

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/  
Couverture de couleur
- Covers damaged/  
Couverture endommagée
- Covers restored and/or laminated/  
Couverture restaurée et/ou pelliculée
- Cover title missing/  
Le titre de couverture manque
- Coloured maps/  
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/  
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/  
Planches et/ou illustrations en couleur
- Bound with other material/  
Relié avec d'autres documents
- Tight binding may cause shadows or distortion along interior margin/  
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/  
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- Additional comments:/  
Commentaires supplémentaires:

- Coloured pages/  
Pages de couleur
- Pages damaged/  
Pages endommagées
- Pages restored and/or laminated/  
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/  
Pages décolorées, tachetées ou piquées
- Pages detached/  
Pages détachées
- Showthrough/  
Transparence
- Quality of print varies/  
Qualité inégale de l'impression
- Continuous pagination/  
Pagination continue
- Includes index(es)/  
Comprend un (des) index

Title on header taken from: /  
Le titre de l'en-tête provient:

- Title page of issue/  
Page de titre de la livraison
- Caption of issue/  
Titre de départ de la livraison
- Masthead/  
Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below /  
Ce document est filmé au taux de réduction indiqué ci-dessous.

|     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 10X | 12X | 14X | 16X | 18X | 20X | 22X | 24X | 26X | 28X | 30X | 32X |
|     |     |     |     |     |     |     |     | ✓   |     |     |     |

# CANADIAN JOURNAL OF Fabrics

THE JOURNAL OF THE  
Textile Trades of Canada.

Vol. XV.

TORONTO AND MONTREAL, NOVEMBER, 1898.

No. 11.

The United Alkali Company, Limited, of England.



Caustic Soda, 60°, 70°, 74°, 76°, 77°. Soda Ash, all strengths, SAL. SODA. PURE ALKALI. 58°.

WILSON, PATERSON & CO., Montreal, Sole Agents.  
Importers of Sulphate of Alumina, Hypo Sulphite of Soda, Bichromate of Soda, Silicate of Soda, Caustic Potash, Crystal Carbonate, Borax, Coconut Oil, Palm Oil, Castor Oil, Cotton Seed Oil, Rosin Oil, ROSIN. All Chemicals used by Soap, Paper, Woolen, and Cotton Manufacturers.

NEW YORK OFFICE, - 133, 135, 137 FRONT STREET

McARTHUR, CORNEILLE  
& CO.

Importers and  
Manufacturers of

**OILS** . . . . .  
**CHEMICALS**  
and **DYE**  
**STUFFS**

310 to 316 St. Paul St.  
MONTREAL . . . . .

**MILLS SOAPS**  
DOMINION DYEWOOD  
& CHEMICAL CO. TORONTO  
MANUFACTURERS.

**ANILINES - ALIZARINES**

DYEWOODS, CHEMICALS, ACIDS, ETC.

MARSHALL'S INDIGOS AND ARCHILS

SOLE AGENTS IN CANADA FOR

CARL NEUHAUS—Alizarines, Acetates, etc.  
ANILINE DYE WORKS, (FORMERLY A. CERBER & CO.)—Direct Cotton Colors.

CHEMISCHE FABRIKEN VORN WEILER-TER MEER—Aniline Colors and Chemical Products.

JOHN MARSHALL, SON & CO.—Indigos, Archils, Extract Fustic and Logwood.

SCOTTISH ALUM CO.—Alum, Sulphate, Alumina, etc.

FRANCESCO, BASSO & CO.—Sumac.

**JACK & ROBERTSON** 7 St. Helen St.  
MONTREAL

New York and Boston  
Dyewood Co. Manufacturers  
.. of ..

Sole Agents for the  
United States and  
Canada for the

**DYEWOOD EXTRACTS**

ACTIEN GESELLSCHAFT FUR ANILIN-FABRIKATION  
Manufacturers of ANILINE COLORS,  
Berlin, Germany.

NEW YORK. 55 Beekman St. BOSTON. 115 & 117 High St.  
PHILADELPHIA: 122 & 124 Arch St.

A. W. LEITCH, 10 Hughson Street South, HAMILTON, Ont.

**ANILINE DYES** }  
**LOGWOOD** } Extracts  
**SUMAC** }  
**INDIGO** }

HEMOLIN BLACK, MORIN YELLOW

WM. J. MATHESON & CO., Limited  
423-425 St. Paul Street, MONTREAL

Main Office: 152-184 Front Street, New York.

