise capable. Spain is still a treasure-house of the splendid stuffs of the past, most of the richest ornaments of the Kensington Museum having been obtained in that country. We are assured that many of the traditionary arts of silk-weaving have been preserved, particularly in the religious houses. Black silks of good manufacture, and black cashmere silks in fine grades, well made in every respect, were exhibited; also curtains, furniture damasks, and brocades in good colors; effective stuffs for cravats and fichus, and hand-made figured silks in old Moorish and Oriental styles. The principal exhibitors and products were:

| | |
|--|---|
| Black silks | Antonio Pascual & Co., Reus, Tarragona. |
| Black cashmere silks | Farriols & Son, Barcelona. |
| Curtain and furniture damasks | Benito Malrehy, Barcelona. |
| Silk cravats and fichus | Eduardo Reig & Co., Barcelona. |
| Valencia silks in old Moorish styles | Fernando Ibanez Palenciano, Valencia. |

PORTUGAL.

Portugal surprised us by the excellence of several exhibits of gold and silver damasks for church purposes, and of rich brocades and brocatelles for furniture and curtains, as well as well-made dress silks; all evincing an unexpected progress in that country towards industrial independence. The leading exhibits were as follows:

| | |
|---|--|
| Gold and silver damasks | David José da Silva & Son, Oporto. |
| Gold and silver cloths | Viuva Ferreira Campos & Co., Oporto. |
| Upholstery stuffs | National Silk-Weaving and Spinning Co., Lisbon. |
| Gold and silver galloons and gimp | Custodio Lopez da Silva Guimaraes, Penafiel. |
| Black and colored failles and brocatelles | Ramires & Ramires, Lisbon. |

In observing, as we do in this slight sketch, the high attainments made in silk fabrication by countries regarded as barbaric, as well as those possessing all the modern inventions, we perceive that there are no conditions in any country, where civilization has dawned, preventing the appropriation of this industry. The raw material, unlike wool and cotton, from its high intrinsic value, compared with its weight, being almost as transportable as the precious metals, is almost equally available to every country. Where traditionary skill, which still nourishes the manufacture in the declining countries of the East, is wanting, or favorable circumstances, like the exodus of silk workmen into England from the revocation of the Edict of Nantes, do not exist, the encouragement of governments and the enterprise of the people must give the impetus to a manufacture which every self-dependent nation aspires to plant upon its soil. What these influences have accomplished we shall now attempt to trace in the history of the silk fabrication in our own country.

SILK-CULTURE AND FABRICATION IN THE UNITED STATES.

The exhibits of American silks at Philadelphia were, without question, the most triumphant trophies of achievements in the textile industry within the last two decades displayed by any nation or department of textile fabrication. The brief period within which our silk-manufacture has reached its high position tempts us to describe the steps of its progress. But a detailed history would be unsuited to the general plan of this report, while any attempt at original historical research in this department is rendered unnecessary by the full "particulars in relation to silk and the silk-manufactures, chronologically arranged, prepared by Mr. Franklin Allen, Secretary of the Silk

Association of America," published in the *United States Industrial Directory of 1876*; and by the exceedingly well-written and carefully-executed *History of the Silk-Industry of America, prepared for the Centennial Exposition by L. P. Brockett, M.D.*, and published under the auspices of the Silk Association of America. These works will be freely drawn upon without further acknowledgment. The writer will add that he has verified the observations of Mr. Allen and Dr. Brockett, as well as his own impressions and notes at the Exhibition, by a recent personal visit to most of the representative silk-manufacturing establishments in this country.

THE SILK-CULTURE.—We will first notice the growth and extension of the silk-culture in this country. The production of the raw material was attempted in the earliest periods of our colonial history, in the Southern colonies, where the conditions of climate were most favorable for the growth of the mulberry and the raising of silk-worms; but the more profitable culture of tobacco and rice, and subsequently of cotton, together with the incapacity of the only working population of the South, the negroes, to perform the delicate operation of reeling, caused the silk-culture, in that section, finally to wholly disappear. It was more successful in Connecticut, where the conditions of climate were less favorable, but where the necessities of the people, and their habits of thrift, had developed an active household industry.

Through the influence of Dr. Stiles, afterwards President of Yale College, a State bounty was given, in 1763, for the culture of the mulberry and the production of raw silk. In 1766, half an ounce of mulberry-seed was sent to every parish in the State. The domestic culture of silk was very general in the State during and subsequent to the Revolution. It became a fixed industry, however, only in the town of Mansfield, where it had been introduced by Dr. Aspinwall, in 1766. This town became noted for the production of silk grown and reeled in the households. "Mulberry orchards," of the hardy native white mulberry, were distributed throughout the township, and rows of this tree shaded the highways and fringed the cultivated fields. The production of silk in a single family sometimes amounted to one hundred and thirty pounds in a season, and most of the labor was performed by women and children. The silk, very imperfectly reeled, was spun on a hand-wheel into a roughly-made sewing-silk (dyed in the household), which was usually sold in barter to the country stores. The floss, waste, and pierced cocoons, being mixed with wool, cotton, or flax, were made into coarse stuffs for every-day wear. The domestic production of this town from 1820 to 1831 was of an annual value of not less than \$50,000. In this domestic manu-

facture, as we shall hereafter see, were the germs of the present silk-industry of America.

From 1780 to 1820 the domestic culture and fabrication of silk was also pursued to some extent in New Jersey, Pennsylvania, and parts of New York, Delaware, Maryland, and Virginia, but without any results bearing upon the extension of the manufacture, as in Connecticut.

About the period of 1825, with the growing sentiment which then prevailed for the extension of American industry, the public attention was attracted by means of congressional reports, messages of State governors, and publications by enthusiasts in the press, to the field for American industry which lay open in the silk-culture and fabrication. Among the individuals most prominent as writers and practical experimentists, though with no results profitable to themselves, were Mr. Duponceau, of Philadelphia, and Judge Cobb, of Dedham, Massachusetts. Their appeals found a response in the public mind, dictated by the natural desire to appropriate the most attractive and luxurious of the textile arts, together with a new product for our soil. But the means by which the much-desired industry should be planted were not yet made clear. At an unhappy moment, Dr. Felix Pascalis made known to the public the remarkably rapid growth and supposed excellent qualities of the *Morus multicaulis*, first planted in the United States in 1826. In place of the old method of planting the well-known and hardy, but slow-growing, mulberry-trees, it was proposed to secure leaves fit for feeding from trees of a single season's growth, which seemed possible through the extraordinary luxuriance of growth of the multicaulis variety. The public were taught that every farm should be a nursery for the young trees, that every house should have its cocooneries, and that silk would become as cheap as cotton. At first gradually, and then more and more rapidly, the excitement in regard to the multicaulis grew, until it reached a speculation, whose extent and folly, and the ruin it brought in its collapse, in 1839, are too well remembered to need any further notice. With the subsidence of the multicaulis fever, there came a general decline of interest in the silk-culture, except in Mansfield, which had so thoroughly tested the value of the white mulberry as to partake but little of the prevalent excitement. There, however, the mania for speculation, which seems to have been an epidemic of the times, was transferred to the white mulberry. The fever had its course and its reaction. Silk-culture sank into disfavor in the town to which it had given prosperity for nearly seventy years. Finally, in 1844, a blight of a general character, to which even the hardy

white mulberry yielded, gave the finishing blow, and silk-culture in America ceased to exist.

But the silk-culture, humble as it was and brief in duration, was the means of developing a knowledge of the fibre, of its uses, and manipulations; it drew attention to the possibilities of the fabrication, and created a passion for working it. The silk-culture was the humble larva from which was developed the winged and perfect insect, brilliant with gold and color, to which the perfected silk-manufacture may not unaptly be compared.

FABRICATION OF MACHINE- AND SEWING-SILK.—Proceeding to a history of the organized manufacture of silk in this country, we find that two of the most important branches of the manufacture, that of sewing-silk and spun silk, were direct offshoots from the domestic silk-culture of Connecticut. Attempts were made at Mansfield in 1810, 1814, and 1821, by Rodney Hanks, to manufacture sewing-silk by power, but without success. His grandsons are now successful manufacturers. In 1829 a company, consisting of seven individuals, most of whom subsequently became identified with numerous enterprises in the silk-manufacture, was incorporated under the name of the Mansfield Silk Company. Their first successful machinery was made by Mr. Lilly, the promoter of the enterprise, in accordance with the descriptions and rude drawings of Edmund Golding, a young English "throwster," who came to this country at the age of seventeen, expecting to find employment in his art. But the machinery proving inadequate for the manufacture of American silk, as it was then reeled, raw silk for the first time was imported from England and used in the manufacture of sewing-silk, which proved superior to the hand-made skeins. From that first successful attempt, the manufacture of sewing-silk, by power, has been uninterruptedly continued, though with successive improvements in machinery, as well as in the quality of the goods made. This company, having unwisely entered into the culture of silk, was finally dissolved. Several members of the disbanded company started the manufacture of sewing-silks in other places, and contributed to the spread of the new industry. An ingenious mechanic of Mansfield, named Rixford, made improvements in the machinery for winding, doubling, and reeling, which were adopted in a mill started at Florence, near Northampton, out of which the now celebrated Nonotuck Company's establishment sprung. So that in the humble domestic silk-culture of Mansfield may be clearly seen the source of the present manufacture of sewing-silks and machine-twists in this country, amounting in 1875 to over six million dollars in value.

This is, at present, the characteristic department of New England

in the silk-manufacture, and the few details which we are able to offer in relation to this branch of silk fabrication can be most appropriately given in this connection. So numerous have the establishments become (twenty-five in Connecticut and Massachusetts, besides those in other States), and necessarily so active is the rivalry between them, that it would be invidious to specialize the several contributions which they have made to the high advancement of this great branch of the silk-manufacture.

The first object sought by the early sewing-silk manufacturers was to rival and replace in our markets the Italian sewing-silks in universal use; and the sewings, at first, were put in packages with Italianized labels, simulating Italian sewings. Although dealers had the usual distrust in American productions, our early manufacturers were aided by the long voyages between this country and Europe, which often caused temporary deficiencies in the supply of Italian sewing-silks. By filling up these gaps, our manufacturers got their first hold upon the American markets. At first, only colored silks were attempted; competition with the superior black sewings of Italy being considered hopeless. Advancing in the fabrication, and attaining a permanent black dye, through its introduction in 1838 by Messrs. Valentine & Leigh, who had been practical dyers in England,—one of whom, Mr. Leigh, still survives,—they undertook a fabric in greater demand,—black sewing-silks in skeins, for tailors' use. The sewing by the hand, and the simple needle then in sole use, demanded a far less perfect thread than that now required for machine-sewing. Illustrations of the solidarity of the industries are perpetually recurring. The American invention of the sewing-machine was the inauguration of the sewing-silk manufacture of America, in the forms and proportions which it now holds. The sewing-machine required that silk for its use should be put upon spools, and be of a special manufacture. The proprietors of an establishment in Massachusetts, now famous, knowing the difficulties attending the use of silk threads, as then made, upon the newly-invented sewing-machine, devised the plan of twisting the silk in a direction opposite to that of common or skein sewing-silk. Winding a pound of three-cord silk, thus twisted, upon spools containing one-half ounce each, they submitted it, in 1852, to Mr. Singer, who was then experimenting upon his newly-invented sewing-machine, with which he met difficulties that he could not overcome. We cannot so well describe this important step in the manufacture of sewing-silks as in the language of Mr. Lilly, a proprietor in the establishment referred to. The silk was handed to "Mr. Singer with the request that he would try it. He put a spool upon his machine,

threaded up, and commenced sewing. After sewing sufficiently to enable him to judge of its merit, he stopped, and, after examining the work it had done, exclaimed, 'Can you make any more like this?' (addressing the agent, who stood watching the result with great interest :) 'I shall want all you can make,'—a prophecy literally fulfilled. The new fabric assumed the name of 'machine-twist;' and from that time to the present the amount of silk consumed upon sewing-machines is marvelous. A new enterprise was born, which created an industry giving labor to many thousands."

Although, in this first experiment of machine-twist, the invention was complete, the manufacturers still found great trouble in its production; for the machine required a thread which, to be moved automatically, must be absolutely perfect, like the machine itself. It was by gradual improvements in machinery, and manipulations generally too minute to warrant description, that they succeeded in the result they have now so completely attained,—that of placing upon spools a definite weight of silk thread, of continuous length, entirely free from slugs, knots, and uneven places, and perfectly adapted to the machine which is to apply it. We may, however, mention as American inventions, which have contributed to the advancement of this manufacture, new mechanical patented devices for spooling the thread and weighing it; and especially a machine in general use for stretching the thread after it has been twisted, which has the effect of lengthening the thread about fifteen per cent., and of making it even throughout. As the manufacture advanced, the standard of excellence, both on the part of the producer and consumer, grew higher. In the earlier stages of manufacture, the black silks were heavily weighted by chemical means; greatly diminishing the tensile strength of the thread,—a system then invariably pursued by the makers of foreign sewing-silks. Certain American manufacturers then introduced goods of strictly pure dye; and, to insure the consumer against fraud, also introduced measuring and strength-testing machines, by means of which the buyer might inform himself of the actual value he had in each pound of twist. In time, the makers placed upon the goods their own names and brands or trade-marks, like the well-known designations, "Nonotuck," "Corticelli," "Lion," "Eureka," etc., which are absolute guarantees, to the consumer and dealer, of the quantity and quality of the goods sold. The direct tests to which the American sewing- and machine-silks are subjected, in this country, by the ready-made clothing manufacture, unequaled by any other in the world in the extent and systematical character of its operations, has contributed greatly to the perfection of this branch of the silk-

manufacture. That the United States may now challenge the world in the fabrication of sewing-silks was fully demonstrated at the Exhibition, as here before said. All the sewing-silks exhibited were subjected to the most severe tests by the expert Judges. A result of these careful tests was the conclusion of the Judges, that certain American sewing-silks exhibited surpassed, in all the qualities which make up the sum of excellence, any displayed by foreign nations.

The statement of the aggregate production of sewing-silks and machine-twists in this country fails to show the large scale upon which this manufacture is conducted, and the activity of enterprise in this department. A better conception may be formed from the facts, that in a single establishment not less than six hundred operatives are constantly employed, and its consumption of raw reeled silk in the present year is one hundred and three thousand pounds of raw silk, of a value of about twelve dollars per pound. As an illustration of the rapidity with which this manufacture has been expanded, it may be stated that a firm of manufacturers who commenced the sale of sewing-silks in 1856, with a capital of twenty-five dollars, in 1876 consumed no less than three thousand pounds of raw material in their own manufacture, gave employment to one thousand hands, and sold a value of about eight hundred thousand dollars.

Before leaving this branch of the silk-manufacture, we must not omit to notice the machinery in actual operation at the Exhibition, illustrating the methods in use in this country for fabricating sewing-silk. A description furnished by an expert correspondent of the *New York Times* is better than any we can offer. The machinery in operation was exhibited by the Nonotuck Company, of Florence, Massachusetts, and the Danforth Manufacturing Company, Paterson, New Jersey. The writer from whom we quote says,—

“To begin with, the skeins of raw silk, just as they come from China or Italy, are strung upon winders, for the purpose of being wound on to bobbins. This is a very simple process, and done on very simple machinery; the only mechanical aid of any consequence being a reciprocating cam, which gives a lateral motion, and distributes the strand of silk equally over the bobbin. These bobbins are then transferred to the ‘doubling’ machine, on which any number of threads, from three up to ten, are wound together. But this machine involves one or two very pretty movements. As in the case of the winder, the equal distribution of the combined thread on the bobbin is regulated by a reciprocating cam; but a very neat attachment also stops any one bobbin the moment one of the threads, making the

combined thread, snaps. Immediately under the bobbin on which the threads are jointly wound there is an arm rising from a balance-frame. Should one of the threads snap, the guide, through which it runs, and which is only supported by its tension, falls back against the balance-frame. Its weight is sufficient to displace the frame and bring forward the arm; and the arm, having an elevation, raises the bobbin and unships it, at once stopping its revolution. By this ingenious arrangement, the main thread is kept of one continuous size without any trouble, because it cannot run on without the companionship of all the minor and component threads. On being taken from the doubling-machines, the bobbins are placed on the 'spinner,' which gives the various threads a sufficient spin to make a strand in the process of unwinding. The bobbins then go to the 'twisting' machine, on which the threads from three of them are firmly spun and twisted together to make what is called machine-twist silk, but from only two bobbins to make sewing-silk. Both kinds of silk are twisted twice, but with this great difference: machine-twist is first twisted to the right, and then to the left; while sewing-silk is first twisted to the left, and then to the right. The silk is then rewound into skeins, and, after being washed in strong soap-suds, is dried and stretched. The length of these skeins is regulated with great nicety by an ingenious adjustment. An eccentric drives a ratchet-wheel with a dog on it, and the adjustment causes the dog to strike the shipper and stop the winding-machine the moment the desired length of silk has been wound into the skein. The silk is now ready for the dyer, and, after being dyed, is again wound in bobbins preparatory to 'spooling.' The spooling-machine has a feed-shaft, with a right and left hand thread on it, and a half-nut on either side. This arrangement gives an easy and regular direct and reverse lateral motion to the guide, the spool remaining stationary; the length of silk wound on to the spool is regulated by a binder and a strap attached to a weight, both being governed by a treadle. The operator knows exactly how many times the guide should travel right and left to fill the spool. By pressing the treadle the weight below the shaft is raised, and releases the strap from the shaft; while at the same moment, and equally governed by the treadle, the binder (which is a small wheel) presses the belt against the shaft, causing it to revolve. The moment the spool is full, the operator ceases to press the treadle, the binder releases the belt, and the strap, attached to the weight below, falls on the shaft and stops it instantly. The same arrangement enables the operative to stop the revolution of the shaft in case of accident to the spool or thread, as the machine cannot run unless the foot is pressing on the treadle;

and, the moment the pressure ceases, the machine comes to an instantaneous stop. One of these spooling-machines will wind one hundred and ten dozen of spools a day; and some conception of the extent of the Nonotuck Company's business may be gained from the fact that they have no less than sixty of these spooling-machines in constant operation in their factory, where they employ over six hundred hands. Only one thing has to be done to render the spools ready for the silk; it is to stamp their two ends with the brand and the name of the company. This is done by one of the prettiest and most perfect little pieces of machinery in the hall, and the stamping of the colors into the wood obviates the falling off of printed labels, as is sometimes the case with cotton spools from insufficient gumming in the labeling-machine. The spools are fed from a trough, through a hollow post, into the stamping-machine; an arm pushing them one by one, as they come out at the base of the post, into a groove, where they are caught and held in position by a small weight, the spool at the same time pushing back a spring. Two spools are in the grooves at one time, the one receiving its first and the other its second stamping simultaneously. At either end of the spools are two dies, one inked with red and the other with blue ink. These dies press upon the spools simultaneously, impressing the name of the company in one color, and, on the second impression, the brand in the other color. The outer spool is then released by the momentary rising of the weight, and the spring against which it was pressing kicks it out into a basket. The groove-bed revolves, bringing the inner spool to the outside and a new spool into the place of the inner one; the operation being repeated *ad infinitum*. As the dies spring back from the spools, they take a quarter turn upward, which brings them under the inking-rollers; the rollers being inked and moving in a similar manner to those in a job-printing press. There are four composition rollers to each ink reservoir, and pair of dies. The whole stamping-machine is divided into two parts, each the counterpart of the other, and turns out the stamped spools at the rate of one hundred and twenty a minute. One machine will stamp seventy thousand to eighty thousand spools a day, sufficient to fill ten ordinary flour-barrels. When wound on the spools, the silk is ready for the completion of orders, or to go into stock in the warehouse."

THE FABRICATION OF SPUN SILK.—It was in the silk-culture that the largest and most celebrated of our manufactories of silk goods, that of the Cheney Brothers, had its birth. As this establishment is wholly without rivals in its special department, and one of the most characteristic in the whole range of the American textile industry,

it commands a special mention which would be invidious in other branches of the silk fabrication.

The sons, eight in number, of a farmer in South Manchester, after the custom of the town had cultivated mulberry-trees and raised silk-worms in their boyhood. Some remained at home, while others were scattered, but only to return. For four or five years previously to 1838, four of the brothers had been raising silk-worms and producing silk, like their neighbors. In that year they started a small silk-mill at South Manchester, for the purpose of making sewing-silk. Their increasing interest in the silk-culture, however, led them to suspend the operations of the mill for a time, when three of the brothers removed temporarily to Burlington, New Jersey, where they established nurseries and cocooneries, and published a magazine known as the *Silk-Grower's Manual*. Their energy having, however, been mainly devoted to planting nurseries of the multicaulis, and their plans having been frustrated by the explosion of that bubble, in 1839 they returned to their forsaken mill at South Manchester, and resumed the work of making sewing-silk from imported raw silk. Subsequently, they were rejoined by others of the family, who had established mulberry plantations in Florida and Ohio. We do not propose to follow the steps by which this establishment reached its present vast expansion. Success came slowly, and after many discouragements, and with it an enlargement of their operations. In 1854 a mill was built in Hartford. Buildings were added at South Manchester, new machinery and methods invented and imported, while new branches of manufacture were added to that of sewing-silk. The main feature of the manufacture in time came to be the working into every conceivable fabric that form of silk known here as spun silk, and on the Continent of Europe as *chappe*. This is silk spun from pierced cocoons, floss, and waste, and whatever cannot be reeled. The fabrics from this material, though wanting in the high lustre of those made from reeled silk, are remarkable for their wearing qualities, their beauty actually increasing with wear. The extensive use of this material for dress goods and ribbons is quite recent; but these fabrics, as now made by Messrs. Cheney Brothers, are recognized as cheaper and better than any goods of their grade in the market. The leading articles produced in this establishment are black and colored gros-grain silks, which have obtained a wide-spread reputation for their cheapness and good wearing qualities, as compared with imported goods of corresponding grades and weight. Ribbons of all colors and widths, which are among the most popular brands in the market, and a great variety of silks for the millinery and trimming trade,—for parasols, and for hat and fur

linings. The expert Judges at the Exhibition recognized in their award to Messrs. Cheney Brothers the "high degree of excellence of the piece goods and ribbons exhibited, and the perfect manipulations of the spun silk in every form."

But the proud distinction of this establishment is not so much the unequaled character of the fabrics in its peculiar line, its army of fifteen hundred workmen, or its production exceeding two millions in annual value, as the manner in which it has solved the highest and most difficult of problems,—the securing commercial success, with the harmony of interest between the employer and the operative. It would seem that neither taste nor social science could devise happier adaptations for the wants of a manufacturing population than are found in the village of South Manchester. In a highly-kept park of seven or eight hundred acres, without a single inclosure, are scattered the beautifully-appointed factories and warehouses, the handsome residences of the proprietors, the churches and public halls, the convenient boarding-houses, and the two hundred dwellings of the workmen, each isolated, with a pleasant garden-plot, and provided with water, gas, and perfect sewerage. The large farm of the proprietors, near the village, furnishes a supply of milk and vegetables at moderate prices; and an extensive bakery contributes to the public convenience. The intellectual wants of the workmen are provided for by a first-class school, a library and reading-room, and a commodious hall for lectures and public entertainments. The dream of an ideal community seems here to be as completely realized as is possible with the inexorable conditions of labor and capital. It is gratifying to see that the enlarged views of the proprietors have been productive of commercial success. An obvious result of their system has been to secure and retain the best class of workmen. There has never been a strike in this establishment; a strike being held, in the words of one of the proprietors to the writer, "as disgraceful to the employer as to the operative."