Branches: Boston, Philadelphia, Providence.

Works: Long Island City, Port of New York

**W. T. BENSON & CO.**  
31 Common St., MONTREAL

Direct  
Importers of

**FOREIGN WOOL**

And all lines of

**CHEMICALS and DYESTUFFS**

Also COCOANUT AND PALM OIL, and all other Soap Stocks.

Sole Agents in Canada for

The British Dyewood & Chemical Co., Limited

JOHN DAWSON & CO., } Branches.  
W. R. SCOTT & CO., }

Manufacturers of

Extracts of LOGWOOD, FUSTIC, SUMAC, etc.

Complete stocks of all the above always on hand.

**Bellhouse, Dillon & Co.**

SOLE AGENTS IN CANADA FOR

THE WEST INDIES CHEMICAL WORKS, LIMITED,  
Spanish Town, Jamaica, W. I.

TRADE MARK



ALLIGATOR BRAND

Write for samples and prices.

**PURE EXTRACTS  
LOGWOOD**

FOR COTTON, WOOL AND SILK

Toronto Office—26 Colborne Street.

30 St. Francois Xavier St., Montreal

New York Office, 20 Cedar Street.

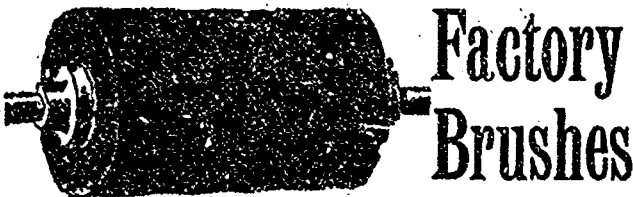
# GEO. D. ROSS & CO.

WOOLEN COMMISSION MERCHANTS  
MONTREAL and TORONTO

**Tweeds**    **Etoffes**    **Shirts and Pants**  
**Worsted**   **Blankets**   **Fulled Socks and Mitts**  
**Serges**    **Yarns**        **Gloves, Hosiery, etc., etc.**

*Advances Made on Consignments.*

*Correspondence Solicited.*



## Factory Brushes

AND ALL KINDS OF  
**MACHINE BRUSHES** made, and Blocks re-filled.  
Highest quality and best work-  
manship guaranteed, and clos-  
est possible prices.  
**CHAS. BOECKH & SONS, Manufacturers, TORONTO**

## DYEWOOD EXTRACTS

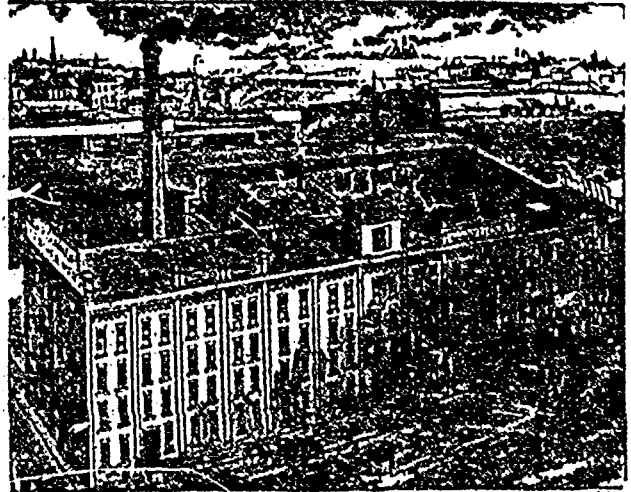
Manufactured by  
**MUCKLOW & CO., - BUBY, ENGLAND**

**DOMINION DYEWOOD & CHEMICAL CO.**  
**TORONTO**

... SOLE AGENTS FOR CANADA ...

A. R. CLARKE      F. G. CLARKE      C. R. CLARKE

# A. R. CLARKE & CO.



Manufacturers of **GLOVES and MITTS**  
Office: 28 Front St. East    **TORONTO**  
Works: 109 to 203 Eastern Ave.  
Branches at Montreal, Quebec, Halifax, Winnipeg and Victoria

## PURE SOAP

FOR  
Woolen Mills, Knitting Mills, Carpet Factories,  
Shirt Factories, Laundries.

**EMPIRE SOAP CO., HAMILTON**



Samples and Price List on Appli-  
cation. We have no Travellers, and  
Sell to the Wholesale Trade only.

**The Beaver Rubber Clothing Co.**

THE PIONEERS IN THIS TRADE IN CANADA.  
**1490 Notre Dame Street, MONTREAL.**  
E. L. ROSENTHAL, Manager.

# D. K. McLAREN,

VICTORIA  
SQUARE

MANUFACTURER AND MILL FURNISHER

MONTREAL      \*      OTTAWA      \*      GALT

## Genuine Oak Tanned Leather Belting

Lancashire Hair Belting

## English Card Clothing

**Western Trade**—Please note our stock depot at GALT, ONTARIO, is now open, and our MR. R. M. W. McLAREN will be pleased to answer any enquiries, also to fill orders.

# CANADIAN Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XV.

TORONTO AND MONTREAL, NOVEMBER, 1898

No. 11

## Canadian Journal of Fabrics

A Journal devoted to Textile manufactures and the Dry Goods and kindred trades.

Subscription Canada and United States, \$1.00 per year Great Britain, 5s Advertising rates on application.

Offices. 62 Church Street, Toronto, and the Fraser Building, Montreal.

E. B. BIGGAR | BIGGAR, SAMUEL & CO. | H. R. SAMUEL  
PUBLISHERS

Agency in Europe. Polsue Bros., 30 Poppin's Court, Fleet St., London, Eng  
Toronto Telephone, 1392 | Montreal Telephone, 2589

Business correspondence should be addressed to Montreal; but cuts, news items and editorial correspondence to Toronto; cuts from abroad should be sent by post wherever possible, not by express, changes of advertisements should be in our hands not later than the 10th of each month to ensure insertion.

### THE CANADIAN TEXTILE DIRECTORY

A Handbook of all the Cotton, Woolen and other Textile manufactures of Canada, with lists of manufacturers agents and the wholesale and retail dry goods and kindred trades of the Dominion, to which is appended a vast amount of valuable statistics relating to these trades. Fourth edition now in hand

Price, on and after publication, \$3.00. Subscribers ordering in advance are given a discount of \$1.00

BIGGAR, SAMUEL & CO., Publishers,  
Fraser Building, Montreal

### CONTENTS OF THIS NUMBER :

|                                     | PAGE. |   | PAGE. |
|-------------------------------------|-------|---|-------|
| Among Mills .....                   | 312   | Matheson, New Warehouse of W            | 312   |
| Belleville Brussels Carpet Co., The | 319   | J., Ltd., New York .....                | 312   |
| Cotton Mill, A New Canadian.....    | 321   | Preparation for Giggling .....          | 312   |
| Dyer's Art, The .....               | 327   | Reminder A .....                        | 312   |
| Electricity in the Manufacture of   |       | Ring Twister .....                      | 341   |
| Oil Cloth .....                     | 328   | Silk and its Artificial Substitutes ... | 324   |
| Finishing, Oil, Wax, etc., in.....  | 326   | Technical Education in Great Brit-      |       |
| Foreign Textile Centres .....       | 329   | ain .....                               | 323   |
| Flannels .....                      | 318   | Textile Design .....                    | 319   |
| Hand Spining vs. Machine Spinning   | 324   | " Imports from Great Britain .....      | 322   |
| Literary Notes .....                | 341   | " Novelties .....                       | 322   |
| Loom Harnesses and Reeds, The       |       | " Schools of Philadelphia and           |       |
| Manufacture, Use and Care of .....  | 336   | Lowell .....                            | 333   |
| Mercerized Cotton .....             | 334   | Wool in the United States in 1898...    | 321   |
|                                     |       | " Market, The.....                      | 342   |

## Editorial.

### A NEW CANADIAN COTTON MILL

The shirt and collar manufacturers of Canada feel that the present tariff bears unfairly upon them, and that it has been adjusted rather to suit the cotton manufacturer than the large consumer of cottons such as the shirt-maker. A number of the latter have come to an agreement to establish, if possible, a cotton mill to turn out bleached cottons for shirt-making and also to cut somewhat into the general trade. We are informed by one of the shirt

manufacturers that \$600,000 has been subscribed towards the capital of the proposed mill, and Jas. Jackson, late general manager of the Dominion Cotton Mills Co., has been in England for some time looking up the latest improvements in cotton manufacturing machinery on behalf of the projected mill. A large builder of cotton machinery in England has offered to take a large block of stock in the new mill if the contract for equipment goes to his firm.