WOVEN GOODS OF REELED SILK.—To observe the American fabrication of silk in its most luxurious forms and in the utmost variety, we must leave New England, and seek a district in New Jersey and New York, comprising the city of Paterson, its chief centre, and outlying establishments in Brooklyn, Hoboken, and New York City. In this district, and particularly in Paterson, lying about twenty miles by rail from the great metropolis, may be seen, in successful activity, nearly every form of silk fabrication pursued in Europe. It is a law of the development of industries that they spring from some obscure germ, as the tree grows from its seed. Like the sewing-silk and the

spun-silk manufacture, the magnificent industry of Paterson grew out of the silk-culture of Connecticut. It was founded by Christopher Colt, Jr., whose father was a president of a Connecticut silk-manufacturing company, which existed from 1835 to 1839, and an enthusiast in the silk-culture. An uncle of Christopher Colt, Jr., was the inventor of the celebrated revolving-pistol, and had built a large factory in Paterson, then a town of about seven thousand inhabitants, for the manufacture of his pistols. He offered the fourth story of his mill, with power to drive machinery, to his nephew Christopher, for the establishment of a silk-mill. It was supplied with machinery and started; but at the end of three months it was closed, and the stock, machinery, and fixtures offered for sale. Happily at this time, namely, in 1839, John Ryle, of Macclesfield, England, who had learned the arts of the silk-manufacture in his native town, was attracted to this country by the glowing statements sent abroad by the promoters of the *Morus multicaulis* excitement, then at its height. He visited Northampton and Connecticut, witnessed the collapse of the multicaulis bubble and the extinction of the silk-manufacturing establishments which had embarked in the speculation, but only to be more vividly impressed as to the field which lay open in this country for silk-manufacture. Imparting his enthusiasm to a Mr. Murray, a capitalist, whom he fortunately met at Northampton, the latter was induced to buy out Colt's machinery and place Mr. Ryle in charge of the first successful silk-mill in Paterson.

In 1843, Mr. Ryle having become a partner with Mr. Murray, the firm employed fifty hands, and consumed eight thousand pounds of raw silk per annum, in the production of tram, sewing-silk, and twist. In 1846, Mr. Ryle was assisted by his brothers in England to buy out Mr. Murray's interest, and, being sole owner of the establishment, set some looms at work, and produced several pieces of dress silks. But this fabrication was not continued. In 1857-58 he employed from four to five hundred operatives, and consumed two thousand pounds of raw silk per week. For twelve years he was without any competitor in Paterson. His first successful rivals were Messrs. Hamil & Booth, who commenced business in Paterson as throwsters, in 1854, with twenty operatives, but who now give employment to nine hundred. Even as late as 1862, the manufacture of silk at Paterson was mainly restricted to the making of machine-twists, sewing-silks, and tram-silks, for the use of manufacturers of silk trimming located in other cities. Efforts were made, in the years 1846, 1849, and 1864, to introduce the weaving of broad silks; but the experiments were only successful in demonstrating the skill of manufacturers. In

1862-63 material improvements were made by the machinists of Paterson in the construction of the silk-spinning machinery required for the fabrication of fine trams and organzines, the yarns necessary for weaving broad silks; and a greater uniformity was attained in assorting the various sizes of yarns required for weaving, which was effected by the introduction of the processes known as *deniering* and *draining*.

In the mean time, the command of the domestic market, assured by the tariff of 1861, encouraged manufacturers in Baltimore, and in Williamsburg, New York, to embark in the weaving of ribbons, scarfs, neckties, etc. The establishment at Williamsburg was transferred, in 1867, to Paterson; and, under the name of William Strange & Co., now employs eight hundred operatives, turning out an annual product of ribbons of the value of over a million of dollars. There are now eight ribbon-manufacturers in Paterson, and the production of this single city is over one hundred thousand pieces of ribbon per month.

The permanent establishment of broad-silk weaving in Paterson dates from the period of 1866. It was first successfully effected there by the Phœnix Manufacturing Company, and was made successful through the production of the yarns before referred to. This establishment now employs nine hundred operatives, and is distinguished for its perfection in Jacquard weaving. At first, eighty per cent. of the broad silks made was used for ladies' ties. In 1872 other firms entered into broad-silk weaving. The increase in the number of looms was followed by variety in production, until, as at present, there is scarcely a product of European looms in millinery, and even the highest class of dress-silks, which does not find its rival in the Paterson factories.

The command of skilled labor, the admirable water-power, the vicinage to the metropolis, and, above all, the well-known advantages of centralizing the manufacturers in a special department of a textile industry, have led several important silk-manufacturers, first located in Boston, Williamsburg, Schoharie, New York, and New York City, to transfer their establishments to Paterson.

A prominent advantage of centralizing manufacturing establishments is the opportunity given for specializing certain departments of industry. This is shown at Paterson in the great success attained in an essential branch of the silk-manufacture,—that of dyeing. The concentration of silk-manufactures at this place has produced the largest and most perfectly appointed dyeing establishment in the country, in which a large part of the fabrics produced in Paterson are dyed on commission. The proprietors of this establishment, Messrs.

Weidmann & Greppo, educated in Europe, and related to eminent dyers in Lyons and Switzerland, have introduced the best processes and machinery known abroad. One group of machines just introduced for stringing and shaking the yarns, for the purpose of straightening and stretching them after being dyed, does with three or four men what formerly required the severe labor of sixty stout men. Their relations with Lyons and Zurich keep them promptly informed as to the latest improvements and fashions. Their exhibit of dyed silks was one of the most attractive, and that of black weighted silks was one of the most instructive, at the Exhibition. Four years ago the dyers of Paterson held that it was impossible to perfectly dye pure black silks in their establishments, on account of supposed defects in the water of the place. A dye is now given in black dress-silks fully equal to the celebrated black dyes of St. Chaumont, near Lyons. The American dyers of black silks refrain from the reprehensible practice of European manufacturers of heavily weighting their black silks by means of chemicals. It is said that the average of French black silks are weighted as high as one hundred per cent. The weighting may be carried, without detection by the eye, as high as three hundred per cent.; but very brief wear reveals the deception. It is by no means claimed that there is higher morality on the part of American manufacturers. But the sins of the producer for a domestic market fly back to him so promptly and certainly, in the form of reclamations, that interest compels honest fabrication.

“Dyeing,” said the immortal Colbert, “is the *soul* of tissues, without which the body could scarcely exist.” This is especially true of silks: the attainment of the arts of perfect dyeing is the overcoming of the last obstacle to a successful manufacture. Fashion, constant only in change, is perpetually varying her demand for new colors, hues, and tones. She is inexorable even as to the most delicate shades. A ribbon or dress-silk may become absolutely unsalable, at any moment, by a change of fashion. Hence the advantages which Paterson enjoys in the perfection of her dyeing establishments, and of a taste instructed by a vicinage to the great metropolis. The taste of the present times, it may be observed, demands the almost exclusive use of aniline dyes in colored silks. They are more vivid and enduring on silk than on any other raw material, and, though still comparatively fugitive, are no more so than the fashions. Black, brown, and drab are almost the only colors for which anilines are not used.

To recur to the more general features of the silk-industry of Paterson. Its importance is shown by the facts obtained from the

report of its Board of Trade of 1876: number of operatives, 8000; amount of silk used each week, 9000 pounds; number of ribbon-manufacturers, 8; number of broad-silk factories, 6; and about 150 hand-loom, worked by men in their own homes. Most of the spinners use their own silks. The average wages of men weavers per week, \$15; women and boys, \$7. The value of the total production yearly is about \$6,000,000.

We have dwelt at length upon the silk-industry of this city, because it is representative of its class. Important manufactories of woven silks, broad goods, and ribbons are found in West Hoboken and Union, in New Jersey, and in New York City: such as those of Herman Simon, in Union; Givernaud Brothers, in West Hoboken; John N. Stearns & Co., and J. Silbermann & Co., in New York City, etc. All the silk-manufacturing establishments of New York and New Jersey, including those of Paterson, may be said to be manufacturing appendages of the city of New York. The manufacturers nearly all have their warehouses and partners in the city, or visit it daily, and the goods are dispatched each day to the city sale-rooms. Some were originally importers of silk goods; others still continue importing in connection with their manufacturing operations. Thus a knowledge of the wants of the trade, of the changes of fashions, of the coming styles, is secured, which would be unattainable except through the influences of a great metropolis.

A few words may be given to some of the improvements made in the silk fabrication, which may be observed in the centre of manufacture now under review. Machinery for throwing has recently been introduced at Paterson, by which a spindle which formerly made three thousand five hundred revolutions per minute now makes seven thousand, doing its work as well as that more slowly revolving. It is claimed that these machines, some of which contain nearly seven hundred spindles, are capable of producing double the amount of work per spindle than can be done with the largest European frames; and that they can be managed by two attendants, one on each side. Winding, which ten years ago cost by piece-work one dollar per pound, costs now forty-five cents; the girls earning more than at old prices before the improvements. A new Swiss machine, just introduced, reduces the cost of warping from ten cents to five cents. The old machines, moved by hand, contained eighty bobbins; the new one, moved automatically, contains three hundred. A new loom for weaving hat ribbons makes two hundred and fifty shots in a minute; each loom is independent, making from thirty-six to fifty yards per day, and one girl tends eight looms.

But the most notable improvement is the absolutely successful achievement of weaving the very highest class of dress gros-grains, black and colored, by power. This has been accomplished by the Messrs. Simon, at Union, New Jersey, about fifteen miles from Paterson. Mr. Simon, educated as a civil engineer in the technical schools of Europe, has combined the various improvements observed by him abroad and in this country into an automatic loom; upon which, with the attendance of a boy of twelve or fourteen years old, sixteen yards of broad gros-grain silks may be woven per day,—the cost being eleven cents per yard. The production of eighty looms in this establishment has this average. We are assured that no first-class goods are woven abroad by power. These goods can therefore be made more cheaply here than at Lyons. These looms, with their products, won the admiration of our associate, Mr. Gebhard, who remarked “that he had never seen such goods made upon power-looms, and had no idea that such work could be performed automatically.”

SILK BRAIDS, TRIMMINGS, AND LACES.—This department of the silk-manufacture employed in 1876 two thousand seven hundred and fifty-three operatives; more than three-fifths were women. The founder of this branch of industry in the United States—if, indeed, he may not claim to be the pioneer of the industry as a whole—was William H. Horstmann, who, having learned the trade of silk-weaving in France, established himself in Philadelphia, in 1815, as a manufacturer of silk trimmings. In 1824 he introduced from Germany the use of plaiting- or braiding-machines; and, in 1825, the use of the first Jacquard loom employed in this country. By means of the various improvements introduced by him and his successors, his sons and grandsons, the house of William H. Horstmann & Sons has become one of the largest in the silk-manufacture now existing in this country. Its vast warehouses and sale-rooms in Philadelphia bewilder the eye with the number and variety of fabrics; including, indeed, the whole range of narrow textile fabrics,—bindings, braids, fringes, dress trimmings, coach and military equipments, theatrical goods, gold and silver laces, and embroideries. Two other large houses in Philadelphia, viz., J. C. Graham and Homer, Colladay, & Co., vie with the older house in the production of this class of goods. Their houses were established about 1850. These manufacturers have most contributed to give Philadelphia its reputation as the chief seat of the general manufacture of trimmings in the United States. In New York, the present house of J. Maidhoff & Co. was established in the manufacture of dress trimmings in 1849. In this city, Louis Franke is also prominently identified with the manufacture of silk fringes,

cords, and tassels. In Connecticut, Tobias Kohn, of Hartford, now president of the Novelty Weaving and Braid Works, established the manufacture of gimps, fringes, and tassels as early as 1848. An expert in this department of the silk fabrication observes that "the home manufacturers so fully supply the demands for the dress-trimming trade that there are very few colored dress and cloak trimmings imported. The variety of patterns for sale at the trimming-stores is so great that ladies find no difficulty in perfectly matching the color of their dresses. While thus meeting all the requirements of taste, the American fringes and trimmings are in general of the best material. Being made of pure silk, they will usually outlast the garment they ornament. They contrast in this respect with imported goods of similar appearance, but made from inferior silk, and hence apt to fade by exposure, or to wear out and fall off. Greater care in the processes by which they are made has also contributed to the notable superiority of American trimmings."

The manufacture of silk laces by means of the most modern and approved European machinery has been undertaken on a large scale, with high success, by A. G. Jennings, of the Nottingham Lace-Works, Brooklyn, New York; the machines made in England having cost over one hundred thousand dollars. The products of the works are principally silk guipure laces, and black thread and silk blonde laces for trimmings, Brussels spot-net and grenadine veilings, silk purling for trimmings, and silk-lace ties and scarfs. It is claimed that the lace goods are superior to those ordinarily imported, from being made of pure silk. The exhibit of these goods at Philadelphia received an award for excellent fabrication, and for "illustrating an important manufacture just introduced into the United States by the exhibitor."

GENERAL OBSERVATIONS.—Having considered the characteristics of the three leading departments of the silk-manufacture in this country, our remaining observations must apply to the industry as a whole. It is believed that, as a whole, American silk machinery, in efficiency, is equal, and in some respects superior, to that abroad. As to our fabrics, first in acknowledged excellence are our machine-twists and sewing-silks, articles of first necessity in the manufacture of boots, shoes, and clothing, and in the household economy of every home. The machine-twists are produced of such quality and at such prices as entirely to prevent the importation of foreign twists, and sewing-silks are imported only to satisfy the lingering prejudice against domestic productions. Our spun-silk fabrics have no foreign rivals, in quality and prices. In ribbons, we supply two-thirds of the demand of our own market, and in plain goods can fairly compete in quality with the

products of St. Etienne. In trimmings, even with their infinite diversity, there is no article made abroad which is not or may not be reproduced here. In broad silks, each of the last five years has seen the achievement of some new fabric, advancing from millinery to dress silks, overcoming all the difficulties of Jacquard weaving, and thence to brocade and damask silks. Our manufacturers have in the last year seen accomplished, on a large scale, the fabrication of colored and black gros-grain dress-silks, which are pronounced, not by the makers, but by rival manufacturers, to be absolutely equal in quality, while cheaper in price, to the very best imported silks. We are still, however, far from the position in the silk-manufacture to which we should aspire. In the higher fabrics, we are wanting in originality and a national character of design. The widest field for artistic work, that of the fabrication of upholstery stuffs, is almost wholly unexplored. We have made no bolting-cloths, have done nothing in velvets, and still allow the silk plushes for hats (so enormously consumed here) to be made abroad. With all the excellences of our machinery, we are too dependent upon foreign workmen for skill in manipulation. Technical and art schools, which shall develop native taste and skill, can alone give a national character to the higher fabrics of this industry.

These general observations cannot be more appropriately closed than by a summary of the American production, as furnished by that model industrial institution, the Silk Association of America:

VALUE OF PRODUCTS, CLASSIFIED BY ARTICLES, MANUFACTURED IN THE YEAR ENDING DECEMBER 31, 1876.

| | Pounds. | Value. |
|------------------------------------|---------|-------------|
| Tram | 369,132 | \$2,768,490 |
| Organzine | 184,567 | 1,614,961 |
| Spun silk | 140,000 | 805,000 |
| Fringe-silk | 33,862 | 203,172 |
| Floss-silk | 5,488 | 35,428 |
| Sewing-silk | 82,895 | 951,460 |
| Machine-twist | 468,916 | 6,301,059 |
| Dress goods . . . . . | ..... | 1,350,535 |
| Millinery and tie silks . . . . . | ..... | 1,679,166 |
| Women's and men's scarfs . . . . . | ..... | 119,946 |
| Handkerchiefs . . . . . | ..... | 927,000 |
| Foulards . . . . . | ..... | 472,000 |
| Ribbons . . . . . | ..... | 4,526,556 |
| Laces . . . . . | ..... | 220,000 |
| Coach laces . . . . . | ..... | 24,500 |
| Veils and veiling . . . . . | ..... | 16,518 |
| Silk hose . . . . . | ..... | 3,200 |
| Braids and bindings . . . . . | ..... | 315,000 |

| | Pounds. | Value. |
|---|-----------|--------------|
| Military trimmings . . . . . | ..... | \$28,000 |
| Upholstery trimmings . . . . . | ..... | 526,036 |
| Ladies' dress trimmings . . . . . | ..... | 3,705,076 |
| | <hr/> | <hr/> |
| Total products, 1876 | 1,284,860 | 26,593,103 |
| | <hr/> | <hr/> |
| | Pounds. | Value. |
| Reeled silk consumed | 1,144,860 | \$11,874,570 |
| Spun silk consumed | 140,000 | 805,000 |
| | <hr/> | <hr/> |
| Total silk threads | 1,284,860 | 12,679,570 |
| Consumed in sewings and twist | 551,811 | 7,252,519 |
| | <hr/> | <hr/> |
| Consumed in weaving | 733,049 | \$5,427,051 |
| | <hr/> | <hr/> |
| | | \$13,913,533 |

THE AMERICAN EXHIBITS OF SILK.—Although much material furnished by the Exhibition has been incorporated in the preceding pages, the features of the display of products of the silk-industry at the Exhibition demand a special notice.

The position accorded to the American silk exhibits was an exceedingly advantageous one. Instead of being thrust on one side or into a corner, it had the post of honor at the east end of the Main Building, on the central aisle; and thus naturally attracted the first attention of the visitors who made a systematic survey of the Exhibition. The show-cases in which the goods were displayed exhibited the good taste so peculiarly requisite in this industry. Although various in construction and ornamentation, there was a general resemblance, which gave agreeable unity to the display. Inside the cases some of the goods (as those of spooled silk) were arranged in architectural devices, giving the effect of towers, domes, and arches. In others, the richness of fabrics alone sufficed to give brilliancy to the displays. The arrangement of the dyed silks, so as to give prismatic effects, was peculiarly attractive. No visitor could fail to feel that, if this exhibit had been wanting, the American display of textiles would have lost its chief charm, and American patriotism one great source of its complacency. In Machinery Hall, and in the Women's Pavilion, different processes of the silk-manufacture were illustrated, on a large scale, by several different manufacturers. The actual operations of reeling, twisting, spooling, and weaving—in some cases by the Jacquard attachment—gave delight and instruction to curious throngs. The newest American machinery—especially the "two-decker" spinning-frame, constructed by the Danforth Locomotive & Machine Company, containing winder, doubler, spinner, and reeler in one—attracted the admiration of experts.

These exhibits were equally surprising to foreign visitors and to

our own people. High tributes have already come back to us from abroad: the French publicist, Jules Simonin; the Swiss Commissioner-General at the Exhibition; and a well-instructed writer in a paper published in Macclesfield, the headquarters of the English silk-industry,—having pointed out the exhibits at Philadelphia as proofs of the competition which their countrymen must expect in this country.

Having given the names of the principal foreign exhibitors in this department, we cannot do less for our own countrymen. In describing the exhibits, to avoid any possibility of error, the writer has adopted substantially the language of the official awards. The exhibitors are grouped according to the departments they pursue, and are named irrespectively of merit,—no numerical scale of excellence being admitted by the rules of the Exhibition:

J. H. HAYDEN & SON, *Windsor Locks, Conn.*

Slack and medium twist, of great brilliancy, strength, and regularity.

M. HEMINWAY & SON, *Watertown, Conn.*

Machine- and sewing-silks, perfect in quality of material, color, and workmanship.

HOLLAND MANUFACTURING CO., *Willimantic, Conn.*

Machine-twist and sewing-silks; highly meritorious for the excellent quality of raw material, and the preparation for the various purposes.

SEAVEY, FOSTER, & BOWMAN, *Boston, Mass.*

Sewing-silks, of great uniformity and general excellence.

BELDING BROTHERS & CO., *Rockville, Conn.*

Machine- and sewing-silks, of good color, strength, smoothness, and quality.

AUB, HACKENBURG, & CO., *Philadelphia, Pa.*

Sewing- and embroidery-silks, meritorious for great beauty and brilliancy of color; button-hole twist and saddler's silk highly commendable.

NONOTUCK SILK CO., *Florence, Mass.*

Sewing-silks and machine-twist; great superiority as to strength and regularity, evincing extreme care in the manufacture.

S. M. MEYENBERG, *Paterson, N. J.*

Millinery silks and upholstery satins, of superior quality and finish; ladies' scarfs, of excellent color and design.

JOHN N. STEARNS & Co., *New York, N. Y.*

Brocade silks, of superior styles and quality; twilled silks, well made, and meritorious in every respect.

DEXTER, LAMBERT, & Co., *Paterson, N. J.*

Millinery silks, well made, and of good colors; brocade silks, of excellent manufacture.

CHENEY BROTHERS, *Hartford and South Manchester, Conn.*

Spun silk, in every form, perfectly manipulated; piece goods and ribbons made thereof, evincing a high degree of excellence.

NEW YORK WOVEN LABEL MANUFACTURING COMPANY, *New York, N. Y.*

Woven silk labels and *fac-simile* of signature of Declaration of Independence, of good execution.

FREDERIC BAARE, *Paterson, N. J.*

Black figured silks, made in an improved and superior manner; millinery goods, of good manufacture.

HAMIL & BOOTH, *Paterson, N. J.*

Figure, dress, and millinery silks, plain satins, serges, and silk ribbons, of excellent manufacture and material.

WERNER, ITSCHNER, & Co., *Philadelphia, Pa.*

Faille, fancy, and Jacquard ribbons, of very good manufacture both as to color and combination of material.

B. B. TILT & SON, *Paterson, N. J.*

Brocade silks and handkerchiefs, of superior quality and workmanship.

WILLIAM STRANGE & Co., *Paterson, N. J.*

Plain and fancy ribbons, of good materials, well made in every respect; silk and millinery ribbons, of great beauty and superior quality.

LOUIS FRANKE, *New York, N. Y.*

Silk fringes, dress trimmings, and tassels, of the best material, excellent in style and manufacture.

SUTRO BROTHERS, *New York, N. Y.*

Braids of great regularity and excellent manufacture.

DALE MANUFACTURING COMPANY, *Paterson, N. J.*

Silk and mohair braids, fancy cords and trimmings, of great beauty and excellent workmanship.

WILLIAM H. HORSTMANN & SONS, *Philadelphia, Pa.*

Dress, carriage, and upholstery trimmings, of great excellence and beauty in style, material, and execution.

A. G. JENNINGS, Nottingham Lace Works, *Brooklyn, N. Y.*

Guipure, cashmere, and other lace and trimmings and net goods, of excellent fabrication.

WEIDMANN & GREPPO, *Paterson, N. J.*

Black and colored dyed silk; compares well with the production of the best European establishments.

EXHIBITS OF AMERICAN COCOONS AND RAW SILK.—Although we have waived the consideration of the foreign products of raw silk, the only two American exhibits of this material were so interesting and instructive that they deserve an extended notice. While the silk-culture has ceased in all the older States, it has recently been attempted, with sanguine hopes of success, in California and Kansas.

The planting of mulberries for the feeding of silk-worms was first undertaken at San José, California, in 1856, by M. Prevost, a botanist from Normandy, France; but the public attention was then so occupied with gold mining that the trees were unsalable, and M. Prevost abandoned their culture. A small number of trees was also planted by a Swiss gentleman,—M. Mueller, of San José,—who, in 1861, imported a few silk-worm eggs. The worms raised were fed upon the trees before planted, and the results obtained were so excellent as to revive the interest of M. Prevost, who recommenced the planting of mulberries and raising of silk-worms, which he continued until the time of his death, in 1869; he having in the mean time distributed

silk-worm eggs, gratuitously, to persons in various parts of the State. The interest in sericulture thus became so general in the State that the Legislature of California provided by law that a bounty of \$250 should be paid for every 5000 newly-planted mulberry-trees, and \$300 for every 100,000 cocoons produced in California. The object of the law was defeated by the planting by speculators, for the bounty, of several millions of the worthless *multicaulis* mulberry, and the law was repealed. In 1866, Mr. Joseph Neumann, of German birth, imported machinery for the fabrication of silk, and invented a reeling-machine for winding the raw silk from the cocoons. In 1867 he reeled the first skein of raw silk produced in California. In 1869 he produced 130 pounds of raw silk, and made from it two large flags,—one of which he presented to the State, and the other to the National Government. Meeting, like most pioneers, with but little commercial success in his attempts to manufacture silk, he finally abandoned the fabrication for the production and reeling of raw silk. His very large exhibit of cocoons and raw silk, and his exhibition of worms feeding and in different stages of growth, attracted great interest, and received from the expert Judges the following award: "A very good collection of cocoons and raw silk, of a variety of races, highly commendable for the successful attempts in the introduction of this important branch of industry."

The statements made by Mr. Neumann to the Judges, in regard to inducements for sericulture in California, were so interesting and important that they deserve a wider publication.

He regards California as better adapted for the silk-culture than almost any country in the world. He said, in regard to climate, that—

"The mulberry-trees in most parts of the State grow ten months in the year (from February to the end of November); so that worms can generally be fed uninterruptedly. Spring, summer, and fall are uncommonly dry, consequently the food of the worms is dry. The mulberry-tree throws out new branches and leaves four times a year, and worms can be fed from the fifteenth day with branches. In some localities in California trees five years old surpass those of fifteen years in Europe. The leaves are much larger, also, and one can gather six or eight times as much as in Europe in the same time. Thunder-storms do not occur during the feeding-season, and the worms consequently are not disturbed. The dryness of our atmosphere prevents the remains of the leaves which the worms do not consume from decaying, and the beds need not be cleaned more than twice in a season. We have proved that the cocoons enlarge from year to year."

In Kansas, sericulture has been attempted by E. V. de Boissiere, a French gentleman of means, who has set his heart upon surrounding his chosen home with a colony of operatives employed in the silk-culture and manufacture. He has built a mill for the manufacture of silk goods, and is confident that the silk to supply it will be produced in his neighborhood. His exhibits of raw silk and cocoons at Philadelphia were conclusive as to the favorable influences of the soil and climate of Kansas for sericulture. The remarkable character of the cocoons exhibited by M. de Boissiere so much impressed Mr. Le Boutillier, one of the American Judges of silk in Group IX., that he requested Mr. Hayami Kenzo, of Japan, a member of the group specially expert in raw silk, to give him his personal observations. Mr. Kenzo thus replies, in a note to Mr. Le Boutillier, now before the writer :

“Having examined the cocoons from Kansas, we marked them as good as the best cocoons from France, Italy, and Japan. Having a doubt as to the correctness of our judgment, I looked them over again with great care, and came to the same conclusion as we had before. I suppose the mulberry-trees are cultivated in very rich soil, and, being not so old, are especially suited for feeding silk-worms. The chrysalids are large and healthy, and several have been almost entirely transformed into butterflies. The best silks in good weights will be obtained from these cocoons.”

It is obvious that a protective duty on raw silk for the general encouragement of sericulture in this country would not be justified. The culture offers no prospects of success, except in a few favorable localities; and a duty on the raw material would be oppressive to the manufacture. The question of encouraging the silk culture by legislative provisions addresses itself only to the governments of the States which are specially adapted by soil and climate to this culture. The American Judges in Group IX. were so impressed by the exhibits and facts presented by Mr. Neumann and M. de Boissiere, that they were prepared to indorse memorials which might be addressed by these gentlemen to Legislatures of their respective States, asking for bounties on silk productions. The members of the group, however, separated without taking more definite action in this matter.

In concluding the report on wool, we gave the yearly production throughout the world. We cannot do less for the more costly material. The following statement, prepared by Mr. Franklin Allen, is believed to be a near approximation to the yearly production of raw silk in the several silk-producing countries of the world at the present time :

| | |
|------------------------------------|---------------|
| China and Chinese Empire | \$92,928,000 |
| Japan | 19,800,000 |
| Persia, Turkistan, etc. | 6,250,000 |
| Syria and Asia Minor | 8,500,000 |
| Italy | 59,250,000 |
| France | 31,246,800 |
| Turkey in Europe | 7,920,000 |
| Spain and Portugal | 1,884,000 |
| Greece | 1,087,000 |
| Morocco | 300,000 |
| Austria-Hungary | 3,087,600 |
| India | 35,200,000 |
| America | 100,000 |
| | \$267,553,400 |

... will be obtained from these cocoons. ... It is obvious that a protective duty on raw silk for the general encouragement of sericulture in this country would not be justified. The culture offers no prospects of success, except in a few favorable localities; and a duty on the raw material would be oppressive to the manufacturer. The question of encouraging the silk culture by protective provisions addresses itself only to the government of the States which are specially adapted by soil and climate to this culture. The American judges in Ghent, N. Y. were so impressed by the exhibits and facts presented by Mr. Newman and Mr. de Boisserie that they were prepared to induce memorials which might be addressed by these gentlemen to Legislatures of their respective States, asking for bounties on silk productions. The members of the group however, acquiesced without taking more definite action in this matter. In conducting the report on wool, we gave the yearly production throughout the world. We cannot do less for the more costly material. The following statement, prepared by Mr. Franklin Allen, is believed to be a near approximation to the yearly production of raw silk in the several silk-producing countries of the world at the present time:

REPORTS ON AWARDS.

GROUP IX.

1. M. G. Diena, fu Jacob, Spilimberto, near Modena, Italy.

SILK COCOONS AND RAW SILK.

Report.—A very fine exhibit of cocoons; also very elastic and clear grèges of great beauty.

2. E. Meyer & Co., Milan, Italy.

RAW SILK.

Report.—Raw and thrown silks, of remarkable quality, both as to regularity, purity, and elasticity.

3. Ibrahim Bogdanof-Teregoulof, Tiflis, Russia.

SILK COCOONS.

Report.—A variety of silk cocoons, principally of new races, showing great care, and worthy of commendation for successful efforts in introducing this new branch of industry.

4. E. V. de Boissiere, Williamsburg, Kansas, U. S.

SILK COCOONS.

Report.—Commended for successful attempts to raise silk-worms, and for cocoons of good quality.

5. Baumann Aelter & Co., Zurich, Switzerland.

SILKS.

Report.—Commended for a high degree of perfection as to texture, regularity, beauty, and finish in fine goods.

6. Antonio Pascual & Co., Reus, Tarragona, Spain.

BLACK SILKS.

Report.—Black silks of good manufacture, color, and finish.

7. Sons of Oñate, Valencia, Spain.

RAW SILK AND COCOONS.

Report.—An excellent assortment of silk cocoons and raw silk, entitled to the highest commendation.

8. Faustino Martinez, Seville, Spain.

RAW SILKS.

Report.—A very good show of cocoons; also excellent raw silk of great purity and elasticity.

9. Emelianof & Rochefort, Moscow, Russia.

SILK AND WOOL DRESS GOODS.

Report.—A fine assortment of fancy dress goods, silk and wool, in rich qualities and tasteful combinations.

10. Zolotaref & Ribakof, Moscow, Russia.

WORSTED AND SILK DRESS GOODS.

Report.—A great variety of fancy dress goods of worsted and silk, in very tasteful styles and at moderate prices.

11. A. & W. Sapojnikoff, Moscow, Russia.

DAMASKS OF SILK AND SILVER AND GOLD.

Report.—A superb display of the richest silk and gold and silver brocades, unrivaled in every respect.

12. Sergius Zoobkof, Khomootovo, Moscow, Russia.

PLAIN SILKS.

Report.—Colored failles of rich quality, excellent material, and great brilliancy; high degree of merit.

13. Alexis Fomitchef, Moscow, Russia.

SILKS.

Report.—Rich figured failles and silk cashmeres of great beauty and taste.

14. Pokrovsky Sisterhood of Charity, Moscow, Russia.

SILK COCOONS.

Report.—A good display of silk cocoons of fine quality.

15. Kondrashef Brothers, Grebenevo, Moscow, Russia.

SILK GOODS.

Report.—Commended for plain black and colored failles, excellent in color and manufacture; also for very well made upholstery damasks.

16. J. H. Van Bellingen & Max Suremont, Antwerp, Belgium.

BLACK SILKS.

Report.—Commended for superiority of manufacture, fast colors, and splendid effects.

17. Woldemar Wimmer, Annaberg, Germany.

GOLD AND SILVER BRAIDS.

Report.—A very creditable assortment of silk and gold braids and galoons.

18. Escales & Hatry, Saargemünd, Germany.

BLACK SILK PLUSHES.

Report.—Hatters' black silk plushes of remarkable perfection in color and finish.

19. Gressard & Co., Hilden, Germany.

SILK FOULARDS.

Report.—A superb assortment of well-finished foulards and handkerchiefs.

20. Carl Mez & Sons, Freiburg, Baden, Germany.

SEWING SILK.

Report.—An assortment of colored and black sewing silk, of great brilliancy in color and finish.

21. Farriols & Son, Barcelona, Spain.

BLACK SILKS.

Report.—A great variety of black cashmere silks in fine grades, of excellent manufacture in every respect.

22. Benito Malrehy, Barcelona, Spain.

SILK DAMASKS AND BROCADES.

Report.—A great variety of curtain and furniture silk damasks, brocades, and trimmings, of good colors and excellent manufacture.

23. Eduardo Reig & Co., Barcelona, Spain.

SILK CRAVATS AND FICHUS.

Report.—Good assortment of silk neck-handkerchiefs, well made, and very effective for the price.

24. S. Rüttschi & Co., Zurich, Switzerland.

SILK GOODS.

Report.—Black and colored fabrics at very moderate prices, showing great care in the manufacture; the satin du chene particularly well made.

25. Ryffel & Co., Stæfa and Zurich, Switzerland.

SILKS.

Report.—The marcelines (satinets) exhibited are superior in texture, color, and finish, and can scarcely be excelled.

26. Emil Schærer & Co., Zurich, Switzerland.

SILKS.

Report.—Commended for good taste in style and coloring, and for stripes which are very regular in the manufacture, and show great progress.

27. J. Schwarzenbach-Landis, Thalweil, near Zurich, Switzerland.

SILKS.

Report.—Colored failles and changeables of great regularity and beauty, at moderate prices, well adapted for the best markets.

28. Joh. Stapfer's Sons, Horgen, Zurich, Switzerland.

SILKS.

Report.—An exhibit of great merit, evincing considerable progress in the manufacture of plain, striped, and checked silk goods of perfect taste, at low prices.

29. Stünzi & Sons, Horgen, Zurich, Switzerland.

SILK GOODS.

Report.—Cotton-back satins, which in price compare favorably with the best products of other countries.

30. Jansen, Bodek, & Hertz, Riesbach, near Zurich, Switzerland.

SILK GOODS.

Report.—Good styles of cravat materials at low prices.

31. Y. Tamamura, Ishi-i-mura, Shimodzuke, Japan.

RAW SILK.

Report.—Very good specimens of raw silk of excellent quality, carefully prepared.

32. M. Marunaka, Kanazawa, Kaga, Japan.

RAW SILK.

Report.—Very superior raw silk.

33. Yo. Suzuki, Yamura, Kai, Japan.

PLAIN SILKS.

Report.—Plain, colored, and checked silks, well woven and of good appearance.

34. Yamamoto Kinu, Susakamura, Shinano, Japan.

SILKS.

Report.—Two productions of silks made from the cocoons of new silk-worms feeding on the native walnut; highly interesting.

35. Y. Nakagawa, Kiyoto, Japan.

SILK CRAPES.

Report.—Excellent specimens of white silk crapes, perfect in color, and of great solidity.

36. S. Nishimura, Kiyoto, Japan.

SILK CRAPES.

Report.—Dyed and printed silk crapes, excellent in color and execution, principally the shaded specimens.

37. Y. Shibata, Hakata, Chikusen, Japan.

SILK GOODS.

Report.—Silks for ladies' scarfs, of perfect manufacture.

38. S. Tomita, Kiyoto, Japan.

GAUZES.

Report.—Well-made silk gauzes, commendable for their low price.

39. Captain Luiz Ribeiro de Souza Rezende, Rio de Janeiro, Brazil.

RAW SILK AND COCOONS.

Report.—A variety of specimens of cocoons and raw silk, of great beauty and excellence, both as to the nature of the silk and its preparation, and meriting high commendation for the introduction of this important branch of industry.

40. Antonio Luiz dos Santos Reis, Piratinim, Brazil.

RAW SILKS.

Report.—Commended for successful experiments in raw silks.

41. H. Kono, Chikuma-Ken, Japan.

SILKS.

Report.—Samples of silk, natural color, from the silk of the worm feeding on the oak; new and very remarkable.

42. Dr. Nicolau J. Moreira, Rio de Janeiro, Brazil.

SILK COCOONS.

Report.—A highly curious specimen of a new silk-worm feeding on forest trees.

43. David José da Silva & Son, Oporto, Portugal.

DAMASK OF SILK AND GOLD.

Report.—Gold and silver damasks, for church purposes and upholstery, of good design and excellent manufacture.

44. Viuva Ferreira Campos & Co., Oporto, Portugal.

GOLD BROCADES AND MILITARY TRIMMINGS.

Report.—Gold brocades, and silk and silver cloth, in good taste and of excellent manufacture; gold and silver military trimmings in great variety, and well made.

45. Jacintho P. Valverde Miranda Vasconcellos, Oporto, Portugal.

RAW SILK.

Report.—Raw silk of excellent quality in every respect.

46. F. Cabral Paes & Sons, Vizeu, Portugal.

RAW SILK AND COCOONS.

Report.—Very fine silk cocoons, and silk spun thereof; quality and preparation highly commendable.

47. José Antonio Reis, Moncorvo, Bragança, Portugal.

RAW SILK.

Report.—Raw silk of great fineness, excellent spinning, and general effect.

48. Simão Ribas, Guarda, Portugal.

RAW SILK.

Report.—A fine exhibit of very well spun tram, of great pureness and tenacity.

49. Antonio de Sa Pereira, Sta. Maria, Bragança, Portugal.

RAW SILK.

Report.—Raw silk of excellent quality, as to the natural tenacity, and of very regular preparation.

50. National Silk Spinning and Weaving Co., Lisbon, Portugal.

RAW COCOONS AND SILK UPHOLSTERY GOODS.

Report.—A very fine show of silk cocoons; also raw silk of excellent quality and silk upholstery goods of good manufacture and excellent design.

51. S. Trebitsch & Son, Vienna, Austria.

BLACK SILKS AND CRAVATS.

Report.—Black silks and silk cravats, well made, of good color and appearance, and from their low price adapted for a large consumption.

52. Carl Hetzer & Sons, Vienna, Austria.

SILK VELVETS.

Report.—Black and colored silk velvets, cotton back, made two pieces together, of good manufacture and excellent result.

53. C. G. Hornbostel & Co., Vienna, Austria.

SILKS AND SILK AND COTTON GOODS.

Report.—Fancy silks and mixed fabrics of good design and effect.

54. F. Reichert's Sons, Vienna, Austria.

SILK VELVETS AND SILK GOODS.

Report.—Colored and black velvets and silks of excellent manufacture; specialty of white velvet of great purity.

55. Filippo Dalla Pozza, Vicenza, Italy.

RAW SILK.

Report.—Very fine and well-spun raw silk, very clean, and of great tenacity and elasticity.

56. Ugolino Chiericoni, Messina, Italy.

SILK COCOONS.

Report.—Silk cocoons of great beauty and superb quality.

57. Leopoldo Cagliani, Milan, Italy.

SILK VELVETS.

Report.—Silk colored velvets of good color and very creditable manufacture.

58. Alberto Keller, Milan, Italy.

RAW SILK.

Report.—Raw silk of great superiority in every respect.

59. Erede Salomon Sinigaglia and Lattes, Turin, Italy

RAW SILK.

Report.—An excellent show of raw silk of remarkable purity, perfect in preparation.

60. Madame Elbis, Constantinople, Turkey.

SILK EMBROIDERY.

Report.—Curiously-wrought silk embroidery, showing great skill and taste.

61. Nicholas Bolad, Damascus, Turkey.

STRIPED AND FIGURED SILKS.

Report.—Striped and figured silks, of good taste in good colors and combination of materials.

62. Emanuel G. Marridas, Kiopler, near Brousse, Turkey.

RAW SILK.

Report.—A remarkable display of white and yellow raw silk of great beauty and tenacity.

63. Gondard, Cirlot, & Martel, Lyons, France.

FOULARDS.

Report.—Commended for the elegance of design, brilliancy of colors, and general good taste of printed foulards.

64. E. P. Schilizzi, Adrianople, Turkey.

RAW SILK.

Report.—Very fine, clean, and strong white and yellow raw silk.

65. Merouk Oglou, Brousse, Turkey.

SILK GOODS.

Report.—Very well made, and of good texture.

66. Hu Kwang Yung, Hang Chow, China.

PLAIN SILKS.

Report.—Plain colored satins of excellent manufacture and superior finish.

67. K. A. Almgren, Stockholm, Sweden.

SILKS.

Report.—Colored failles, very well made from the best material, and of brilliant lustre.

68. Fy Cheong, Canton, China.

FANCY AND PLAIN SILKS.

Report.—A very fine exhibit of colored and figured silk goods, showing marked improvements over former productions.

69. Hadji Hakim Brothers, Aleppo, Turkey.

SILK GOODS.

Report.—White and gold damask of beautiful workmanship.

70. Imperial Silk Manufactory of Hieréké, Turkey.

SILK FABRICS.

Report.—A superb display of rich brocade silks, excellent in design, color, and execution.

71. Estate of Bir-Abu, Bellach, Egypt.

SILK COCOONS.

Report.—An exhibit of cocoons of great beauty and excellent nature of silk.

72. Giovanni Tramontina, Cairo, Egypt.

RAW SILK AND COCOONS.

Report.—A fine exhibit of cocoons and specimens of raw silk of great regularity and tenacity, commendable especially on account of the difficulties of this new branch of industry.

73. Audibert, Monin, & Co., Lyons, France.

SILKS AND POPLINS.

Report.—Well-made black Siciliennes of great regularity and beauty of texture.

74. Jandin & Duval, Lyons, France.

FOULARDS.

Report.—A great display of plain, figured, and printed foulards, elegant in design, taste, and execution.

75. J. P. Million & Servier, Lyons, France.

SILK GOODS AND VELVETS.

Report.—Commended for superiority of manufacture of black silk velvets and colored silk goods.

76. Alex. Giraud & Co., Lyons, France.

SILK GOODS.

Report.—Umbrella silks, of good color and manufacture.

77. Gillet & Son, Lyons, France.

DYED SILKS.

Report.—Fine assortment of black-dyed silk, of superior shade and excellent workmanship; can scarcely be excelled.

78. Thomas Brothers, Avignon, France.

RAW SILK.

Report.—Bright China tram and organzine, of very good quality and excellent preparation.

79. Jules Chabert & Co., Chomerac (Ardèche), France.

RAW SILK.

Report.—Commended for French tram of great regularity and remarkable elasticity; also for Bengal organzine of excellent preparation.

80. Louis Boudon, Saint-Jean-du-Gard, France.

RAW SILK.

Report.—A remarkable exhibition of white and yellow raw silk, of extraordinary fineness, purity, and great regularity.

81. Arlès-Dufour, Lyons, France.

RAW SILK.

Report.—A fine assortment of French raw silks of great beauty, and China organzine of great regularity and neatness.

82. Jurie & Co., Lyons, France.

VELVETS AND SILKS.

Report.—A great variety of very well made black and colored plain silk velvets and dress silks.

83. Antoine Guinet & Co., Lyons, France.

BLACK SILKS.

Report.—Black silks, very effective in appearance, in low and medium grades.

84. J. Boquet & Co., Amiens, France.

SILK VELVETS.

Report.—Utrecht velvets in fine qualities and beautiful colors.

85. Weidmann & Greppo, Paterson, N. J., U. S.

DYED SILK.

Report.—Commended for excellent production of black and colored dyed silk, comparing well with the best European establishments.

86. New York Woven Label Manufacturing Co., New York, N. Y., U. S.

WOVEN SILK LABELS.

Report.—Woven silk labels of very good execution.

87. J. H. Hayden & Son, Windsor Locks, Conn., U. S.

SEWING SILK.

Report.—Slack and medium twist sewing silk of great brilliancy, strength, and regularity.

88. Joseph Neumann, San Francisco, Cal., U. S.

RAW SILK AND SILK COCOONS.

Report.—A very good collection of cocoons and raw silk of a variety of races, highly commendable for the successful attempts in the introduction of this important branch of industry.

89. M. Heminway & Sons Silk Co., New York, N. Y., U. S.

SEWING SILK.

Report.—A full assortment of colored and black machine and sewing silks, perfect in quality of material, color, and workmanship

90. Dale Manufacturing Co., Paterson, N. J., U. S.

SILK, MOHAIR, AND FANCY BRAIDS.

Report.—A very fine display of silk and mohair braids, fancy cords and trimmings, of great beauty and excellent workmanship.

91. Sutro Brothers, New York, N. Y., U. S.

SILK AND COTTON BRAIDS.

Report.—Braids of great regularity and excellent manufacture.

92. Louis Franke, New York, N. Y., U. S.

SILK FRINGES AND BRAIDS.

Report.—Silk fringes, dress trimmings, and tassels, made of the best material, excellent in style and manufacture.

93. Holland Manufacturing Co., Willimantic, Conn., U. S.

SEWING SILK.

Report.—Commended for a fine assortment of sewing silks of different kinds; also machine twist, highly meritorious for the excellent quality of raw material and the preparation for the various purposes; also for silk spinning and silk thread-testing machines.

94. S. M. Meyenberg, Paterson, N. J., and New York, N. Y., U. S.

SILKS AND UPHOLSTERY SATINS.

Report.—Commended for very well made millinery silks and upholstery satins, of superior quality and finish; also for ladies' scarfs of excellent color and design.

95. John N. Stearns & Co., New York, N. Y., U. S.

FIGURED AND TWILLED SILKS.

Report.—A handsome exhibit of brocade silks of superior styles and quality; also twilled silks well made, and meritorious in every respect.

96. Dexter, Lambert, & Co., New York, N. Y., U. S.

SILK GOODS.

Report.—Commended for millinery silks, well made and of good colors; also for brocade silks of excellent manufacture.

97. Cheney Bros., Hartford and South Manchester, Conn., U. S.

SILKS AND SILK RIBBONS.