While we wish all success to any new enterprise which will extend the textile industries of Canada, it is only right to point out that within the last four years the productive capacity of existing mills has been greatly increased. Only one new mill has been added and a couple of old mills have been dismantled, but in case of the others the spinning and weaving capacity have been greatly increased, and not only so, but the capacity of the looms and spinning frames has been enhanced by throwing out old machinery and installing modern, high speed machinery. This fact will be fully in evidence when the new edition of the Canadian Textile Directory is issued.

### WOOL IN THE UNITED STATES IN 1898.

The estimate of the wool clip of the United States for 1898 has been given out by the National Association of Wool Manufacturers. The number of sheep in each State on April 1st is given and the total estimated clip is wool, washed and unwashed, 266,720,684 pounds. The estimates for the past four years have been as follows

#### FLEECE AND PULLED WOOL, WASHED AND IN THE GREASE

|            | Pounds.     | Decrease   | Increase. |
|------------|-------------|------------|-----------|
| 1895 ..... | 294,296,726 | 30,913,986 | .....     |
| 1896.....  | 272,474,708 | 21,822,018 | .....     |
| 1897.....  | 259,153,251 | 13,321,457 | .....     |
| 1898 ..... | 266,720,684 | .....      | 7,567,433 |

The general conditions surrounding the clip of 1898 show surprisingly little variation from those which prevailed in the previous year. The average weight of fleece in 1897 was 6.3 and the average shrinkage 60.1 per cent. In 1898 the average weight is 6.44 pounds and the average shrinkage is 61 per cent. Variations in both weight and shrinkage appear in many States, in some sections fleeces are lighter than formerly, in others slightly heavier, owing to variations in local conditions to which it is not necessary to specifically refer. The most important phase of the general wool market, the National Association states, is the accentuated diminution of the fine wool supply, resulting from the world-wide change in breed that ha

been in progress for ten years or more. The users of fine wools are beginning to fear the possibility of a famine in the Merino stocks as the outcome of this remarkable transformation. The clip of the Argentine Republic has been most strikingly affected by the wholesale abandonment of Merino for the crossbred; but the consequences of the change in that country are accentuated by the continued shortage in the Australian clip. In 1890 the Argentine clip was 300,000 bales, 95 per cent. of which was Merino; in 1898 the Argentine clip is 500,000 bales, 75 per cent. of which is crossbred. Here is a shortage of 160,000 bales of fine wool from Argentina, comparing 1898 with 1890. The Australian clip of 1896 was 134,000 bales short of the maximum supply (1894) from that country, the clip of 1897 245,000 bales short of the maximum, and the clip of 1898 is again short of the clip of 1897, making a net loss of at least 350,000 bales from the maximum supply of that country, all but about 25 per cent. of which can be reckoned as Merino. Reckoning the Argentine bale as  $2\frac{1}{2}$  times the Australian, we have a total loss of about 750,000 bales of fine wool (on the basis of the Australian bale) from the maximum supply, with a tendency on the part of fashion to require an increased use of fine wools.

#### TEXTILE NOVELTIES.

The opening free lectures of the twenty-fifth session of evening classes in textile industries at the Yorkshire college, Leeds, was given by Prof. Roberts Beaumont, his subject being "Some Textile Novelties." Professor Beaumont said: In all fabrics made for apparel the insatiable demand for novelty is a tyrannizing influence. So long as the tickle changes of fashion prevail the designer is not a free agent, and, therefore, in some degree, is not responsible for the styles of textures manufactured. But not wholly so, for while he may comply in part with the arbitrary conditions imposed, his work, so far as it is superior to accepted ideals, is sure to be appreciated and highly remunerative. The judgment of the ordinary purchaser is chiefly influenced by what appears striking, new and fashionable—terms which may have absolutely no relation to beauty and excellence of pattern and fabric. It is satisfactory that the taste for "loudness" in woven design is diminishing with the advance of education. One of the results of the improved taste in textiles is the increased manufacture of fabrics in which the patterns are minute in character and choicely colored. When these are in vogue, the difficulties of the designer are multiplied manifold, for the resources of the loom are reduced to a minimum, and color combinations have to be chiefly relied upon. Formerly there existed a well-defined line of demarcation between materials for men's and women's garments. Now-a-days, both wear similar materials, the alpaca and textures of that species having been displaced by woolen and worsted fabrics, soft in tone of color and neat in design.