Report.—Commended for perfect manipulation of spun silk in every form, and for piece goods and ribbons manufactured thereof, evincing a high degree of excellence.

98. Frederick Baare, Paterson, N. J., U. S.

SILK GOODS.

Report.—Commended for black figured silks, made in an improved and superior manner; also for twenty-six inch millinery goods of good manufacture.

99. The Central Commission of the District of Vizeu, Vizeu, Portugal.

SILK COCOONS.

Report.—A very fine exhibition of raw-silk cocoons of superior quality.

100. The Imperial Ottoman Government, Constantinople, Turkey.

COLLECTIVE EXHIBITION OF SILK GOODS.

Report.—Commended for an excellent and very complete display of the silk, gold, and mixed fabrics of the Ottoman Empire, collected from the various places of manufacture, and deserving the highest merit for taste and workmanship; also for a splendid display of carpets, of great beauty of design, harmony of colors, and excellent manufacture.

101. Pim Brothers & Co., Dublin, Ireland.

SILK AND WOVEN POPLINS.

Report.—Black and colored hand-woven plain silk poplins, excellent in every respect; furniture damasks of superior effect and manufacture.

102. Charles A. Rickards, Leeds, England.

SEWING SILK.

Report.—Sewing silk of excellent character, both as to quality, color, and preparation.

103. Fredr. Wurm, Adelaide, South Australia, Australia.

SILK COCOONS.

Report.—A very good exhibit of cocoons, remarkable for such a short period of culture. The yellow silk shows great tenacity, and is very clean.

104. George Thorne, Sydney, New South Wales, Australia.

SILK COCOONS.

Report.—A good assortment of cocoons of different races; commendable, considering the youth of the plantation.

105. Superintendent of Destitute Children's Asylum, Sydney, New South Wales, Australia.

SILK COCOONS.

Report.—A fine show of cocoons; very creditable as first essays.

106. Mrs. Bladen Neill, Melbourne, Victoria, Australia.

RAW SILK AND COCOONS.

Report.—A good exhibit of raw silk and cocoons, highly creditable from the fact that this branch of industry has only lately been introduced. The raw silk, particularly from the reproduction of Japanese and Grenoble cocoons, has great elasticity.

107. Sheldon & Fenton, London, England.

SEWING SILKS.

Report.—Sewing silks of excellent quality and brilliant colors, in a variety of shades.

108. Wm. Milner & Sons, Leek, Staffordshire, England.

SEWING SILKS.

Report.—Sewing silks of excellent appearance for the prices quoted.

109. Mrs. Ann Timbrell, Collingwood, Victoria, Australia.

RAW-SILK COCOONS.

Report.—A good display of raw-silk cocoons of a variety of races, very firm, and of good quality.

110. C. F. Chubb, Ipswich, Queensland, Australia.

RAW-SILK COCOONS.

Report.—Good variety of raw-silk cocoons of different races.

111. John McDonald, Queensland, Australia.

SILK COCOONS.

Report.—A very creditable assortment of raw-silk cocoons of good quality.

112. American Silk Label Manufacturing Co., New York, N. Y., U. S.

WOVEN SILK LABELS.

Report.—A well-woven fac-simile of the signatures to the Declaration of Independence.

113. Hamil & Booth, Paterson, N. J., and New York, N. Y., U. S.

PLAIN AND FIGURED SILKS.

Report.—A very fine exhibit of figured dress and millinery silks, plain satins, serges, and silk ribbons, of excellent manufacture and material.

114. Werner Itschner & Co., Philadelphia, Pa., U. S.

SILK RIBBONS.

Report.—Commended for faille, fancy, and Jacquard ribbons of very good manufacture, both as to color and to combination of material; also for a good display of very suitable hat-bands.

115. Seavey, Foster, & Bowman, Boston, Mass., U. S.

SEWING SILKS.

Report.—Commended for great uniformity and general excellence in manufacture of their sewing silks.

116. F. Thomas, Pont-des-Charrettes, France.

RAW SILKS.

Report.—A fine collection of cocoons and beautiful organzine, superior in every respect.

117. Font, Chambeyron, & Benoît, Lyons, France.

SILK VELVETS.

Report.—A fine assortment of black silk velvets of great evenness and lustre; the blacks beautiful.

118. F. Brioude & Co., St. Etienne, France.

VELVET RIBBONS.

Report.—Black velvet ribbons of good manufacture and finish, very well made in every respect.

119. Benoit, Tabard, & Co., Lyons, France.

LINING SILKS.

Report.—A good assortment of black and fancy lining silks, well made.

120. Belding Bros. & Co., Rockville, Conn., U. S.

MACHINE AND SEWING SILKS.

Report.—Machine and sewing silks of good color, strength, smoothness, and quality.

121. Aub, Hackenburg, & Co., Philadelphia, Pa., U. S.

MACHINE AND SEWING SILKS AND BUTTON-HOLE TWIST.

Report.—A fine exhibit of sewing and embroidery silks and machine twist; the sewing and embroidery silks principally meritorious for great beauty and brilliancy of color; the button-hole twist and saddlers' silk highly commendable.

122. Nonotuck Silk Co., Florence, Mass., U. S.

SEWING SILK AND SILK MACHINERY.

Report.—A splendid exhibit of a variety of sewing silks and machine twist of great superiority as to strength and regularity, evincing extreme care in the manufacture; also a fine collection of silk manufacturing machinery, embracing winding, doubling, spinning, and reeling machines, and spool-finishing machines; the latter of very ingenious construction.

123. B. B. Tilt & Son, Paterson, N. J., U. S.

FIGURED SILKS AND SILK LOOMS.

Report.—Commended for brocade silks and handkerchiefs of superior quality and workmanship, excellent in color and style; also for a Jacquard ribbon-weaving loom and a figure silk loom, both of very good construction.

124. A. Hamelin Son, Paris, France.

SEWING SILK.

Report.—Sewing silk of excellent quality and manufacture; a great assortment of very fine shades.

125. Jaubert, Audras, & Co., Lyons, France.

BLACK SILKS.

Report.—Commended for excellence of manufacture and quality of material, and general superiority of black silks and satins.

126. Sevène, Barral, & Co., Lyons, France.

SILK GOODS.

Report.—A good display of medium qualities; fine shades at reasonable prices.

127. Poncet, Senior & Junior, Lyons, France.

SILKS.

Report.—Commended for novelties in dress silks, of exquisite taste and perfect workmanship.

128. Faye & Thévenin, Lyons, France.

COLORED SILK GOODS.

Report.—This exhibit has special merit in the superior manufacture of the plain silks as regards quality and color.

129. C. J. Bonnet's Sons & Co., Lyons, France.

BLACK SILKS.

Report.—Commended for unrivaled productions of black silk fabrics, showing the highest state of perfection in silk manufacture.

130. Huber & Co., Paris, France.

HATTERS' SILK PLUSHES.

Report.—Hatters' black silk plushes of remarkable perfection in color and finish.

131. Gourd, Croisat Son, & Dubost, Lyons, France.

BLACK SILKS.

Report.—Commended for excellence, in every respect, of black silks, in medium and fine grades.

132. Gautier, Bellon, & Co., Lyons, France.

SILK VELVETS.

Report.—A fine exhibit of plain black and colored velvets; specialty of rich goods of superior manufacture.

133. Joseph Puydebart & Son, Lyons, France.

RAW AND SEWING SILKS.

Report.—Sewing silks, raw and dyed, of great regularity and excellent workmanship; specialty of saddlers' silk of great tenacity.

134. L. Dornon, Lyons, France.

SILK GAUZES FOR BOLTING-CLOTH.

Report.—Commended for extraordinary fineness and great uniformity of texture.

135. Giron Bros., St. Etienne, France.

VELVET RIBBONS.

Report.—A great display of very well made velvet ribbons.

136. J. B. Martin, Tarare, France.

PLUSHES AND VELVETS.

Report.—Commended for superiority of manufacture, lustre, finish, and quality of black and colored plushes for hatters and milliners.

137. Tapissier Son & Debry, Lyons, France.

BLACK SILK.

Report.—Commended for the great care and general excellence bestowed upon the manufacture in all its stages.

138. Mauvernay & Co., Lyons, France.

SILK GOODS.

Report.—Striped and fancy silks in medium grades, creditable for the price.

139. Bresson-Agnès & Co., Lyons, France.

SILKS.

Report.—A very fine exhibition of rich damask silks; also novelties in figured crêpe du chine and printed cravats.

140. C. J. Servant & Co., Lyons, France.

VELVETS AND SILKS.

Report.—Superior very wide black silk velvets of remarkable beauty, made of the best raw material of their own production.

141. L. R. Gascou, Montauban, France.

SILK BOLTING-CLOTH.

Report.—Silk bolting-cloth of great regularity; perfect in execution.

142. Bardon & Ritton, Lyons, France.

SILKS.

Report.—A fine exhibit of colored faille and gros-grain, which, for superiority of manufacture, purity of material, brilliancy of color, and beauty of finish, cannot well be excelled.

143. Collective Exhibition of the Weavers of Mineyama, Province of Tango, Japan.

SILK CRAPES.

Report.—A very fine assortment of white and colored silk crapes, showing great perfection, principally those marked "Ikebe."

144. Government Establishment for Experimental Silk-Worm Breeding, Tokio, Japan.

RAW SILK AND COCOONS.

Report.—An excellent exhibit of raw silk and cocoons, of great regularity, evenness, and tenacity, showing the best productions of this valuable industry, collected from the silk-spinning establishments of Tomioka, Yamanacho, Nihoumato, Kanazawa, and Nagano.

145. Egyptian Raw Silk Company, Oporto, Portugal.

RAW SILK.

Report.—Very clean, strong, and elastic raw silks and sewing silks.

146. Brashnin Bros., Oriechovo-Zooevo, Moscow, Russia.

SILK GOODS.

Report.—A creditable assortment of striped and checkered dress silks.

147. Local Government of Tsurugaken, Japan.

PLAIN FOULARD SILK.

Report.—White foulard, excellent in quality, at a remarkably low price.

148. His Highness the Bey of Tunis, Tunis.

SILK TISSUES AND MIXED FABRICS.

Report.—A great variety of silk, silk and gold, and mixed fabrics of Tunisian manufacture, all evincing great taste and excellent workmanship, and highly commendable for the great care bestowed upon this collection.

149. Adlischweil Silk Goods Factory, Adlischweil, near Zurich, Switzerland.

SILK GOODS.

Report.—Black and colored failles and taffetas, which are remarkably well made for the price, and on that account are calculated for a large and general consumption.

150. Winterthur Silk Goods Factory, Winterthur, Switzerland.

SILK GOODS.

Report.—A fine and varied assortment of all grades; power-loom umbrella silks, which are well adapted for the purpose intended; also good black cotton-back satins.

151. Russian Government.

RAW SILK AND SILK COCOONS.

Report.—A very fine display of raw silk and silk cocoons in great variety, all of excellent quality and purity, meriting high commendation, and showing great skill and care on the part of the Director, Mr. Loochinsky.

152. Government Office for Experimental Silk-Worm Breeding, Tokio, Japan.

SILK-WORM BREEDING.

Report.—A very fine exhibit, showing the breeding of the silk-worm, with drawings, models, samples, and implements, showing great care in its preparation.

153. The National Museum of Egypt, Cairo, Egypt.

FIGURED AND BROCADED SILKS.

Report.—A splendid assortment and a great variety of national manufactures of silk and mixed fabrics, evincing great skill of workmanship and combination of colors, and meriting the highest praise for the good taste with which this collection has been made.

154. India Museum, Kensington, London, England.

SILKS AND MIXED FABRICS.

Report.—A splendid display of Indian productions of silk and mixed fabrics of classical taste and beauty.

155. Imperial Maritime Customs, Shanghai, China.

PLAIN AND FANCY SILKS.

Report.—A very fine collection of Chinese plain and fancy silks, highly meritorious for the improvement in the manipulation, workmanship, and uniformity; also an extraordinarily fine collection of raw silk, comprising a full assortment of all the qualities produced in the country.

156. Collective Exhibit from the Provinces of the Ottoman Empire.

RAW SILK AND COCOONS.

Report.—An excellent display of silk cocoons and raw silk of exceptional merit.

157. L. J. Knowles & Bro., Worcester, Mass., U. S.

LOOMS.

Report.—Looms of good construction and workmanship.

158. John Lang Currie, Larra, Derimallum, Victoria, Australia.

WOOL.

Report.—Three fleeces of lambs' and merino wool of superior quality and in good condition. The lambs' wool is specially good.

159. Robert W. Scott, Franklin Co., Ky., U. S.

WOOL.

Report.—Commended for two pelts, with wool, illustrative of fleeces from sheep claimed to be a distinct breed, produced by the exhibitor, the wool of a fair quality for combing purposes; and for two excellent pelts from Angora goats.

160. William Croskey, Hopedale, Harrison County, Ohio, U. S.

WOOL.

Report.—An exhibit of twelve samples of Saxony wool, of the highest excellence.

161. Moses Stocking, Wahoo, Saunders County, Nebraska, U. S.

WOOL.

Report.—One fleece of merino rams' wool, of good weight and excellent quality.

162. Atlas Manufacturing Co., Newark, N. J., U. S.

WOOL-BURRING MACHINES.

Report.—Wool-burring machines of rapid and effective action.

163. First Hungarian Wool-Washing and Commission Co., Budapest, Austria.

WASHED WOOL.

Report.—Beautifully-washed wool, from which potash is extracted from the yolk by an entirely new process.

164. David Smith & Co. (Limited), Halifax, England.

PREPARED SHODDY AND WOOL.

Report.—Commended for shoddy and wool, prepared for manufacturing purposes by a patent process, by which the burrs are completely cleaned, and for cotton and wool stuff, prepared on the same principle.

165. The Mill Hill Wool and Rag Extracting Co. (Limited), Huddersfield, England.

PREPARED SHODDY AND WOOL.

Report.—Commended for shoddy and wool, prepared for manufacturing purposes by a patent process, by which the burrs are completely cleaned, and for cotton and wool stuff, prepared on the same principle.

166. Board of Agriculture of the State of New Hampshire, U. S.

WOOL.

Report.—An assortment of Spanish merino wool of fine fibre and good staple, adapted for the manufacture of cassimeres, merinos, and flannels.

167. State of Oregon, U. S.

WOOL.

Report.—Some very fine specimens of merino wool of fine fibre and good staple, very much resembling Australian wool, and giving evidence that this State can produce wool of very great value.

168. Province of Entre Rios, Argentine Republic.

RAW WOOL.

Report.—An assortment of small samples of fine merino wool of superior quality and long staple.

169. Danforth Locomotive and Machine Co., Paterson, N. J., U. S.

SILK MACHINERY.

Report.—A collection of silk machinery, embracing winding and spinning frame for singles and for doubling.

170. Government of the Argentine Republic.

WOOLEN MANUFACTURES.

Report.—A beautiful collection of vicuña shawls and ponchos, carpets, and tapestries. Among the vicuña shawls exhibited were some especially to be mentioned, made by Jova Madueno, Samuel A. Lafone Quevedo, of Catamarca, M. Malbran, of Catamarca, and Teresa Luraschi, of Catamarca. The above goods are of the highest texture and merit.

171. Chamber of Commerce of Reims, France.

COLLECTIVE EXHIBIT OF WOOLEN MANUFACTURES.

Report.—A brilliant collection of merinos, cashmeres, sateens, reps, and ecosse cloth; plaid, white, and colored flannels; worsted coatings, fancy cassimeres, shawls, and blankets, all of high excellence. The finish of the merinos, and the variety and brilliancy of the colors dyed by Delamotte and Ernst Houpin, are specially commendable.

172. Commissioners for Victoria, Melbourne, Victoria, Australia.

RAW WOOL.

Report.—Washed lambs' wool, greasy wool, and Victoria merino; all well selected and of excellent growth and quality.

173. C. H. Beall, Brooke County, West Virginia, U. S.

WOOL.

Report.—An admirable exhibit of fleeces of American merino wool from two bucks and nine ewes, with a case containing thirty-three samples, all the samples being of exceptional excellence.

174. S. A. Cockayne, Moundsville, Marshall County, West Virginia, U. S.

WOOL.

Report.—One fleece of good merino wool.

175. John Ingram, Poplar Spring, Marshall County, West Virginia, U. S.

WOOL.

Report.—Ten fleeces of excellent merino combing and beautiful merino clothing wools.

176. Ninian Beall, Ohio County, West Virginia, U. S.

WOOL.

Report.—An exhibit of Saxony fleeces, two bucks and two ewes, of fineness characteristic of the race.

177. J. J. Surber, Vienna, Austria.

REEDS AND HEDDLES FOR LOOMS.

Report.—A good collection of reeds and heddles for looms.

178. Faxon & Wright, Philadelphia, Pa., U. S.

EXTRACT OF WOOL.

Report.—A creditable exhibit of extract of wool, prepared by a chemical process not disclosed, together with yarn made from same, illustrating the excellence and strength of the prepared fibre.

179. Albert Bauer, Humpoletz, Austria.

WOOLEN GOODS.

Report.—A good collection of well-made cloth, at low prices, for general use.

180. Brosset-Heckel & Co., Lyons, France.

SATINS.

Report.—All silk, and silk and cotton back, black and colored satins.

181. A. G. Jennings, Nottingham Lace Works, Brooklyn, N. Y., U. S.

SILK LACES.

Report.—Commended as an attractive exhibit of gimpure, cashmere, and other laces and trimmings; also for a general assortment of net goods, highly commendable for excellent fabrication. This exhibit is noticeable as illustrative of an important manufacture just introduced into the United States by the exhibitor.

182. James Oddy & Son, Bradford, England.

WOOLS.

Report.—A unique assortment of fleeces, admirably illustrative of the principal characteristic wools of England.

183. Parks & Woolson Machine Co., Springfield, Vt., U. S.

CLOTH-SHEARING AND BRUSHING MACHINES.

Report.—A cloth-shearing and a cloth-brushing machine, both of very good construction and workmanship.

184. S. G. Reed, Portland, Oregon, U. S.

LONG COMBING WOOL.

Report.—Three samples of Leicester combing wool, and three samples of Cotswold combing wool, noticeable for long staple and bright lustre.

185. Stanfield, Brown, & Co., England.

SHOE LASTINGS.

Report.—A superb exhibit of ten numbers of lastings, especially creditable for richness of lustre, good color, and evenness of thread.

186. Jacob Senneff, Philadelphia, Pa., U. S.

FLAT METALLIC EYE HEDDLE.

Report.—Commended as an improvement upon the cotton and varnished heddles, being less liable to abrade the warp.

187. The State of Michigan, U. S.

WOOL.

Report.—A collective exhibit of samples of wool produced in the State, contributed by one hundred and sixteen persons in ten counties, four hundred and sixty-one samples being of merino wool and grades, and one hundred and ninety-six samples being of long combing wool of English blood. The collection is illustrative of the high character of an annual product of wool in the State, estimated at eight million pounds.

188. M. Wilkins, Eugene City, Lane County, Oregon, U. S.

COMBING WOOL.

Report.—An exhibit of a sample of Cotswold wool, with twelve samples of wool improved by a series of crossing, pursued for many years, of high-bred Cotswold bucks on high-bred Oxfordshire-down ewes, producing a combing wool retaining the length of the original Cotswold, but with greatly increased fineness and softness, and total absence of hair.

Also for improved Oxfordshire and Leicestershire wool.

189. Peter Kozishnikof, Veliki-Oostioog, Vologda, Russia.

BRISTLES.

Report.—Commended for bristles of extraordinary lengths, adapted for the manufacture of brushes.

190. Tunxis Mills, Poquonnock, Conn., U. S.

COLORED WORSTED YARNS.

Report.—Commended for an admirable collection of colored wools and worsted yarns, in a great variety of colors and mixtures, adapted for both dress purposes and clothing goods, and for excellence of dye and colors.

191. Baltic Woolen Mills, New York, N. Y., U. S.

REPELLANTS.

Report.—Medium grades of repellants, in black and colors, of good manufacture and cheap prices.

192. Shaffner & Stringfellow, Philadelphia, Pa., U. S.

GERMANTOWN WOOL.

Report.—A handsome variety of Germantown wool and zephyr yarns, in beautiful colors, and very neatly made up in a special style of ball, weighing one ounce each.

193. Farrington & Kinsey, Rahway, N. J., U. S.

EXTRACT WOOLS.

Report.—Extract wools from old garments of cotton and wool, from which the cotton is destroyed by a chemical process without injury to the wool.

194. A. Prouvost & Co., Roubaix, France.

WOOLS.

Report.—A large assortment of prepared wools from Australia, South America, Black Sea, Russia, France, and Belgium; also of slivers and noils from the same, adapted to a great variety of fabrics.

195. J. M. Kirkpatrick, Utica, N. Y., U. S.

MERINO WOOL.

Report.—Six samples of fine merino wool, of good quality and fibre.

196. Albert Quigley, Cadiz, Ohio, U. S.

MERINO WOOL.

Report.—Five samples of fine merino wool, of good quality and fibre, and adapted either for clothing or combing purposes.

197. E. J. Hiatt & Bros., Chester Hill, Ohio, U. S.

OHIO WOOL.

Report.—Fleeces of excellent quality and growth of Ohio wool, well bred, and adapted for combing.

198. Walter Craig, Cadiz, Ohio, U. S.

WOOL.

Report.—Seventeen samples of pure merino wool, of very superior quality, and of considerable merit.

199. James B. Jamison, Cadiz, Ohio, U. S.

WOOL.

Report.—Eight samples of Spanish merino wool, of very superior quality and growth.

200. Henry Boyles, Cadiz, Ohio, U. S.

MERINO WOOL.

Report.—Six samples of Spanish merino wool, of very superior quality.

201. J. M. Holmes, Short Creek, Ohio, U. S.

MERINO WOOL.

Report.—Twelve samples of excellent merino wool, of good staple and fibre.

202. W. B. Law, Connotton, Ohio, U. S.

MERINO WOOL.

Report.—Thirteen samples of fine Spanish merino wool, of superfine quality and growth.

203. S. S. Campbell, Cadiz, Ohio, U. S.

WOOL.

Report.—Twenty-four samples of merino wool, of excellent quality and good staple, well adapted for the manufacture of cashmeres and merinos.

204. Isaac Thomas, Short Creek, Ohio, U. S.

WOOL.

Report.—Twelve samples of fine merino wools, of superior quality and growth.

205. Andrew Jamison, Short Creek, Ohio, U. S.

MERINO WOOL.

Report.—Eleven samples of fine merino wool, of considerable merit and good fibre.

206. W. O. Harrah, Cadiz, Ohio, U. S.

MERINO WOOL.

Report.—Eleven samples of pure merino wool, of superior quality and good staple.

207. M. L. Birney, Bowerstown, Ohio, U. S.

WOOL.

Report.—Twelve samples of fine Spanish merino wool, of superior quality and growth.

208. James Torrence, Utica, N. Y., U. S.

WOOLS.

Report.—Twelve samples of merino, Leicester, and half-blood wools, of excellent quality and considerable merit.

209. George W. Bond, Boston, Mass., U. S.

WOOL, MOHAIR, AND ALPACA.

Report.—A very large and complete selection of wool, mohair, and alpaca, consisting of one hundred and ninety specimens, all of distinct qualities and varieties, collected from every wool-growing country in the world, and adapted for the manufacture of all fabrics of which wool is a component part. The exhibit is admirably arranged for scientific investigation.

210. W. W. Jamison, Cadiz, Ohio, U. S.

MERINO WOOL.

Report.—Eleven samples of merino wool, of good quality and fibre, well adapted for combing.

211. Thomas F. Cumming, Stony Point, Victoria, Australia.

MERINO WOOL.

Report.—Sample of very superior combing greasy merino wool, of excellent quality and growth.

212. J. Brock, Campania, Tasmania.

MERINO WOOL.

Report.—Fleece of pure merino wool, of very superior quality and growth.

213. Greenwood & Batley, Leeds, England.

WARP-TYING MACHINE.

Report.—A warp-tying machine of very ingenious construction.

214. George W. Keach, Chiswick, Ross, Tasmania.

WOOL.

Report.—A fleece of four years' old ram, and one of five years' old ewe; wool of good quality and adapted for combing.

215. David Taylor, St. Johnstone's, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino wool in the grease; all of superior quality and merit.

216. Charles Headlam, Egleston, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino wool of excellent quality, staple, and fibre.

217. Samuel Page, Belle Vue, New Town, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino hot-water washed wool; all of superior quality and excellent growth.

218. Pacific Scouring Co., Hartford, Conn., U. S.

WOOL.

Report.—A fine specimen of beautifully cleansed wool, carefully assorted into different qualities, ready for manufacturing purposes.

219. Marinska Model Farm, near Saratov, Russia.

WOOL.

Report.—An exhibit of excellent merino clothing wool, with samples illustrative of native Russian merino fleeces.

220. Count Komarowsky, Government and District of Orel, Russia.

WOOL.

Report.—Six illustrative fleeces of wool of native Russian breeds and English races.

221. Theodore Fatz, Olviopol, Kherson, Russia.

WOOL.

Report.—Samples of electoral wool of great fineness and beauty.

222. V. Labenski, Government and District of Warsaw, Russia.

WOOL.

Report.—Two cases of very beautiful electoral wools, short and fine in staple, corresponding to the fine Silesian and Hungarian wools.

223. Ganeshin Bros., Moscow, Russia.

WOOL.

Report.—Merino wool, washed, fine, and of good staple.

224. Simon Stishinsky, Golobovo, near Voronesh, Russia.

WOOL.

Report.—Merino wool of fine quality and good staple.

225. Nicholas Glinka, Ostrolenka, Lomza, Russia.

WOOL.

Report.—Four fleeces of clothing wool from sheep of the electoral breed, of special fineness.

226. Baklanof & Sons, Moscow, Russia.

WOOL.

Report.—Six small bales of excellent washed merino wool.

227. Edward Falz-Fein, Kakhovka, Tauride, Russia.

WOOL.

Report.—Commended for seven fleeces of washed merino wool of fine quality and good growth; and for one hundred samples of clothing and combed merino wool of great excellence.

228. P. Mariolaki, Rostov on the Don, Russia.

WOOL.

Report.—Excellent Donskoi wool, marked for cleanness and length of staple.

229. A. Warshawski, St. Petersburg, Russia.

WOOL.

Report.—Samples of wool of Rambouillet and Negretti breeds, of good growth, quality, and staple.

230. Karlovka Estate of the Grand Duchess Katherine Mikhailovna, Government of Poltava, Russia.

WOOL.

Report.—One hundred samples of wool from sheep of the Rambouillet and Negretti breeds, principally adapted for combing purposes, and remarkable for length of staple.

231. Th. J. Martin, Verviers, Belgium.

WOOL CARD CLOTHING.

Report.—A good exhibition of wool card clothing.

232. Felix Delrez, Verviers, Belgium.

WOOL CARD CLOTHING.

Report.—An excellent exhibition of wool card clothing.

233. Heinr. Lewald, Breslau, Germany.

WOOL.

Report.—A good exhibit of woollen and vigogne fabrics, made for technical and medical purposes.

234. Ambros. Marthaus, Oschatz, Germany.

FELTS.

Report.—Perfectly made felts used for saddle-cloths, shoes, and boots.

235. R. von Mens, Karlsdorf, Silesia, Germany.

SILESIA WOL.

Report.—Three very fine fleeces of Silesian wool, of excellent quality and fibre, and adapted for the manufacture of the finest cloths produced.

236. Valckenberg & Schoen, Worms, Germany.

ARTIFICIAL WOOL.

Report.—A good assortment of extract, mungo, and shoddy wool.

237. Carlos J. Guerrero, Province of Buenos Ayres, Argentine Republic.

MERINO WOOL.

Report.—Fleeces of unwashed merino wool, of superior quality and fibre, adapted to the manufacture of cashmeres and merinos.

238. Nazar & Brothers, Buenos Ayres, Argentine Republic.

MERINO WOOL.

Report.—A large assortment of samples of merino wool, in great variety of staple and of good quality.

239. Francisco Chas & Son, Province of Buenos Ayres, Argentine Republic.

WOOL.

Report.—One fleece of unwashed wool, weighing thirty-one pounds, of fair quality and excellent growth.

240. Jorge Stegman, Province of Buenos Ayres, Argentine Republic.

MERINO WOOL.

Report.—One fleece of healthy, full-grown merino wool, weighing twenty-one pounds, of good staple and fibre, and adapted for combing purposes.

241. Wilfred Latham, Province of Buenos Ayres, Argentine Republic.

MERINO WOOL.

Report.—Two fleeces of merino combing wool, of excellent quality and fibre; also samples of fine merino wool.

242. Emilio Duportal, Province of Buenos Ayres, Argentine Republic.

WOOL.

Report.—A very good exhibit of sheep-skin wool, very heavy, and of good quality, and nine inch staple; also four fleeces excellent combing wool, weighing about twenty-three pounds each.

243. Samuel B. Hale, Province of Buenos Ayres, Argentine Republic.

MERINO WOOL.

Report.—Six fleeces of merino combing wool, of very superior quality, well bred, and long staple, almost equal to Australian wool, and well adapted for the manufacture of merinos and Italian cloths.

244. Count Alois Karolyi, Stampfen, Austria.

WOOL.

Report.—Several very beautiful fleeces of short wool, both washed and unwashed, of exceedingly fine quality and fibre, and adapted for the manufacture of superfine cloths.

245. Adolf Jacob, Reichenberg, Bohemia, Austria.

WOOLEN CLOTH.

Report.—A rich collection of military cloth, in good qualities and brilliant colors.

246. Count Emerich Hunyady, Urmény, Hungary, Austria.

HUNGARIAN WOOL.

Report.—Fleeces of washed and unwashed Hungarian wool, of excellent quality and fibre, and adapted to the manufacture of fine cloths.

247. Joint Stock Company of the Vöslau Worsted Yarn Manufactory, Vöslau,
Austria.

WORSTED YARNS.

Report.—An excellent collection of worsted yarns, of various numbers and brilliant colors.

248. John L. Bowes & Brother, Liverpool, England.

WOOLS, MOHAIRS, ALPACAS, NOILS, AND WASTE.

Report.—Commended for a very complete and well-arranged assortment of wool, mohair, and alpaca, comprising about two hundred and eighty specimens, from all parts of the world; also for wool waste, extract wool, silk noils, camels'-hair noils, alpaca and mohair noils, mungo, and wool-waste, adapted for manufacturing purposes.

249. Gunerius Pettersen, Christiania, Norway.

FLANNELS AND WOOLEN DRESS GOODS.

Report.—Well-made dress goods and flannels, for general consumption.

250. Frederick Shaw, Redbanks, Swansea, Tasmania.

LEICESTER WOOL.

Report.—One fleece of Leicester wool, of excellent quality and growth.

251. Wm. H. Gibson, Fairfield, Snake Banks, Tasmania.

MERINO WOOL.

Report.—For fleeces of pure merino raw wool, of superior quality and staple.

252. John Taylor, Milford, Campbell Town, Tasmania.

MERINO WOOL.

Report.—Washed and skirted yearling merino ewe wool, of first-rate quality, adapted for the manufacture of the finest goods.

253. W. Gibson & Son, Scone, Perth, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino ram, ewe, and hogget wool, all of excellent quality and of the highest merit.

254. George Wilson, Oatlands, Tasmania.

MERINO WOOL.

Report.—Several fleeces of fine merino wool, of excellent quality, well bred, and of good staple, weighing about eleven and a half pounds each.

255. James Gibson, Belle Vue, Cleveland, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino, ram, ewe, and lambs' wool, all of excellent quality and growth.

256. W. H. D. Archer, Brickendon, Longford, Tasmania.

WOOL.

Report.—Samples of pure merino and lambs' wool, all of excellent quality and growth.

257. George Taylor, Milford, Campbell Town, Tasmania.

MERINO WOOL.

Report.—Several very superb fleeces from stud merino ram, valuable for length of fibre and adaptation for the manufacture of the best merinos and cashmeres.

258. William Kemp, Adelaide, South Australia, Australia.

WOOL.

Report.—Twelve sheep-skins of excellent growth and quality; very good of their kind.

259. Fenwick & Scott, Queensland, Australia.

WOOL.

Report.—A large collection of samples of Australian wool, most of which are of high merit, great length of staple, and superior quality.

260. G. H. Davenport, Headington Hill, Queensland, Australia.

WOOL.

Report.—A most choice exhibit of merino combing wool of the finest quality, long staple, and excellent in every respect; especially remarkable for its length and richness of fibre.

261. Hayward, Armstrong, & Co., Adelaide, South Australia, Australia.

WOOL.

Report.—A very good selection of merino, ewe, wether, hogget, and lambs' wool, all of superior quality and merit.

262. John Howard Angus, Adelaide, South Australia, Australia.

WOOL.

Report.—Commended for scoured merino lambs' wool, of fine quality and in good condition; also for two cases of show wool of choice quality, and for dressed skins of pure Lincoln ram, clean and of good staple.

263. Shanahan & Jennings, Westbrook Station, Queensland, Australia.

WOOL.

Report.—A very excellent exhibit of Australian merino wool, choice in every respect.

264. Allan McFarlane, Adelaide, South Australia, Australia.

WOOL.

Report.—Merino ewe wool, of good fibre, staple, and quality.

265. Price & Browne, Adelaide, South Australia, Australia.

WOOL.

Report.—Merino, ewe, wether, hogget, and lambs' wool, of fine quality, good fibre, and healthy growth.

266. L. E. Lester, Rosenthal, Queensland, Australia.

MERINO WOOL.

Report.—Australian merino wool, of superior quality and in fine condition.

267. John Murray, Adelaide, South Australia, Australia.

MERINO WOOL.

Report.—A choice selection of combing merino rams' wool, of long staple and excellent quality, some fleeces weighing fifteen pounds.

268. Joseph Keynes, Keyneton, South Australia, Australia.

MERINO WOOL.

Report.—Four fleeces of combing merino wool, of healthy growth, good staple, and superior quality.

269. C. B. Fisher, Headington Hill, Queensland, Australia.

MERINO WOOL.

Report.—Well-bred merino wool, of exceedingly fine quality, good staple and growth.

270. John Wilson, Lismore, Victoria, Australia.

WOOL.

Report.—Three fleeces of greasy merino lambs', ewes', and wethers' wool, of good quality and growth, adapted both for combing and clothing purposes.

271. W. & N. G. Elder, Elder, Rookwood, Victoria, Australia.

WOOL.

Report.—An excellen texhibit of merino lambs', ewes', and wether wool, of very superior quality and growth.

272. R. Goldsbrough & Co., Melbourne, Victoria, Australia.

WOOL.

Report.—A very considerable variety of greasy and washed merino wool, most of which is of very superior quality and growth, and adapted for both clothing and combing purposes.

273. George Arnold & Co., Melbourne, Victoria, Australia.

WOOL.

Report.—Five cases of wool, containing thirty fleeces of washed and greasy merino; also, Lincoln, Leicester, and cross-bred. The merinos are excellent in every respect, and the Leicester crosses are of considerable merit.

274. Timms Brothers, Mount Hesse, Victoria, Australia.

WOOL.

Report.—Samples of ewe and wether merinos, hot-water washed, of very superior quality and fibre.

275. Hastings Cunningham & Co., Melbourne, Victoria, Australia.

WOOL.

Report.—A most complete assortment of fine washed combing merino wool; also greasy rams' wool, and cross-bred and Lincoln ewe fleeces. The merino wool is excellent in every respect, and reflects great credit on the growers.

276. Alexander Armstrong, Warramtine, Victoria, Australia.

WOOL.

Report.—A very creditable exhibit of washed and greasy merino wool, of excellent quality and growth.

277. Wm. Bliss & Son, Chipping Norton, Oxfordshire, England.

WOOLENS.

Report.—Commended for a very handsome assortment of Himalayan shawls, novel in pattern and combination; also, for tweeds, Cotswold suitings, serges for military wear, Cambridge rugs, Angora beavers and horse clothing; all of excellent manufacture and adapted for general use.

278. Howgate, Day, & Nolt, Huddersfield, England.

WOOLENS.

Report.—A very complete assortment of reversible coatings, Victoria naps, Irish frieze, and presidents cloth; all of excellent manufacture, at low prices.

279. Nussey & Leachman, Leeds, England.

CLOTH MACHINE.

Report.—A powerful hot-pressing machine for cloth, having an effective and automatic action.

280. B. C. Parr, Queensland, Australia.

AUSTRALIAN WOOL.

Report.—Australian wool, of superior quality and in good condition, high class wool in every respect.

281. George Clark, East Talgai, Queensland, Australia.

MERINO WOOL.

Report.—Australian merino wool, of very superior quality and fibre, and of high merit.

282. Gore & Co., Yandilla, Queensland, Australia.

MERINO WOOL.

Report.—A very good exhibit of merino wool, of fine quality, good staple, and healthy growth.

283. Simpson & Co., Bon Acora, Queensland, Australia.

WOOL.

Report.—Combing merino wool, of very superior quality, staple, and growth.

284. F. R. White, Blandford, New South Wales, Australia.

WOOL.

Report.—Commended for combing merino wool, of superior growth and quality; also for several fleeces of Saxon merino wool, of excellent growth and staple.

285. J. B. Bettington, Merrieva, New South Wales, Australia.

WOOL.

Report.—Commended for two cases of Saxon merino combing wool, of fine quality, good staple and growth; also for greasy wool, of very superior quality and merit.

286. G. H. Cox, Mudgee, New South Wales, Australia.

WOOL.

Report.—An extensive and excellent exhibit of Saxon merino combing wool, beautifully washed, of the finest quality, and very high merit.

287. Henty & Balfour, Albury, New South Wales, Australia.

WOOL.

Report.—Two cases of combing merino wool, of very superior quality and growth, and excellent in every respect.

288. E. K. Cox, Mudgee, New South Wales, Australia.

WOOL.

Report.—Several fleeces of Saxon merino combing wool, well washed, of excellent quality, fibre, and staple, and of very high merit.

289. E. & A. Tindal, Barrajan, New South Wales, Australia.

WOOL.

Report.—Commended for fine washed combing Saxon merino wool, of very superior quality and fibre, and of high merit; also for greasy combing wool of superior quality.

290. W. S. Peter, Canterbury, New Zealand.

WOOL.

Report.—Merino fleece wool, of very choice quality, good fibre, and staple.

291. Samuel Bealey, Canterbury, New Zealand.

WOOL.

Report.—Several fleeces cross-merino ewe wool, by Romney Marsh or Kent ram, of very choice quality and good weight.

292. John Hall, Canterbury, New Zealand.

WOOL.

Report.—Merino fleece wool, of very superior quality and growth.

293. Geo. A. Anstey, Nelson, New Zealand.

WOOL.

Report.—Several fleeces of merino ram and ewe wool, of choice quality and excellent growth.

294. J. Cathcart Wason, Canterbury, New Zealand.

WOOL.

Report.—Commended for several fleeces of merino wether wool, and for Lincoln fleeces, of good staple and quality.

295. A. Braithwaite, Wellington, New Zealand.

WOOL.

Report.—Romney Marsh and merino fleece wool, of good quality and growth.

296. A. H. Rickman, Canterbury, New Zealand.

WOOL.

Report.—Romney Marsh ewe wool, very silky, and of healthy growth.

297. Charles Clark, Queensland, Australia.

ANGORA WOOL.

Report.—Fleece of pure Angora wool, of excellent quality, good staple, and rich lustre.

298. Willibald Schram, Vienna, Austria.

JACQUARD MACHINES.

Report.—Jacquard machines, excellent in workmanship.

299. G. L. Lethbridge, Singleton, New South Wales, Australia.

WOOL.

Report.—Cases of Saxon merino greasy combing wool, of good fibre and quality.

300. A. N. Gilbert, Warwillah, New South Wales, Australia.

WOOL.

Report.—Saxon merino combing wool, of fine quality, good staple, and healthy growth.

301. E. & A. Bowman, Rotherwood, New South Wales, Australia.

WOOL.

Report.—Commended for greasy merino clothing wool, of superior quality and adapted for fine cloths; also for several cases of Saxon merino combing wool, of good quality and fibre.

302. T. Brown & Co., Tuppal, New South Wales, Australia.

WOOL.

Report.—Cases of excellent combing merino wool, of first-rate quality, and, if free from burrs, would be most choice wool.

303. Hon. James Maclanachan, Ballochmyle, Tasmania.

WOOL.

Report.—Fleeces of pure merino rams' wool, in the grease, of excellent growth and quality, weighing from ten to eleven pounds each.

304. Thomas Russell, Barunah Plains, Victoria, Australia.

WOOL.

Report.—Hot-water washed wool, of excellent quality and high merit.

305. W. S. Sharland, Woodbridge, New Norfolk, Tasmania.

WOOL.

Report.—Fleeces of pure merino wool, of good quality, fibre, and staple.

306. John Ralston, Logan, Evandale, Tasmania.

WOOL.

Report.—Several fleeces of pure merino wool, of good quality and growth; also Leicester fleeces of very good length, staple, and quality, highly creditable to the grower.

307. Victorian Woolen Cloth Co., Victoria, Australia.

WOOLENS.

Report.—Shawls, tweeds, and broadcloths, made of pure wool, and of honest and substantial manufacture; very creditable for a new country.

308. Thos. Parramore, Beaufort, Ross, Tasmania.

MERINO WOOL.

Report.—Several fleeces of wool from pure merino ram and ewes, of very superior quality and staple.

309. John McVean, Woolloomoo, New South Wales, Australia.

MERINO WOOL.

Report.—Combing merino wool, of fine fibre and staple and very superior quality.

310. Geo. Synnot & Co., Geelong, Victoria, Australia.

LINCOLN WOOL.

Report.—Samples of well-grown Lincoln wool, of good staple and rich fibre.

311. Andrew Loder, Colley Creek, New South Wales, Australia.

WOOL.

Report.—Commended for an excellent exhibit of fine merino clothing wool, of superb quality, and adapted for the manufacture of the best superfine cloths; also for combing merino wool, of very choice quality, staple, and fibre.

312. A. H. Lowe, Dynevor, New South Wales, Australia.

WOOL.

Report.—Angora goats' wool of fine growth and high lustre, adapted for the manufacture of mohair fabrics; capable of further improvement.

313. John Allen, Burrangong, New South Wales, Australia.

WOOL.

Report.—One case of Saxon merino combing wool, of very fine quality and good staple; also well bred.

314. Wm. Lang, Wargam, New South Wales, Australia.

WOOL.

Report.—Excellent samples of greasy wether and hogget wool, of very superior quality and staple.

315. F. & A. Cox, Mudgee, New South Wales, Australia.

WOOL.

Report.—A very superior exhibit of fine Saxon merino combing wool, excellent in quality and fibre.

316. D. H. Campbell, Cunningham Plains, New South Wales, Australia.

WOOL.

Report.—Commended for one case of Rambouillet combing wool, of superior quality, healthy growth, and good staple; also for clothing wool adapted for fine cloths.

317. W. A. Brodribb, Moolbong, New South Wales, Australia.

WOOL.

Report.—Fine combing merino wool, of good staple and quality, and adapted for the manufacture of cassimeres.

318. L. Learmonth, Groongal, New South Wales, Australia.

WOOL.

Report.—Cases of fine combing merino wool, of excellent quality, fibre, and growth; a most choice selection.

319. E. B. Hulme, Burrowa, New South Wales, Australia.

WOOL.

Report.—Saxon merino combing wool in the grease, of good fibre, quality, and growth; also very heavy fleeces.

320. P. G. King, Goonoo Goonoo, New South Wales, Australia.

WOOL.

Report.—Several fleeces of superior combing merino wool, excellent in quality and staple.

321. Clive & Hamilton, Collaroy, New South Wales, Australia.

WOOL.

Report.—A very superior exhibit of beautifully washed merino combing wool, of the highest quality, and excellent in every respect; also combing wool of choice quality.

322. Alexander Wilson, Coree, New South Wales, Australia.

WOOL.

Report.—Fleeces of merino combing wool, of excellent growth and quality, and adapted for combing purposes; very choice in every respect.

323. W. Crozier, Adelaide, South Australia, Australia.

WOOL.

Report.—Merino ewe wool of good staple, quality, and growth.

324. Wolfenden, Shore, & Co., Cardington, Pa., U. S.

CLOTH LOOM.

Report.—A general purpose cloth loom, of simplicity of motions and reasonable price.

325. Samuel McCaughey, Coonong, New South Wales, Australia.

WOOL.

Report.—One case of combing merino wool, of very superior quality and good staple; also beautifully washed.

326. Sir Samuel Wilson, Oakleigh Hall, Victoria, Australia.

MERINO WOOL.

Report.—Five bales of very fine merino wool, both ewes' and hoggets', remarkable for fineness of fibre and length of staple; admirably adapted for the manufacture of the finest cloths and cassimeres.

327. Marshall & Slade, Glengallan, Queensland, Australia.

MERINO WOOL.

Report.—A very creditable exhibit of merino wool, one fleece of which is from Champion ram. The wool is choice in every respect.

328. C. H. Green, Goomburra, Queensland, Australia.

MERINO WOOL.

Report.—Australian merino wool, of first-rate quality, and in excellent condition.

329. James Kirkman, Chester, Pa., U. S.

COTTON AND WOOL DOESKINS.

Report.—An exhibit of union doeskins (or Kentucky jeans), in a variety of mixtures, at low prices, and adapted to common use.

330. Knox Woolen Company, Camden, Me., U. S.

PAPER-MAKERS' FELTS.

Report.—An exhibit of paper-makers' felts, unsurpassed in excellence.

331. Provincial Commission, Province of Buenos Ayres, Argentine Republic.

WOOL.

Report.—Samples of merino and other wools, in different classes and great varieties; the staple in some instances being eight inches long; also sheep-skin, Cordova, and goats' wool; all of excellent growth and great weight.

332. Portalegre Woolen Manufacturing Co., Portalegre, Portugal.

FANCY CASSIMERES.

Report.—A collection of fancy cassimeres, in creditable qualities and good designs.

333. Joint Exhibition of Elberfeld Manufacturers of Zanella and Coatings, Elberfeld, Germany.

ITALIAN CLOTHS.

Report.—A splendid exhibition of Italian cloths and coatings, plain and figured, of excellent qualities, fine color, and perfect finish.

334. Association of Cloth Makers of Reichenberg, Bohemia, Austria.

CLOTHS, DOESKINS, AND TRICOTS.