The difficulties of the originators of textile novelties are intensified by the necessity of devising new patterns and cloths which will comply with the prescribed climatic, national, and local conditions. The more knowledge of,

and sympathy with, the tastes of the purchasing community a maker possesses, the better he is equipped for gauging its requirements. Especially is it necessary in endeavoring to supply eastern markets, where caste and custom are of religious origin and revered accordingly that the manufacturer should have the fullest knowledge of the taste and qualities of mind he seeks to gratify. In the method the German pursues in establishing a new market there is ample evidence of a ready willingness to adapt his natural and trained ideas to such models as have become standards in the country to which German manufactures are to be exported. There is an absence of that officious desire too frequently characterizing the pioneer of British enterprise abroad to compel the buyer to see eye to eye producer and seller.

The art of commercial success in designing consists in producing what is fitting, or, in other words, those textures and styles of patterns for which the buyer has naturally and by education and local influences, an appreciative faculty. Some people have the notion that the changes in woven designing and cloth structure are so insignificant as to be unworthy of study. The fallaciousness of this notion is apparent when cloths of about thirty years ago are compared with those of modern structure. A complete transition has occurred in color, pattern, finish and build of the cloth. Illustrations were given of novel styles in heavy fabrics for overcoatings, and also in mixed materials for suitings, and in dress and mantle cloths. Special allusion was made to the improvements effected in recent years in the coloring of fancy patterns generally. Many of the fabrics alluded to had been produced in the textile department of the college.

Proceeding, the lecturer observed that to all connected with textile industries it is a *sine qua non* that there should be a regularly maintained supply of woven novelties. In the more elaborate or decorative loom work there are many sources of newness which are not available in the invention of cloths intended for garments, in which the limitations are both numerous and non-elastic. Factory experience is one of the fundamentals to success, but it must be supplemented by the fuller and more scientific knowledge obtainable in the school. The improvements in yarn spinning and in weaving and finishing machinery have placed at the disposal of the modern producer increased possibilities of pattern origination. This enlargement of the field of operations is one of the many causes which has lessened the effectiveness of the old system of apprenticeship. The reputation of any locality for excellence of woven work is established by sustained effort on the part of succeeding generations of manufacturers to improve upon the woven results of their predecessors. Their capacity to accomplish this is measured by their increase of knowledge. Therefore, as the field for textile development, in spite of the investigations which have been made, is still inexhaustible, the future of the weaving industry will be promising or otherwise in accordance with the scientific skill of the experimenter and the practical ability of the manufacturer, who have happily joined hands in the interest of their common cause.

## TECHNICAL EDUCATION IN GREAT BRITAIN.

Recently, John Hallam, the well-known wool merchant, of Toronto, spent some time in Europe in the study of various social and economic problems through which he thought light might be thrown on existing conditions in Canada. On his return Mr. Hallam presented this report on technical education to the city council of Toronto, of which he is one of the most active members. Mr. Hallam hopes that the report will encourage the city council to be liberal with Toronto Technical School. The schools in England are supported by municipal taxation and by subventions from the Imperial Government. Toronto's school, Ald. Hallam thinks, requires a new home, thoroughly equipped, so that the city may claim from the Ontario Government aid in supporting it.