Report.—A creditable assortment of broadcloths, doeskins, and tricots, of good quality at cheap prices.

335. Orange Free State, Africa.

WOOL.

Report.—One bale of mohair and two bales of merino clothing wool; all of excellent quality.

336. Pryce Jones, Newtown, North Wales, Great Britain.

FLANNELS.

Report.—A creditable exhibit of white Welsh, colored, striped, and robe flannels, together with mixed shawls of substantial make.

337. Carlo Ditta Morandi, Milan, Italy.

SILK TASSELS AND FURNITURE GALLOONS.

Report.—Very well made silk tassels and furniture galloons.

338. Enrico Beati, Milan, Italy.

SILK STOCKINGS.

Report.—A good variety of plain and fancy silk stockings.

339. The Nishijin Weavers, Kiyoto, Japan.

BROCADED SILKS.

Report.—An excellent show of rich brocade silks, of good designs and combinations of colors.

340. A. L. Trapadoux, Brothers, & Co., Lyons, France.

PRINTED FOULARDS.

Report.—A handsome collection of foulards.

341. A. L. Woodworth, St. John, New Brunswick.

WOOLEN YARNS.

Report.—A considerable variety of woolen yarns, in good colors, and well adapted for the purpose intended.

342. Titus Calverley & Sons, Huddersfield, England.

DOESKINS AND CASSIMERES.

Report.—Commended for economy and cost in the manufacture of black doeskins and union cassimeres, which are really creditable articles at the price.

343. Geo. H. Gilbert Manufacturing Co., Ware, Mass., U. S.

FLANNELS AND BLANKETS.

Report.—An imposing display of flannels and blankets, the former consisting of all wool white silk warp, gauze, moleskin, Shaker, domett, and opera flannels; the scarlet and blues of the latter especially striking; the blankets made of Ohio and West Virginia wool are noticeable for their softness of material and excellence of manufacture.

344. Manchester Mills, Manchester, N. H., U. S.

STUFF DRESS GOODS.

Report.—A very complete assortment of three-quarters figured dress goods—mixtures, lustres, cashmeres, twills, and six-quarters cashmeres; all of excellent manufacture, color, and finish, at reasonable prices, and adapted for general consumption.

345. Edward Webb & Sons, Worcester, England.

HAIR CLOTH.

Report.—Hair cloth, adapted to upholstery and tailors' padding; the former specially notable for beauty and novelty of effects in pure white grounds, with rich dark-colored stripes in various shades; the fabric adapted to warm climates.

346. Robert S. Davies & Sons, Stonehouse Mills, Gloucestershire, England.

CLOTHS, BEAVERS, MELTONS, AND DOESKINS.

Report.—A very creditable exhibit of superfine cloths, beavers, meltons, and doeskins, of excellent manufacture, color, and finish.

347. H. Winger, Elmira, Ontario, Canada.

FLANNELS.

Report.—Serge flannel cotton wool blankets; excellent for the price.

348. Kell & Co., Bradford, England

LASTINGS.

Report.—Lastings marked for their lustre and good texture.

349. Smith & Wilby, Toronto, Ontario, Canada.

FLANNELS.

Report.—Three-quarters domestic flannels, at low cost, for general use.

350. Oxford Woolen Mills, Oxford, Nova Scotia.

WOOLENS.

Report.—Wool flannels, Halifax tweeds, and home-spun stuff; all excellent goods for general use.

351. John Wardlaw, Galt, Ontario, Canada.

WOOLEN YARNS.

Report.—White, colored, and gray knitting yarns, in considerable variety of shades, cheap, useful, and well adapted for general use.

352. Rosamond Woolen Co., Almonte, Ontario, Canada.

WOOLENS.

Report.—Fancy cassimeres and tweeds, of excellent manufacture and low cost.

353. Mills & Hutchison, Montreal, Quebec, Canada.

WOOLENS.

Report.—Three-quarters cassimeres and Canadian tweeds, of excellent manufacture and good value.

354. Adam Lomas & Son, Sherbrooke, Quebec, Canada.

FLANNELS.

Report.—Very cheap flannels, cloths, and tweeds, well adapted for general consumption.

355. Samuel T. Willett, Chambly, Quebec, Canada.

FLANNELS.

Report.—Blue, scarlet, and mixed flannels, of rich color and soft texture, all excellent for the price.

356. John Harvie & Co., Hamilton, Ontario, Canada.

WOOL.

Report.—A very complete and creditable exhibit of Leicester, Cotswold, and Southdown wool; also the following crosses: Leicester and merino, Leicester and Southdown, Cotswold and Leicester, Lincoln and Cotswold, Leicester and Cotswold. The Southdown and Leicester merino are excellent both in staple and fibre, also the Leicester and Southdown cross good; the others fair.

357. Toronto Tweed Co., Toronto, Ontario, Canada.

WOOLENS.

Report.—Fancy Scotch tweeds, plaids, and cheviots, in novel patterns, and at reasonable prices.

358. T. S. Fisher, Toronto, Ontario, Canada.

WOOLENS.

Report.—Cheviot coatings, meltons, tweeds, and Blair Athols, all of useful manufacture and at low prices.

359. Robt. Brearley & Son, Great Britain.

PILOTS, BEAVERS, AND OVERCOATINGS.

Report.—A very creditable exhibit of pilots, beavers, and overcoatings, at moderate cost, and adapted for general consumption.

360. Jesse Eddy's Sons, Fall River, Mass., U. S.

FANCY CASSIMERES.

Report.—Well-made fancy cassimeres of novel English effects, in great variety and at moderate prices.

361. Peckham Manufacturing Co., Providence, R. I., U. S.

KENTUCKY JEANS, DOESKINS, AND WOOLEN YARNS.

Report.—Kentucky jeans and doeskins, smooth in finish and uniform in shade; also an excellent exhibit of woollen yarns in great variety of shades.

362. Groveland Mills, South Groveland, Mass., U. S.

FLANNELS.

Report.—An assorted exhibit of red Shaker, Martha Washington, white, light red, and blue flannels, both in twenty-seven and thirty-six inch widths; all of good fabrication, at moderate cost.

363. Oregon City Woolen Mills, Oregon, U. S.

FANCY CASSIMERES AND BLANKETS.

Report.—Fancy cassimeres, substantial in fabric, of excellent finish, and good designs; also blankets of good quality; all marked for their cheapness, resulting from the availability of Oregon wools at low cost.

364. Charles N. Bacon, Winchester, Mass., U. S.

FELTS.

Report.—An excellent exhibit of felt goods, in great variety and of good fabrication, comprising many novel and ingenious applications.

365. William Walshaw, Saxonville Mills, Mass., U. S.

DYEING.

Report.—A considerable exhibit of colors, in great variety, in woolen and worsted yarns.

366. Meriden Woolen Co., West Meriden, Conn., U. S.

FANCY UNION CASSIMERES.

Report.—Fancy union cassimeres of good manufacture, at cheap prices.

367. Union Manufacturing Co., Wolcottville, Conn., U. S.

THREE-QUARTERS BLACK DOESKINS.

Report.—Three-quarters black doeskins; excellent in fabric, color, and finish.

368. Henry Fox & Co., Urbana, Ohio, U. S.

STOCKING YARNS AND TWEEDS.

Report.—Excellent indigo-dyed stocking yarns; also tweeds, honest and substantial in material and make.

369. Niantic Woolen Mills, East Lyme, Conn., U. S.

COTTON WARP TWEEDS.

Report.—Commended for a three-quarters cotton warp tweed, tastefully mixed with silk noils for "Knickerbocker" effects, at cheap prices.

370. Arlington Mills, Lawrence, Mass., U. S.

ALPACAS AND BRILLIANTINES.

Report.—A very superior collection of black alpacas, brilliantines, figured mohairs, and Roubaix poplins; all first-class goods of their kind, very uniform in width, color, and finish, and, being of recent introduction, reflect great credit on the manufacturers.

371. Beckman & Co., Cleveland, Ohio, U. S.

WOOL SHODDIES.

Report.—A full assortment of all wool shoddies, comprising about seventy-eight varieties of colors and mixtures, beautifully arranged, and of considerable merit.

372. Globe Woolen Co., Utica, N. Y., U. S.

FANCY CASSIMERES.

Report.—An admirable exhibit of fancy cassimeres, in great variety of design, superior in texture and finish; the silk-mixed, hair-lines, and velvet effects are specially noteworthy.

373. Weybosset Mills, Providence, R. I., U. S.

FANCY CASSIMERES.

Report.—Three-quarters fancy cassimeres, of substantial make and tasteful designs, at moderate cost, adapted for general use.

374. Lippitt Woolen Co., Woonsocket, R. I., U. S.

OVERCOATINGS AND FANCY CASSIMERES.

Report.—A good exhibit of all wool fancy elysians and fur beavers, of varied patterns and colors, in low and medium grades.

375. L. Dryfoos & Co., New York, N. Y., U. S.

FELT SKIRTS.

Report.—Commended for a handsome exhibit of felt skirts, and for originality of design in embroidery.

376. Economy Mills, Philadelphia, Pa., U. S.

COTTON WARP AND WOOL FUR BEAVERS.

Report.—Various grades of cotton warp and all wool fur beavers and chinchillas, of excellent designs, at cheap prices, together with cotton warp bed and horse blankets for general consumption, at very low cost.

377. Tillotson & Collins, Pittsfield, Mass., U. S.

CASSIMERES.

Report.—Three-quarters cotton warp, double and twist cassimeres of low grades, noteworthy for evenness of weave and clearness of mixture, with low prices.

378. James Phillips, Jr., Fitchburg, Mass., U. S.

WORSTED SUITINGS.

Report.—Worsted suitings made from Ohio wool, unsurpassed for excellence of manufacture, superiority of quality, and beauty of styles.

379. Camden Woolen Mills, Camden, N. J., U. S.

COTTON WARP REPELLANTS AND FLANNELS.

Report.—Cotton warp repellants, flannels, cloakings, and knickerbocker goods at low prices.

380. Hinsdale Bros., Hinsdale, Mass., U. S.

KERSEYS AND COATINGS.

Report.—Commended for light colored kerseys of good finish and beautiful and even shades, and for excellent coatings.

381. Martin Landenberger's Sons, Philadelphia, Pa., U. S.

DRESS GOODS AND SHAWLS.

Report.—A brilliant exhibit of fancy worsted dress goods and shawls, both knit and woven, the latter original in design and process of manufacture.

The India styles are especially creditable for novelty and tastefulness of design and moderate prices.

382. Washington Mills, E. R. Mudge, Sawyer, & Co., Lawrence, Mass., U. S.

WORSTED AND STUFF GOODS.

Report.—A very creditable exhibit of three-quarters worsted stuff goods, consisting of plain and twilled mixtures, checks, stripes, cretonnes, and all wool delaines; all very useful goods, and adapted for general consumption.

383. Robert Rodman, Lafayette, R. I., U. S.

DOESKIN JEANS.

Report.—Humboldt jeans of cotton warp and all wool filling, of substantial make and intrinsic worth, for common wear.

384. Worumbo Manufacturing Co., Lisbon Falls, Me., U. S.

OVERCOATINGS.

Report.—Black and colored Moscow beavers, of excellent fabric, color, and finish.

385. Mississippi Mills, Wesson, Miss., U. S.

WOOL FILLING JEANS.

Report.—An exhibit of doeskin jeans, of substantial manufacture, adapted to the wants of the laboring classes.

386. Bates Manufacturing Co., Lewiston, Me., U. S.

BEAVERS AND REPELLANTS.

Report.—Well-made beavers and repellants.

387. Middlesex Co., Lowell, Mass., U. S.

WOOLEN GOODS.

Report.—Commended for indigo-blue police flannels, cadet uniform and yacht cloths, with police beavers; all of substantial fabrication, and adapted for uniformed schools, city police, and for general consumption; also for large shawls, in excellent colors, at moderate prices.

388. Midnight Yarn Co., Philadelphia, Pa., U. S.

GERMANTOWN WOOL AND WOOLEN KNITTING YARNS.

Report.—An exhibit of woolen Germantown and knitting yarns, adapted for crochet and hand-knitting, embroidery, and hosiery, of brilliant colors and great variety of shades.

389. Germania Mills, Holyoke, Mass., U. S.

BEAVERS, ESKIMOS, AND DOESKINS.

Report.—Three exhibits of fur beavers, elysians, and eskimos; the Germania beavers, in blacks and colors, are especially commended for excellence of texture and finish.

390. Hockanum Co., Rockville, Conn., U. S.

FANCY CASSIMERES AND WORSTEDS.

Report.—A superb display of fancy cassimeres and worsted suitings, excellent in all respects.

391. Bel Air Manufacturing Co., Pittsfield, Mass., U. S.

FANCY CASSIMERES.

Report.—An admirable exhibit of fancy cassimeres, of bold and novel designs, in great variety and of excellent manufacture.

392. Woodvale Woolen Mills, Johnstown, Pa., U. S.

FANCY CASSIMERES.

Report.—Fancy cassimeres of medium grades, substantially made, of neat design, and at moderate prices.

393. Burlington Woolen Co., Winooski Falls, Vt., U. S.

CASSIMERES AND OVERCOATINGS.

Report.—A good exhibit of elysians, black and colored Moscows, kerseys, and castors; also three-quarters black doeskins of superior finish and color.

394. New England Manufacturing Co., Rockville, Conn., U. S.

WOOLEN CASSIMERES.

Report.—Fancy cassimeres of unsurpassed excellence in material, fabric, and finish; the designs tasteful, novel, and varied.

395. The Broad Brook Co., Broad Brook, Conn., U. S.

FANCY CASSIMERES.

Report.—An excellent exhibit of fancy cassimeres, in great variety, substantial, well made, and of good designs; also meritorious indigo-blue coatings.

396. C. H. & F. H. Stott, Stottsville, N. Y., U. S.

FLANNELS.

Report.—Cotton and wool-mixed twilled flannels, for bathing-robcs and other purposes; also plaid flannels of a better grade, all noticeable for cheap prices.

397. Steam Woolen Co., Catskill, N. Y., U. S.

CHEVIOT SUITINGS AND SHAWLS.

Report.—A low grade of cheviot suitings and cotton and wool shawls, both specially noteworthy for cheap prices and adaptation to general consumption.

398. Pawtucket Hair Cloth Co., Pawtucket, R. I., U. S.

HAIR CLOTH.

Report.—Commended for a handsome exhibit of upholstery hair cloth, varied in color and width, and noticeable for the evenness and smoothness of fabrication, especially creditable as a new industry in this country; also for originality in the application of automatic machinery to this fabrication.

399. Sawyer Woolen Mills, Dover, N. H., U. S.

FANCY CASSIMERES AND SUITINGS.

Report.—Fancy cassimeres and kerseys in blacks and colors, of high intrinsic merit, free from cotton, shoddy, or flocks; the styles neat, and the prices for the quality low; the silk mixed and the double and twist specially commended.

400. United States Bunting Co., Lowell, Mass., U. S.

WOOLEN BUNTING, MOREENS, AND DAMASKS.

Report.—Commended for an excellent show of bunting made of English and Canadian wool, and for originality of process of striping and forming design and pattern; also for moreens and damasks of creditable manufacture and of considerable merit.

401. Farr Alpaca Co., Holyoke, Mass., U. S.

ALPACAS AND SERGES.

Report.—An excellent exhibit of black alpacas, mohairs, cashmeres, and serges; all of superior manufacture, very regular in quality, evenly spun and woven, and of permanent color and finish.

402. Philadelphia Worsted Spinners' Association, Philadelphia, Pa., U. S.

WORSTED YARNS.

Report.—A most complete and admirable collection of extra fine yarns, from numbers fifty to two hundred; also, colored and mixed yarns in beautiful colors and great variety, and zephyr, braid, cassimere, genappe, shawl, knitting, floss, and upholstery yarn; all very evenly spun, well adapted for the purposes intended, and excellent in every respect. Mostly spun from American wool.

403. Hamilton Woolen Mills, Southbridge, Mass., U. S.

REPS AND DELAINES.

Report.—A very handsome and complete assortment of three-quarters printed reps and delaines, in strong patterns and designs, adapted for general consumption, and at low prices.

404. Peacedale Manufacturing Company, Peacedale, R. I., U. S.

LASTINGS, SHAWLS, AND WORSTED SUITINGS.

Report.—An exhibit of eleven thread and other numbers of lastings, of very creditable manufacture, and well adapted for shoe purposes; also worsted suitings of excellent manufacture, and shawls in great variety. The all wool cheap shawls are especially creditable.

405. R. Howard & Sons, Apponaug, R. I., U. S.

WOOLEN YARNS.

Report.—Woolen yarns, well spun, and of good colors.

406. Montessuy & A. Chomer, Lyons, France.

CRAPES.

Report.—Goods perfect in manufacture, color, and finish, showing particularly great improvements in English crapes.

407. L. Drogue & A. Monnard, Lyons, France.

POPLINS.

Report.—A fine assortment of plain, striped, and figured poplins, of brilliant shades and good workmanship.

408. Ph. Dufourmantel & Co., Corbie, Somme, France.

WOOLEN YARNS AND YARNS OF WOOL AND SILK.

Report.—Woolen and silk and woolen yarns of great perfection and wonderful fineness.

409. Poirrier, Mortier, & Muller, Paris, France.

DYED GOODS.

Report.—Commended for great variety and beauty of colors in dyed cashmeres and merinos.

410. F. Piquee & Bros., Paris, France.

UPHOLSTERY.

Report.—Figured and plain Utrecht velvets of excellent finish and colors.

411. Pinon & Guerin, Reims and Paris, France.

WOOLEN DRESS GOODS.

Report.—Knickerbocker woolen dress goods, in great variety and of excellent designs.

412. G. Maes, Clichy-la-Garenne, France.

DYED GOODS.

Report.—Commended for the vividness of color and variety of tints in dyed cashmeres and upholstery goods.

413. Dumortier & Guigniet, Roubaix, France.

WORSTED SUITINGS.

Report.—Commended for variety of designs and excellence of manufacture in worsted suitings.

414. F. Talamon Son & Co., Paris and Elbeuf, France.

CLOTHS.

Report.—An admirable display of fancy cassimeres and worsted suitings, excellent in design and fabrication.

415. Decaux Son, Elbeuf, France.

MILITARY CLOTHS.

Report.—Well-made and serviceable military cloths of good colors.

416. F. Vanoutryve & Co., Roubaix, France.

UPHOLSTERY GOODS.

Report.—Upholstery goods, reps, tapestries, and damasks, distinguished for beauty, excellence of fabrication, and variety of product.

417. Dabert & Co., St. Denis, France.

YARNS.

Report.—A large assortment of melanges, in great variety of hues and shades, very evenly mixed.

418. Braquenie Brothers, Aubusson, France.

TAPESTRIES.

Report.—A rich collection of Gobelin tapestries, of excellent workmanship and design and of a very high artistic merit.

419. Pin & Cleugnet, Lyons, France.

SHAWLS.

Report.—Shawls in India style, distinguished for beauty of design, harmony of color, and excellence of manufacture, and especially for the clearness of the whites.

420. Seydoux, Sieber, and Co., Paris, France.

MERINO, CASHMERES, ROVINGS, AND YARNS.

Report.—Commended for a magnificent exhibit of French merinos, all wool and silk warp cashmeres, gauzes, and debèges; all of the highest order of merit in material, texture, beauty, and variety of hue and shade; also for a complete collection of wool rovings and yarns, illustrative of the material of which the goods are composed.

421. E. Bellest & Co., Elbeuf, France.

BLACK AND COLORED CLOTHS.

Report.—A creditable exhibit of black and colored cloths of medium grades.

422. Chalamel & Co., Paris, France.

DYED GOODS.

Report.—Commended for brilliant and varied tints in cashmeres and upholstery goods.

423. A. Guillaumet's Sons, Suresnes, France.

DYED GOODS.

Report.—Commended for beauty, variety, and vividness of tints in merinos, poplins, and reps.

424. E. de Montagnon & Son, Sedan, France.

CLOTHS.

Report.—Overcoatings and worsted suitings of novel and elegant designs and excellent quality.

425. Bertrand Boulla, Nîmes, France.

TAPESTRY.

Report.—Woven tapestry in imitation of the style of the Middle Ages, of high merit and at low prices.

426. Robert-Guerin's Widow & Son, Reims, France.

MERINOS, CASHMERES, AND REPS.

Report.—Merinos, cashmeres, and reps of excellent manufacture.

427. Wanskuck Company, Providence, R. I., U. S.

OVERCOATINGS.

Report.—A beautiful exhibit of fancy elysians and fur beavers, excellent in design and texture; their Devonshire kerseys in black and colors especially commendable.

428. The Rock Manufacturing Company, Rockville, Conn., U. S.

FANCY CASSIMERES.

Report.—An unsurpassed exhibit of fancy cassimeres, in great variety of designs, without blemish in texture and finish; the hair-lines and velvets especially commendable.

429. Conshohocken Woolen Mills, Conshohocken, Pa., U. S.

BEAVERS AND DOESKINS.

Report.—Moscow castor and doeskin beavers of medium grades, well made for the purposes intended, and at moderate prices; the diagonal beavers especially commendable.

430. J. Ledward & Son, Chester, Pa., U. S.

COTTON AND WOOL DOESKINS.

Report.—Cotton and wool doeskins of good and substantial make and at low prices, adapted for a large demand in agricultural districts.

431. James Roy & Co., Watervliet Mills, West Troy, N. Y., U. S.

SHAWLS AND WORSTED SUITINGS.

Report.—An excellent and varied display of worsted suitings and plaid shawls, the former of superior manufacture and design, and the shawls especially creditable for good taste in color and design, with cheap cost.

432. North Star Mills, Minneapolis, Minn., U. S.

BLANKETS.

Report.—Commended for blankets made of Minnesota and Ohio wools, of very high excellence and beauty; also for blankets sixty-six inches by eighty-four inches, adapted for popular consumption, at low prices.

433. Waterloo Woolen Manufacturing Company, Waterloo, N. Y., U. S.

SHAWLS.

Report.—Plain and fancy woolen shawls, notable for their brilliancy of colors and beauty of styles.

434. Mission Woolen Mills, San Francisco, Cal., U. S.

BLANKETS.

Report.—Blankets, carriage and lap robes, made of Pacific coast wool, the higher qualities unsurpassed in excellence of fabrication, softness of finish, and tastefulness of borders.

435. Jacobs, Poelaert, & Co., Brussels, Belgium.

BLANKETS.

Report.—Commended for cheapness and adaptation of blankets to general consumption.

436. Leop. Ph. Hemmer, Aix-la-Chapelle, Germany.

FULLING MILL.

Report.—A model of fulling mill, of excellent construction.

437. James Aked & Sons, Halifax, England.

WORSTED COATINGS.

Report.—Worsted coatings of excellent manufacture and at low prices.

438. J. E. & G. F. Buckley, Delph, near Manchester, England.

SHAWLS.

Report.—A small assortment of shawls in creditable styles and at very low cost.

439. Isaac Carr & Co., Bath, England.

MELTONS, BEAVERS, AND OVERCOATINGS.

Report.—Meltons, beavers, and overcoatings of superior manufacture and finish, at moderate cost.

440. Thackray & Co., Leeds, England.

CALF'S HAIR COATINGS.

Report.—A very handsome assortment of calf's hair coatings in beautiful shades and of excellent manufacture.

441. Ainley, Lord, & Co., Huddersfield, England.

WORSTED COATINGS.

Report.—Well-made worsted coatings of good quality.

442. Jesse Clegg, Huddersfield, England.

COTTON WARP FANCY CHEVIOTS.

Report.—Commended for economy in cost in the manufacture of cotton warp fancy cheviots of considerable merit, and adaptation for general use.

443. Liddle & Brearley, Huddersfield, England.

WORSTED COATINGS.

Report.—A very creditable exhibit of worsted coatings, in neat designs, well manufactured, and adapted for general use.

444. S. Bachman, New York, N. Y., U. S.

SHAWLS.

Report.—An excellent display of silk and worsted plaid and reversible woolen velvet shawls, of novel and beautiful designs and excellent fabrication.

445. F. Steffan & Co., Philadelphia, Pa., U. S.

SHAWLS.

Report.—Reversible beaver shawls of wool filling and cotton warp, noticeable for originality and taste of design of gray and black stripes, with borders woven in the Jacquard loom.

446. E. Gootchkof, Moscow, Russia.

CASSIMERES, CLOTHS, AND SHAWLS.

Report.—Very creditable fancy cassimeres, black and colored cloths, and woolen shawls.

447. Baron Stieglitz, near Narva, Russia.

CLOTHS AND BEAVERS.

Report.—Broadcloths, black and colored, beavers, and Moscows, of excellent qualities and finish.

448. Nikitin, Gorjaef, & Co., Moscow, Russia.

DRESS GOODS AND BAREGES.

Report.—Fancy dress goods, gauzes, and bareges, of wool and silk, in elegant styles.

449. E. Armand & Sons, Moscow, Russia.

ALPACAS AND LUSTRES.

Report.—Merinos, figured alpacas, black and colored lustres, in good qualities and brilliant colors.

450. Theodore Mikhailof & Son, Moscow, Russia.

SERGES, REPS, AND ALPACAS.

Report.—A fair collection of fancy dress goods, serges, reps, and black and colored alpacas.

451. G. Kommichau, Belostok, Grodno, Russia.

BLANKETS AND RUGS.

Report.—Woolen goods, blankets, and rugs, in creditable qualities.

452. Augustus Shrader, Moscow, Russia.

LUSTRES, CASHMERES, AND PLAIDS.

Report.—A rich assortment of black and colored lustres, cashmeres, and plaids, in good qualities and colors.

453. Ganeshin & Co., Moscow, Russia.

WORSTED YARNS, MOHAIRS, AND ALPACAS.

Report.—A good assortment of single and twisted worsted yarns, mohairs, and alpacas.

454. G. P. Uskof, Moscow, Russia.

FANCY DRESS GOODS.

Report.—Fancy dress goods, lions, and plaids, in good qualities and designs.

455. Nicholas Seliverstof, Roomiantzevo, Simbirsk, Russia.

CAMEL'S HAIR AND GOAT CLOTHS.

Report.—Cloths woven of goat and camel hair, in natural colors.

456. Poliakof Bros., Moscow, Russia.

FANCY DRESS GOODS.

Report.—Very creditable fancy dress goods in good qualities and moderate prices.

457. V. N. Soovirof, Tooshino, Moscow, Russia.

WOOLEN CLOTHS.

Report.—Black and colored cloths of medium qualities for general use.

458. Shelaief Brothers, Moscow, Russia.

SATINS.

Report.—Plain black and colored cotton-back satins of excellent manufacture.

459. G. J. Lecloux, Dison, Belgium.

BROADCLOTHS.

Report.—Well-made black and blue broadcloths, adapted to the clothing trade, at cheap prices.

460. François Biolley & Son, Verviers, Belgium.

BROADCLOTHS AND OVERCOATINGS.

Report.—Commended for excellence of manufacture and reasonableness of price of broadcloths and overcoatings.

461. Domken Bros., Verviers, Belgium.

FANCY CASSIMERES AND WORSTED COATINGS.

Report.—Commended for cheapness, combined with utility, of fancy cassimeres and worsted coatings.

462. Charles Begasse, Liège, Belgium.

FELTS.

Report.—Well-made felts at cheap prices.

463. Biolley Brothers & Co., Juslenville, Belgium.

FANCY CASSIMERES AND BATISTE CLOTHS.

Report.—Commended for excellent manufacture of fancy cassimeres and batiste cloths.

464. Jean Tasté, Verviers, Belgium.

FANCY CASSIMERES AND MILITARY CLOTHS.

Report.—Commended for cheapness, combined with utility, of fancy cassimeres and military cloths.

465. Beuthner Brothers, Berlin, Germany.

CARD CLOTHING.

Report.—A good assortment of card clothing.

466. M. Chatten & Co., Dison, Belgium.

BLACK AND COLORED CLOTHS AND BEAVERS.

Report.—Commended for good fabrication of black and blue cloths and Moscow beavers at low prices.

467. J. J. Henrion, Dison, Belgium.

FANCY CASSIMERES.

Report.—Commended for good fabrication of fancy cassimeres, with neat designs, and at low prices.

468. Delhez Brothers, Dison, Belgium.

CLOTHS.

Report.—Cloths, Moscows, and other beavers, adapted to popular consumption, at low prices.

469. Clément Bettonville, Hodimont, Belgium.

MOSCOW BEAVERS AND CLOTHS.

Report.—Commended for fair fabrication and cheapness of price of Moscows and other beavers.

470. H. J. Lejeune-Vincent, Dison, Belgium.

FANCY CASSIMERES.

Report.—Commended for novelty of design, excellence of manufacture, and adaptation to public wants, of fancy cassimeres.

471. Peltzer & Son, Verviers, Belgium.

CLOTHS AND DOESKINS.

Report.—Commended for excellent fabrication of broadcloths, doeskins, Moscow beavers, and chinchillas, at reasonable prices.

472. Iwan Simonis, Verviers, Belgium.

BROADCLOTHS, DOESKINS, AND BATISTE CLOTHS.

Report.—Commended for high excellence of manufacture of superfine black broadcloths and doeskins · excellence of batiste cloths.

473. H. & J. Drèze, Dison, Belgium.

MOSCOW AND OTHER OVERCOATINGS.

Report.—Commended for good fabrication of Moscows and other overcoatings, at cheap prices.

474. L. & E. Lairitz, Remda, Germany.

VEGETABLE WOOL.

Report.—A fine exhibit of vegetable wool and manufactures thereof; very well made in every respect.

475. W. Spindler, Berlin, Germany.

DYED AND PRINTED WORSTED YARNS.

Report.—A rich collection of dyed and printed worsted yarns, in brilliant colors and perfect shades.

476. Ackens, Grand, Ry, & Co., Eupen, Germany.

CLOTHS.

Report.—Commended for brilliancy and stability of colors, good quality, and cheapness of their woolen cloths.

477. C. Delius, Aix-la-Chapelle, Germany.

CLOTHS AND COATINGS.

Report.—Commended for his large production of well-made fancy coatings, at moderate prices.

478. Alois Knops, Aix-la-Chapelle, Germany.

BLACK AND COLORED CLOTH.

Report.—Carefully and solidly manufactured black and colored cloths and coatings, at moderate prices.

479. Joh. Wilh. Jansen, Montjoie, Germany.

FANCY CASSIMERES AND COATINGS.

Report.—Excellent fancy cassimeres and overcoatings, produced in elegant styles, fine qualities, and finish.

480. Wiese Brothers, Werden-on-the-Ruhr, Germany.

CLOTH.

Report.—Cloths and overcoatings distinguished by superiority of material and excellence of manufacture and finish.

481. I. P. Schöller, Dühren, Germany.

CLOTHS AND COATINGS.

Report.—Fine cloths and coatings, made of the best wools, with perfect finish.

482. Joh. Erken's Sons, Burtscheid, Germany.

BLACK AND COLORED CLOTHS AND OVERCOATINGS.

Report.—Commended for fineness and finish of doeskins, and for brilliancy of colors and finish of military cloths.

483. L. Schöller & Sons, Dühren, Germany.

CLOTHS AND COATINGS.

Report.—A rich assortment of cloths and worsted coatings, in the best qualities and highest finish.

484. Massing Brothers & Co., Püttlingen, Germany.

BLACK SILK PLUSHES.

Report.—A remarkable assortment of hatters' black silk plushes, of great beauty in color and finish.

485. Paul Scholz, Friedberg, Germany.

WOOLEN STOCKINGS.

Report.—An exhibit of woolen felted stockings, commendable for their good execution and great durability.

486. Seret & Turull, Barcelona, Spain.

SHAWLS AND BLANKETS.

Report.—Shawls and blankets of good qualities.

487. José Jordá & Son, Alcoy, Alicante, Spain.

WOOLEN CLOTHS.

Report.—A collection of cheap fancy cassimeres.

488. Bresca & Co., Barcelona, Spain.

MERINO.

Report.—Merinos and merino shawls of good qualities.

489. Joaquin Casanovos & Son, Sabadell, Barcelona, Spain.

WOOLEN CLOTHS.

Report.—A good collection of fancy cassimeres, at low prices.

490. Maiquez & Tomás, Valencia, Spain.

MANTLE CLOTHS.

Report.—Spanish mantles of original designs.

491. Juan Sallares & Son, Sabadell, Barcelona, Spain.

WOOLEN CLOTHS.

Report.—Fancy cassimeres in creditable qualities and at moderate prices.

492. Rodriguez Brothers, Bejar, Salamanca, Spain.

WOOLEN CLOTHS.

Report.—Black and colored cloths in creditable qualities, at low prices.

493. Tarrat & Sociats, Teruel, Spain.

WOOLEN CLOTHS.

Report.—Colored cloths of good qualities and colors, at low prices.

494. Francisco Sanchez, Seville, Spain.

GOLD BRAIDS.

Report.—A good assortment of gold braids of very creditable manufacture.

495. Sert Brothers & Solá, Barcelona, Spain.

WORSTED GOODS.

Report.—A large display of dress goods, upholstering materials, shawls, blankets, carpets, and plushes, in great variety of qualities and good designs.

496. Bernardo Daupias & Co., Lisbon, Portugal.

CASSIMERES, PONCHAS, AND SHAWLS.

Report.—A creditable assortment of fancy cassimeres, ponchas, and woolen shawls.

497. Constant Burnay, Lisbon, Portugal.

CASSIMERES, FLANNELS, AND BLANKETS.

Report.—A very creditable exhibition of fancy cassimeres, flannels, and blankets.

498. Antonio Alves Bibiano, Pedrogao Grande, Portugal.

BLACK CLOTHS.

Report.—Black cloths in creditable qualities and at low prices.

499. Collective Exhibition of the Tilburg Wool Industry, Tilburg, Netherlands.

BLANKETS AND FLANNELS.

Report.—A large collection of blankets, white and colored flannels, fancy cassimeres, beavers, and kerseys, in creditable qualities and at low prices.

500. Clinton Mills Co., Norwich, Conn., U. S.

BLANKETS.

Report.—Blankets of low grade and cheap price.

501. Norway Plains Co., Rochester, N. H., U. S.

BLANKETS.

Report.—Blankets of fine and medium grade, of excellent manufacture, at moderate prices, noticeable for cleanness of stock and freedom from grease.

502. Campo Grande Woolen Fabrics Co., Lisbon, Portugal.

CLOTHS AND SHAWLS.

Report.—A good assortment of black and blue cloths and shawls.

503. Otto von Bauer, Brünn, Moravia, Austria.

FANCY CASSIMERES.

Report.—A very good collection of fancy cassimeres, of good finish and neat designs, at moderate prices.

504. Emanuel Thieben, Vienna, Austria.

SHAWLS AND ROBES.

Report.—Well-made long shawls and morning robes, in Oriental styles.

505. J. Philip Schmidt & Sons, Reichenberg, Bohemia, Austria.

BLACK AND COLORED CLOTHS.

Report.—Commended for excellent finish and material of black and blue broadcloths.

506. Hlawatsch & Isbary, Vienna, Austria.

SHAWLS.

Report.—Excellent shawls of fine material and good designs in India styles.

507. Wilhelm Siegmund, Reichenberg, Bohemia, Austria.

BROADCLOTHS AND DOESKINS.

Report.—Commended for high excellence and finish of superfine broadcloths and doeskins.

508. Giov. Bozzalla & Brother, Biella, Italy.

CASSIMERES.

Report.—A creditable exhibit of fancy cassimeres, in good designs, and at moderate prices.

509. Antonio Bozzalla & Brother, Coggiola, Italy.

CASSIMERES.

Report.—A creditable exhibit of fancy cassimeres, in good designs, and at moderate prices.

510. Bergsbro Manufacturing Co., Norrköping, Sweden.

CASSIMERES.

Report.—Fancy cassimeres of excellent manufacture and design.

511. Drag Manufacturing Co. (Limited), Norrköping, Sweden.

FANCY CASSIMERES AND OVERCOATINGS.

Report.—Fancy cassimeres, ratiné, and other overcoatings, doeskins and tricots of superior manufacture and finish.

512. Malmö Wool Manufacturing Co. (Limited), Malmö, Sweden.

CASSIMERES AND COATINGS.

Report.—Fancy cassimeres and worsted coatings, for general consumption, good for the cost of production.

513. Starkey Brothers, Huddersfield, England.

BEAVERS AND DOESKINS.

Report.—Beavers, venetians, doeskins, and woaded cloths, of excellent manufacture, color, and finish.

514. Ballarat Woolen Co., Ballarat, Victoria, Australia.

TWEEDS, SHAWLS, AND FLANNELS.

Report.—Tweeds, shawls, and flannels of honest and substantial manufacture, at moderate cost and good for general use.

515. Alexander Gray Co., Albion Woolen Mills, Geelong, Victoria, Australia.

TWEEDS AND SHAWLS.

Report.—All wool tweeds, in a handsome assortment of shawls and patterns, and of honest and substantial manufacture.

516. William King, Morley, Leeds, England.

COTTON WARP CLOTHS.

Report.—Commended for economy and cost of cotton warp cloths, of excellent make and finish.

517. Charles Hooper & Co., Stonehouse, Gloucestershire, England.

CLOTHS, BEAVERS, AND DOESKINS.

Report.—An excellent assortment of black and blue superfine cloths; scarlet, crimson, and other fine military cloths of brilliant and permanent colors; kerseys of close and fine texture; Hooper's web, a specialty of the house; elysians, beavers, and doeskins; all of a high order of merit, and comprising an unusual variety for one manufactory.

518. Thomas Mallinson & Sons, Huddersfield, England.

FANCY CHEVIOTS.

Report.—A small assortment of fancy cheviots, of superior manufacture, at low prices, and adapted for general consumption.

519. Marling & Co., Stroud, England.

CLOTHS AND BEAVERS.

Report.—An excellent assortment of superfine cloths, beavers, doeskins, and cassimeres, of superior merit and of permanent colors and finish.

520. Samuel Salter & Co., Trowbridge, Wilts, England.

FANCY CASSIMERES.

Report.—A very handsome assortment of fancy cassimeres in novel styles, and at moderate prices.

521. John Day & Son, Huddersfield, England.

CHEVIOT COATINGS.

Report.—Cheviot coatings, of excellent manufacture, at small cost, and adapted for general use.

522. Joseph Buckley & Co., Delph, near Manchester, England.

COTTON AND WOOL SHAWLS.

Report.—Cotton and wool shawls, in tasteful patterns and combinations, at low cost.

523. John Taylor & Sons, Great Britain.

WORSTED COATINGS AND SILK AND WOOL CASSIMERES.

Report.—Worsted coatings and fancy cassimeres of silk and wool, of excellent manufacture and neat patterns.

524. Hargreave & Nusseys, Leeds, England.

WORSTED COATINGS.

Report.—Worsted coatings, medium cloths, tweeds, and meltons; all of superior quality, excellent manufacture, and at low prices.

525. T. W. Little & Co., Leeds, England.

UNION CLOTHS.

Report.—Mixed union cloths, birds'-eye, and tweeds, at low cost, adapted for general consumption.

526. William Child, Huddersfield, England.

MOHAIR SEALSKINS.

Report.—A very fine exhibit of mohair sealskins, tipped seal and dog skins, of exceedingly fine quality, rich material and finish; all of the highest order of merit.

527. M. Mahony & Bros., Cork, Ireland.

BLARNEY TWEEDS.

Report.—A complete assortment of Blarney tweeds, in a great variety of colors, patterns, and qualities; all of a high order of merit, and most useful goods for general consumption.

528. Henry Andrews & Co., Leeds, England.

COATINGS AND COTTON WARP.

Report.—Worsted coatings, cotton warp, melton, and water-proof, of excellent manufacture, and at low cost.

529. J. D. Birchall & Co., Leeds, England.

TWEEDS AND COATINGS.

Report.—A very complete assortment of light tweeds, of beautiful colors and texture; also worsted coatings, meltons, and beavers; all of superior merit, at moderate cost, and adapted for general use.

530. J. Vicars, Sydney, New South Wales, Australia.

TWEEDS, PLAIDS, AND SHAWLS.

Report.—Tweeds, plaids, and shawls of honest and substantial manufacture, made of domestic wool, and very creditable for a new country.

531. B. Hepworth & Sons, Dewsbury, England.

LAP ROBES AND RUGS.

Report.—Lap robes and rugs, in great variety of pattern and of excellent manufacture; also ingenuity of process of shearing rugs so as to produce an imitation of an animal's skin.

532. The Kanoko-shosha Co., Kiyoto, Japan.

DYED CRAPES.

Report.—Commended for excellent production of tie and dye (Kanoko) crapes.

533. Custodio Lopes da Silva Guimaraes, Penafiel, Portugal.

GOLD AND SILVER GALLOONS AND GIMP.

Report.—A good assortment and well made gold and silver galloons and gimp.

534. Ramires & Ramires, Lisbon, Portugal.

COLORED SILKS, VESTINGS, AND RICH BROCATELLES.

Report.—Black and colored failles of excellent manufacture in every respect; rich brocatelles of good design and execution.

535. John Kemperling & Sons, Vienna, Austria.

CIGAR AND HATTERS' RIBBONS.

Report.—Silk, and silk and cotton, cigar and hatters' ribbons, of medium grade, in a great variety of colors and designs. The goods are very effective and of good manufacture, both with regard to combination of materials and to their execution.

536. Usni Hadji, Brousse, Turkey.

FELTS.

Report.—Felts of excellent quality.

537. Joh. Schwarz & Son, Vienna, Austria.

HATTERS' RIBBONS.

Report.—Specialty of hatters' ribbons, very clearly and neatly made; first-rate in manufacture in every respect.

538. Piqua Woolen Mills, F. Gray, O'Farrell & Co., Piqua, Ohio, U. S.

PAPER-MAKERS' WET AND PRESS FELTS AND JACKETS.

Report.—A creditable exhibit of Fourdrinier print, cylinder print, wrapping, second press, and jacket felts for paper-makers' use.

539. Alfred Dolge, New York, N. Y., U. S.

FELTS.

Report.—A superb exhibit of piano felt, made from Silesian wool, jewelers' and marble masons' polishing felts; all of creditable fabrication.

540. Collective Exhibition of Weavers from Nagahama, Province of Omi, Japan

WHITE CRAPES.

Report.—A very fine assortment of white silk crapes, showing great clearness in color and regularity in texture, particularly those marked "Nishigori."

541. National Manufactory of Gobelins, Paris, France.

GOBELINS.

Report.—Splendid specimens of Gobelin tapestry, representing this celebrated establishment.

542. Ministry of the Colonies, The Hague, Netherlands.

GOLD EMBROIDERY STUFFS.

Report.—A splendid collection of silk and Oriental tissues, superb in design and perfect in workmanship; highly meritorious for the great care bestowed on this exhibit.

543. National Tapestry Manufactory of Beauvais, Beauvais, France.

TAPESTRY.

Report.—Very fine specimens of artistically woven tapestry, perfect in design, combination of colors, and general execution.

544. The Eickmeyer Hat Blocking Machine Co., New York, N. Y., U. S.

HAT-MAKING MACHINERY.

Report.—Ingenious, novel, and highly valuable labor-saving machinery, adapted for the making of hats, extensively used in this manufacture in place of hand processes, to wit, a hat-tip stretching machine, a universal hat pouncing machine, and hat ironing machine.

545. Norris & Co., London, England.

UPHOLSTERY GOODS.

Report.—A fine display of upholstery silks, of good styles and well manufactured.

546. Henry Noske, Philadelphia, Pa., U. S.

PAPER-MAKERS' FELTS.

Report.—Well-made paper-makers' felts.

547. Novelty Weaving and Braiding Works, Tobias Kohn, Hartford, Conn., U. S.

BRAIDS.

Report.—A very fine exhibit of braids, well made in every respect as to quality and color.

548. Shuler & Benninghofen, Hamilton, Ohio, U. S.

PAPER-MAKERS' FELTS.

Report.—Well-made felts for paper-making.

549. W. H. Horstmann & Sons, Philadelphia, Pa., U. S.

DRESS, CARRIAGE, AND UPHOLSTERY TRIMMINGS.

Report.—A splendid exhibit of dress, carriage, and upholstery trimmings, of great excellence and beauty in style, material, and execution; also a very handsome and complete assortment of woolen and mohair yarns, known to the trade as Germantown, cashmere, Saxonia, Shetland, and Balmoral yarns, of brilliant colors, variety of shades, and regularity of spinning.

550. Frezon Sr., & Leclerq, Amiens, France.

CHEMICAL PROCESS FOR REMOVING FIBRES FROM WOOLENS.

Report.—An interesting exhibit of cloths illustrating a chemical process for removing fibres of burrs, thistles, and vegetable particles from woolen fabrics, the samples showing extraordinary efficiency in the process employed, and indicating a discovery of great practical value.

551. E. Roussel, Roubaix, France.

DYED STUFFS.

Report.—A very fine collection of piece-dyed woolens, perfect in shade and finish.

552. L. Dupont, Beauvais, France.

UPHOLSTERIES AND AXMINSTER CARPETS.

Report.—Commended for excellence and originality of designs in tapestry and upholstery fabrics; also Axminster carpets of superior quality and beautiful designs.

553. S. B. & M. Fleisher, Philadelphia, Pa., U. S.

BRAIDS.

Report.—A fine exhibit of the "Star" alpaca braids, of superior manufacture, perfect in colors, and of the best materials, placing this braid in the first rank.

554. William Strange & Co., Paterson, N. J., U. S.

RIBBONS.

Report.—Commended for an extremely fine exhibit of plain and fancy ribbons, of good materials, well made in every respect; also for sash and millinery ribbons of great beauty and superior quality.

555. Enterprise Co., Woonsocket, R. I., U. S.

SHOE LASTINGS.

Report.—A very creditable exhibit of 11, 14, and 16 thread lastings of honest make and good quality for the number of threads. The goods are well adapted for the manufacture of boots and shoes.

556. Newichawanick Company, South Berwick, Me., U. S.

HORSE BLANKETS.

Report.—An excellent exhibit of horse blankets in great variety of styles.

557. Pontoosuc Woolen Manufacturing Co., Pittsfield, Mass., U. S.

ROBES AND BLANKETS.

Report.—An excellent exhibit of lap and railway robes, all made of California wool; the Pullman palace and Wagner's blankets are particularly noteworthy.

558. D. Goff & Son, Pawtucket, R. I., U. S.

ALPACA BRAIDS.

Report.—A complete assortment of alpaca braids, in a beautiful variety of colors and mixtures, of uniform width and length, and admirably adapted for trimming ladies' dresses.

559. G. L. Kelty & Co., New York, N. Y., U. S.

TERRIES AND DAMASKS FOR UPHOLSTERY PURPOSES.

Report.—Plain, figured, and striped terries and damasks for upholsterers' use, substantially made, and of neat designs.

560. John Sytof, St. Petersburg, Russia.

GOLD DAMASKS.

Report.—Silk and velvet brocades, and velvets made of silk, silver, and gold, of great beauty in design and excellent manufacture; also trimmings of the same materials.

561. Michael Borodin, Moscow, Russia.

GAUZES.

Report.—A very fine exhibit of gauzes and fancy dress goods, in very good taste and of perfect execution.

562. Mosjookhin & Sons, Moscow, Russia.

DAMASKS AND BROCADES.

Report.—A fine display of rich furniture silk damasks of great perfection in the execution.

563. Alexander Timashef, Moscow, Russia.

GAUZES.

Report.—A large display of striped and fancy gauzes, very well made.

564. Braquenie Brothers, Malines, Belgium.

TAPESTRIES.

Report.—A rich collection of tapestries (Gobelins), of excellent workmanship, and designs of a very high artistic merit.

565. Hauzeur-Gerard Son, Verviers, Belgium.

YARNS.

Report.—Excellent carded yarns in great variety and brilliancy of color.

566. Armand Jamme, Saint-Hadelin, Belgium.

CARDED YARNS.

Report.—Well-spun carded yarns of great variety of colors.

567. Bergmann & Co., Berlin, Germany.

DYED ZEPHYR WOOL.

Report.—Commended for the brilliancy of colors, perfection and variety of shadings of their Berlin wools.

568. Heinrich Hüffer, Crimmitschau, Germany.

VIGOGNE YARNS.

Report.—Commended for the good assortment, large production, and cheapness of his vigogne yarns.

569. Württemberg Wool Felt Co., Giengen o. B., Germany.

FELTS.

Report.—A rich collection of wool felts in great perfection.

570. Tittel & Krüger, Leipsic, Germany.

DYED WORSTED YARNS.

Report.—Well-dyed worsted yarns, in brilliant colors.

571. Worsted Yarn Co., Kaiserslautern, Germany.

WORSTED YARNS.

Report.—Commended for large production of fine worsted yarns for weaving purposes, in great variety of qualities, colors, and mixtures.

572. Dufour & Co., Thal, Switzerland.

SILK BOLTING-CLOTH.

Report.—Bolting-cloth of good manufacture, well adapted for the purpose.

573. Sl. Siegenthaler, Enggistein, Switzerland.

FELTS.

Report.—A good collection of felts for shoes and hats, for general use, and at moderate prices.

574. Meyer Brothers, Zurich, Switzerland.

BOLTING-CLOTH.

Report.—Bolting-cloth of great regularity and perfection of quality.

575. Heidegger, Wegmann, & Co., Seefeld, Zurich, Switzerland.

SILK BOLTING-CLOTH.

Report.—Bolting-cloth remarkable in all grades for superior manufacture and regularity.

576. Egli & Sennhauser, Zurich, Switzerland.

BOLTING-CLOTH.

Report.—Bolting-cloth in great variety; evenly and well made.

577. Reiff-Huber, Zurich, Switzerland.

BOLTING-CLOTH.

Report.—A large variety of bolting-cloths, deserving special merit for great perfection in their manufacture.

578. Mehmed Erwin, Constantinople, Turkey.

FURNITURE BROCADES.

Report.—A great display of divan figured velvets of rich design and good execution.

579. Giorgi Melouk, Damascus, Turkey.

GOLD FIGURED VESTMENTS.

Report.—Rich damask mantle of great beauty in material, design, and execution.

580. F. A. Jevarjeief, St. Petersburg, Russia.

SILVER AND GOLD FABRICS FOR CHURCH VESTMENTS.

Report.—A magnificent display of sacerdotal vestments, made of silver and gold tissues, of excellent execution, preserving the traditional splendor of the Greek Church.

581. Gibb & Co., Philadelphia, Pa., U. S.

CARPETS.

Report.—An exhibit of cotton-warp and rag-filling carpet of substantial manufacture, at fair prices; especially adapted for kitchen or common use.

582. Ballard Vale Mills, Ballard Vale, Mass., U. S.

FLANNELS.

Report.—An exhibit of all wool flannels from No. 1 to 5, including extra and double extra, all highly meritorious; the four-fourths silk warp wool filling and four-fourths silk warp gauze especially commendable for perfection of fabrication.

583. Leedom, Shaw, & Stewart, Philadelphia, Pa., U. S.

CARPETS.

Report.—A creditable exhibit of extra super carpets and damask Venetians, of good designs, especially noticeable for low prices.

584. McCallum, Crease, & Sloan, Philadelphia, Pa., U. S.

CARPETS.

Report.—An excellent exhibit of two and three ply ingrain carpets, unexceptionable in texture, design, and color, the material and fabrication indicating excellent wearing qualities.

585. Seffarlen & Fritz, Philadelphia, Pa., U. S.

RAG-CARPET YARNS.

Report.—An excellent exhibit of wool and cotton rag-carpet yarns, made from carpet noils, in a great variety of shades; the solferino, pink, and orange especially noteworthy.

586. The Society of Friends of Handiwork, Stockholm, Sweden.

CARPETS AND RUGS.

Report.—A beautiful exhibit of carpets and rugs, in the ancient traditional styles of the country of production, made by hand.

587. Mrs. E. B. Shapleigh, Philadelphia, Pa., U. S.

HAND-MADE RUGS.

Report.—Two rugs made of carpet yarns by the process denominated hooking, being a novel and tasteful adaptation from a domestic industry largely pursued in the State of Maine, and capable of extensive application by ladies for household decoration.

588. P. de Andria & Co., Smyrna, Turkey.

CARPETS.

Report.—A splendid collection of Turkish carpets, excellent in style and quality.

589. J. G. McGee & Co., Belfast, Ireland.

RUGS AND WRAPS.

Report.—A very handsome assortment of rugs and traveling wraps, made chiefly of mohair, silk, and wool, in imitation of real furs, otter, sealskin, and beavers; all of superior merit and beautiful combinations.

590. John & James Dobson, Philadelphia, Pa., U. S.

CARPETS, BLANKETS, AND OVERCOATINGS.

Report.—A varied exhibit of carpetings, all attractive in design and desirable as low and medium grades at moderate prices; also blankets, all wool fur beavers, and chinchillas, adapted for the masses.

591. C. W. & J. Peirce, Bristol, Pa., U. S.

FELTS, CRUMB-CLOTHS, AND FELT SKIRTS.

Report.—A capital display of felts for carpetings, skirts, and other purposes, made of all wool and cotton and wool; the fabrication substantial and excellent, the designs of the carpetings and crumb-cloths remarkable for originality and beauty.

592. Taylor & Mullen, Newark, Del., U. S.

CARPETS AND MATS.

Report.—A creditable exhibit of rag carpets and mats.

593. Hartford Carpet Co., Hartford, Conn., U. S.

CARPETS.

Report.—A capital exhibit of Brussels and two and three ply ingrain carpets, all of the best fabrication; the designs original and tasteful, and the colors clear and bright; the material and texture indicating high wearing qualities. The exhibit is illustrative of a vast production.

594. Roxbury Carpet Co., Boston, Mass., U. S.

TAPESTRY AND VELVET CARPETS.

Report.—A superior exhibit of tapestry Brussels and tapestry velvet carpets, of high excellence in texture, color, and original design; the pile conspicuous for its length, indicating good wearing qualities.

595. Alexander Smith & Sons Carpet Co., Yonkers, N. Y., U. S.

CARPETS.

Report.—A beautiful display of Axminster and tapestry Brussels and tapestry velvet carpets, the latter excellent in texture and design; the Axminster carpets distinguished for great beauty of design, color, and texture, and remarkable as made by original automatic machinery introduced by the senior exhibitor.

596. Lowell Manufacturing Co., Lowell, Mass., U. S.

CARPETS AND LASTINGS.

Report.—An imposing exhibit of Brussels, Wilton, and two and three ply ingrains, all of the best fabrication; the designs original and tasteful, and the colors clear and bright; the material and texture indicating excellent wearing qualities. The exhibit is illustrative of a vast production. Commended also for lastings.

597. Monitor Mills, Philadelphia, Pa., U. S.

CARPETS.

Report.—An excellent exhibit of two and three ply ingrains, specially noticeable for originality of certain patriotic designs, and of good quality and fair prices.

598. Bigelow Carpet Co., Clinton, Mass., U. S.

CARPETS.

Report.—A brilliant display of Brussels and Wilton carpets, in material, texture, design, and color possessing all the elements of the highest manufacture; the Wiltons especially conspicuous for chasteness of design and perfection of fabrication.

599. John Bromley & Sons, Philadelphia, Pa., U. S.

CARPETS.

Report.—A good exhibit of super and extra-super ingrain and damask Venetian carpets, tastefully designed and unexceptionable in fabrication.

600. J. & H. Hutchison, Brooklyn, N. Y., U. S.

MATS.

Report.—A capital exhibit of cocoa and brush mats, with and without wool borders; excellent in design and quality, and at fair prices.

601. Ivins, Dietz, & Magee, Philadelphia, Pa., U. S.

CARPETS.

Report.—The only exhibit of cotton and wool and cotton ingrains, of excellent designs, at very low prices.

602. The Read Carpet Co., Bridgeport, Conn., U. S.

CARPETS AND CARPET TERRY.

Report.—Commended for two-ply ingrain carpets, excellent in design and finish; for originality in weaving the same with variegated yarns, increasing the number of colors; and for all wool carpet terries, serviceable and novel, adapted for libraries and offices.

603. Clement Gravier, Nîmes, France.

CARPETS.

Report.—Commended for excellence of design and execution of carpets.

604. Dienelt & Eisenhardt, Philadelphia, Pa., U. S.

GEE NON-SHUTTLE POWER CARPET LOOM.

Report.—A needle loom of ingenious construction, and a Jacquard loom for weaving silk scarfs.

605. Armand Guédan & Co., Nîmes, France.

AXMINSTER CARPETS.

Report.—Axminster carpets of finest quality and beautiful designs.

606. Gevers & Schmidt, Schmiedeberg, Germany.

SMYRNA CARPETS.

Report.—A rich assortment of imitations of Smyrna carpets of superior quality and tasteful Turkish styles.

607. Gustav Schweinburg, Vienna, Austria.

CARPETS.

Report.—A good assortment of substantial carpets for general use, at moderate prices.

608. Julius Schnabel, Oravitza, Austria.

CARPETS.

Report.—A collection of Slavonic carpets in original styles.

609. Ignaz Ginzkey, Maffersdorf, Bohemia, Austria.

BLANKETS AND CARPETS.

Report.—Blankets and carpets distinguished for taste of design, beauty of dye, and excellence of finish.

610. A. G. Garjeanne & Co., Delft, Netherlands.

CARPETS.

Report.—Imitations of Smyrna carpets, of good qualities and taste.

611. Jan Heukensfeldt, Delft, Netherlands.

CARPETS.

Report.—Imitations of Smyrna carpets of good qualities.

612. Royal Carpet Manufactory, Deventer, Netherlands.

CARPETS.

Report.—A fine collection of imitations of Smyrna carpets in tasteful designs.

613. Said Effendi, Sivas, Turkey.

CARPETS.

Report.—Turkish carpets of beautiful designs.

614. Edver, Diarbekir, Turkey.

CARPETS.

Report.—Turkish carpets of distinguished styles.

615. Tomkinson & Adam, Kidderminster, England.

CARPETS.

Report.—A fine collection of Axminster carpets in beautiful qualities and magnificent designs.

616. Henderson & Co., Durham, England.

AXMINSTER CARPETS.

Report.—A fine and rich assortment of Axminster carpets of admirable designs and qualities.

617. Mehmet Oglou Alichan, Turgosklou, Turkey.

CARPETS.

Report.—Turkish carpets, very well made in every respect.

618. Mohamet, Angora, Turkey.

CARPETS.

Report.—Commended for excellence of quality and very fine combination of colors of Turkish carpets.

619. John Crossley & Sons (Limited), Halifax, England.

CARPETS.

Report.—A large collection of tapestry, Brussels, velvet, and Wilton carpets, in superior qualities and at moderate prices.

620. John Lewis, Halifax, England.

CARPETS.

Report.—A collection of Brussels and Wilton carpets of best qualities and exquisite styles.

621. J. & J. S. Templeton, Glasgow, Scotland.

CARPETS.

Report.—Commended for a rich variety of Wilton and Brussels carpets in admirable designs and superior qualities, and especially for patent brocade curtains, silk and wool, in the most elegant designs and combinations of colors.

622. James Templeton & Co., Glasgow, Scotland.

CARPETS.

Report.—A superior assortment of Axminster carpets, in exquisite styles and of best quality.

623. S. R. Parkhurst, Newark, N. J., U. S.

DOUBLE-CYLINDER BURR-PICKER.

Report.—Well-constructed burring machines.

624. Dornan Bros. & Co., Philadelphia, Pa., U. S.

POWER CARPET LOOM.

Report.—An ingenious needle loom in which the colored weft to be thrown is selected by a Jacquard and raised so as to bring it within the range of the reciprocating needle; this carries it half way across the shed, where it is met by a hook, which in retreating carries the bight of the weft to the other selvage, where it is knit in by a latch needle.

625. M. A. Furbush & Son, Philadelphia, Pa., U. S.

SET OF CARDING MACHINES.

Report.—A series of carding machines, well built, and showing several very valuable improvements; also a Murkland loom, showing simplicity, excellence of finish in work, and great production.

626. James Butterworth & Son, Philadelphia, Pa., U. S.

RAG PICKER AND RAG DUSTER.

Report.—Two machines, a rag waste and shoddy picker, and a rag duster, both of good workmanship.

627. Société Houget et Teston, Bède & Co., Verviers, Belgium.

WOOL-PICKING AND CLEANING MACHINE.

Report.—Wool-picking and cleaning machine; condenser card and fulling mill; all of excellent construction.

628. Thomas Stevens, Coventry, England.

SILK LOOM AND SILK FIGURED RIBBONS.

Report.—Silk loom of excellent and quite original construction, design, and quality; result excellent and economical; new and excellent plan to lessen the pressure of the cards in the Jacquard machine. The large variety of figured and emblematical silk ribbons evinces the highest perfection.

629. S. H. Powers, Woodstock, New Brunswick.

HAND LOOM.

Report.—A useful hand loom for domestic purposes.

630. James Smith & Co., Philadelphia, Pa., U. S.

MACHINES AND CARD CLOTHING.

Report.—A machine for washing wool and a garnet machine or hand-waste card, both of excellent and simple construction and good workmanship; also a very creditable exhibit of card clothing.

631. Thames River Worsted Co., Norwich, Conn., U. S.

SPINNING FRAME.

Report.—Commended for a ring and traveler spinning frame for worsteds.

632. Rodney Hunt Machine Co., Orange, Mass., U. S.

FULLING MILL.

Report.—A useful fulling mill.

633. James Short, New Brunswick, N. J., U. S.

CARPET LOOM.

Report.—A tapestry carpet loom with an ingenious positive motion.

634. George Crompton, Worcester, Mass., U. S.

LOOMS.

Report.—The best looms for fancy weaving on shawls, cassimeres, and satinets, embracing original inventions, ingenious construction, and excellent workmanship.

635. B. A. Earl, Philadelphia, Pa., U. S.

WOOL-OILING MACHINERY.

Report.—A useful wool-oiling attachment for carding machines.

636. Woonsocket Machine Co., Woonsocket, R. I., U. S.

SELF-ACTING SPINNING MILL.

Report.—A self-acting spinning mill of excellent construction and good workmanship.

637. John D. Cutter & Co., Paterson, N. J., U. S.

SEWING-SILK AND SILK MACHINERY.

Report.—Black and colored sewing-silks and machine twist, excellent in every respect, and particularly distinguished for the great regularity obtained through their new system of grading the sizes. The machinery exhibited for the purpose of spooling and measuring the silk is of ingenious construction and good workmanship.

SIGNING JUDGES OF GROUP IX.

The numbers annexed to the names of the Judges indicate the reports written by them respectively.

HAYAMI KENZO, 1, 7, 45, 46, 48, 50, 55, 56, 99, 103, 104, 105, 109, 110, 111, 145.

GUSTAV GEBHARD, 2, 3, 4, 5, 8, 11, 13, 14, 17, 24, 26, 28, 30, 33, 39, 47, 49, 51, 52, 54, 58, 59, 60, 61, 62, 64, 70, 71, 74, 77, 79, 80, 81, 87, 88, 89, 90, 100, 102, 106, 107, 108, 114, 115, 122, 124, 129, 131, 133, 134, 140, 142, 146, 148, 151, 152, 153, 154, 156, 180, 337, 338, 340, 408, 458, 541, 542, 543, 547, 549, 551, 561, 574, 578, 579, 580, 588, 603, 628, 637.

JOHN G. NEESER, 6, 18, 19, 20, 22, 31, 40, 43, 44, 66, 68, 72, 91, 130, 141, 143, 155, 484, 494, 533, 534, 540.

MAX WEIGERT, 9, 10, 157, 162, 169, 170, 177, 179, 191, 213, 231, 232, 245, 279, 298, 324, 332, 342, 346, 375, 418, 436, 438, 439, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 456, 457, 459, 465, 474, 475, 485, 486, 487, 488, 489, 490, 491, 492, 493, 495, 496, 497, 498, 499, 502, 508, 509, 519, 520, 523, 525, 536, 564, 573, 584, 595, 596, 598, 604, 605, 606, 607, 608, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 625, 627, 629, 631, 632, 633, 634, 635, 636.

CHARLES LE BOUTILLIER, 12, 15, 25, 27, 29, 32, 42, 57, 63, 73, 75, 82, 93, 117, 119, 120, 121, 123, 126, 127, 128, 132, 135, 136, 144, 149, 150, 181, 407, 554, 560, 562.

ELLIOT C. COWDIN, 16, 21, 23, 53, 65, 67, 69, 76, 85, 86, 92, 94, 95, 96, 97, 98, 101, 112, 113, 138, 406, 535, 537, 545, 553, 563, 572, 575, 576, 577, 602.

AUGUST BEHMER, 34, 35, 36, 37, 38, 41, 147, 339, 532.

LOUIS CHATEL, 78, 83, 116, 118, 125, 137, 139.

CHARLES J. ELLIS, 84, 171, 178, 185, 329, 330, 343, 360, 362, 363, 365, 366, 367, 368, 369, 372, 373, 374, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 404, 409, 410, 411, 412, 416, 419, 424, 425, 426, 428, 429, 431, 433, 434, 460, 461, 462, 464, 468, 470, 472, 500, 501, 538, 539, 546, 552, 556, 557, 581, 583, 585, 590, 591, 593, 597, 599, 600, 601, 624.

HENRY MITCHELL, 158, 163, 164, 165, 166, 167, 168, 172, 190, 192, 193, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 246, 248, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 325, 326, 327, 328, 331, 333, 341, 344, 347, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 370, 371, 382, 400, 401, 402, 403, 437, 440, 441, 442, 443, 476, 477, 478, 479, 480, 481, 482, 483, 513, 514, 515, 516, 517, 518, 521, 522, 524, 526, 527, 528, 529, 530, 531, 555, 558, 567, 568, 569, 570, 571, 589.

JOHN L. HAYES, 159, 160, 161, 173, 174, 175, 176, 182, 187, 189, 194, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 247, 334, 335, 336, 345, 348, 361, 364, 376, 377, 378, 379, 380, 405, 413, 414, 415, 417, 420, 421, 422, 423, 427, 430, 432, 435, 463, 466, 467, 469, 471, 473, 503, 504, 505, 506, 507, 544, 548, 550, 559, 565, 566, 582, 586, 587, 592, 594, 609, 623.

THEODORE BOCHNER, JR., 183, 233, 381, 455, 626, 630.

J. D. LANG, 184, 188.

CARL ARNBERG, 249, 510, 511, 512.

EDWARD H. KNIGHT, 186.

SUPPLEMENT TO GROUP IX.

REPORTS
OF
JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.

COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. Sanford Mills, Sanford, Me., U. S.

LAP ROBES.

Report.—Commended for excellence in color and general finish, fitness for purpose, together with economy in cost.

2. French & Co., Norwich, England.

NORWICH CRAPE, IN SINGLE, DOUBLE, AND TREBLE.

Report.—Commended for a high degree of excellence in texture and finish.

3. Wilhelm Schröder & Co., Zurich, Switzerland.

SILKS.

Report.—A large display of dress silks, excellent in texture and color.

4. Homberger Bros., Wetzikon, Switzerland.

SILK BOLTING-CLOTH.

Report.—Commended for uniformity in texture and fitness for purpose intended.

5. Baumann & Streuli, Horgen, Switzerland.

DRESS SILKS, CHANGEABLE COLORS.

Report.—Commended as excellent in color and texture.

6. Jose Maria Casqueiro, Crato, Portalegre, Portugal.

WOOLS.

Report.—Washed wools of good quality.

7. Devoosse-Blaise, Dison, Belgium.

CASSIMERES.

Report.—Good fabrics, excellent in design and finish.

8. M. Wihl & Co., Verviers, Belgium.

CASSIMERES.

Report.—A good display in various weights, excellent in color and designs.

9. Campos Mello & Co., Covilhan, Portugal.

CASSIMERES.

Report.—Commended for fancy cassimeres of good fabrication and neat designs.

10. Padronello Woolen Fabrics Co., Amarante, Portugal.

CASSIMERES, OVERCOATINGS, AND SHAWLS.

Report.—Commended for a large display of excellent fabrics tastefully designed.

11. Antonio Jose Pereira da Silva e Alves, Oporto, Portugal.

SEWING SILK.

Report.—Commended for uniform twist and superior strength.

12. Franzi Brothers fu Giuseppe, Alzano Maggiore, Italy.

SILK.

Report.—A good exhibit in tram, organzine, and twist, well prepared and excellent in general finish.

13. Eduardo Augusto Pereira, Meixanil, Oporto, Portugal.

WOOLS.

Report.—An exhibit of wools, washed and in the grease, of good quality and staple.

14. The Colony of the Cape of Good Hope.

WOOLS.

Report.—A collection of samples, indiscriminately selected from bales for export, showing excellent merino and Angora wools.

15. T. L. Davidson, Salem, Oregon, U. S.

MERINO WOOL.

Report.—Commended for fine staple, together with good strength.

16. Fernando Ibanez Palenciano, Valencia, Spain.

SILKS, BROCADE, AND DAMASK.

Report.—Commended for good design and workmanship of hand-made silks of old Moorish and Oriental styles.

SIGNING JUDGES OF SUPPLEMENT TO GROUP IX.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

BENJ. F. BRITTON, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.

COLEMAN SELLERS, 16.

STANDARD THERMAL ANALYSIS

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

The standard thermal analysis is a method for determining the thermal stability of a material. It is performed by heating a sample at a constant rate and measuring the weight loss and the change in heat flow. The results are used to determine the decomposition temperature and the activation energy of the decomposition reaction.