His report is as follows:

Technical education in England has been of very slow growth, and it is only now that the country is following in the wake of the continental nations and beginning to realize the importance of the movement and its far-reaching influence on commercial prosperity. The birth of anything like a national system of science, art or technical education in England may be said to have taken place in 1835, when a select committee of the House of Commons was appointed to inquire into the practical education of the British art craftsmen. The enquiry disclosed deplorable deficiencies in English methods as compared with those of the continent, and revealed the fact that while many European governments were providing and aiding technical education, England was practically doing nothing. Accordingly, a Government school of art was established in London in 1836, and a few years later similar schools were formed in Manchester, Birmingham, Sheffield and other large manufacturing centers. The movement, however, was slow, and the influence of these Government schools but little felt by the skilled trades. In 1853 the Government Department of Science and Art was created, and a certain impetus thereby given to the movement of technical education. A Parliamentary vote was annually made for the purpose of establishing new schools, and aiding those already in existence. This annual vote, by the way, has increased from about £64,000 in 1856 to about £800,000 in the current year. In 1855 an Act was passed enabling local authorities to levy a rate to an amount not exceeding one penny to the pound, towards the support of science and art schools, libraries or museums. Still the movement was comparatively slow, and although Government schools of science and art were during the following thirty years established in every important town in England, yet the British public seemed loth to trouble its head about technical education, and the advantages of this State-aided instruction were after all but indifferently availed of by the art craftsman. I am speaking generally, of course, for undoubted good work was being done in such places as Birmingham, Manchester and other important manufacturing towns. At length, in 1882, a Royal Commission was appointed by the Government to visit France, Germany and Switzerland, and their

report on technical education as carried out in foreign countries opened the eyes of the public.

In 1889 the Technical Instruction Act was passed, which enabled the county councils and boroughs to grapple the question seriously, and in the following year these authorities were supplied with the means of doing the work well if they would avail themselves of the opportunity by the local taxation (Customs of Excise) Act of 1890: an annual amount of about £800,000 is handed over to local governing bodies, with the option of using it for the purpose of technical education or to the relief of the rates. To the credit of the authorities the amount was generally and is now almost in its entirety devoted to technical instruction. It is interesting to know that this money is derived from the extra tax on beer and spirits, which was intended originally for the compensation of dispossessed publicans. (A scheme which fell through). This fund is known as beer money, and it may be tritely said that the technical education of the artisan depends greatly on the amount of beer he drinks.

Finally, it may be safely said that at last England has awakened to the thorough practical education of her workmen, and is now doing her best in the matter, and is making up for lost time. Technical education is the order of the day, and it will soon be felt throughout the length and breadth of the land. Nearly every town, and even village, in England has now the direct grants from Government, partly by local rates (though the rates are by no means levied in all cases), and partly by their share of the "beer-money." The schools, though not absolutely free, are practically so, for the fees paid by the students are but nominal, and Government and municipal scholarships are as plentiful as can be desired. The teachers of these schools have all to be qualified according to set standards of the Government or municipality. Examinations of the student are annually made, principally by the Science or Art Department of London, though there are several other important acknowledged examining bodies. Government certificates are granted to the successful students, and the grants to the respective schools are regulated partly by the results of the examinations and partly by the attendance at the classes.

The finest and best organized technical schools, having both day and evening classes, are to be found in the following towns: London (with its many excellent Polytechnics, not to speak of the great central Government school at South Kensington), Manchester, Birmingham, Sheffield, Salford and Glasgow. Liverpool has been doing a big work also, but has been handicapped through lack of proper accommodation and the want of a large central building for the purpose. However, though late in the field, Liverpool is building a handsome and commodious central technical school at a cost of £100,000, as well as several branch schools in the outer districts. No special rate is levied at present for the purpose of technical education in Liverpool, but the whole of its share of the "beer money," (viz., £20,000 per annum) is spent on the work in one form or another.

Technical education may thus be said to have taken root in England, and has come to stay. Though the movement is now making big strides, there are still many obstacles to be removed, such as the prejudice of the average workman, who fancies he sees in it the flooding of his ranks with craftsmen "who are not wanted," and the indifference of so many of our employers and manufacturers, who apparently cannot and will not see the ill results of allowing our German and French friends to steal a march on us in the quality of their workmanship. However, the Englishman is proverbially slow, but he is sure none the less, and once he grasps the importance of a thing he throws his whole soul into it. And he will do it in the great matter of technical education.

#### SILK AND ITS ARTIFICIAL SUBSTITUTES.

There was recently delivered a valuable and instructive lecture by Professor Hummel, at the Yorkshire Textile College, Leeds, England, on Silk and its Artificial Substitutes.

After giving a sketch of the history of silk as a textile fabric, Professor Hummel said the first class of artificial silk to which he would refer was known as collodion silk. It was manufactured from cotton or wood fiber. The material was first changed into gun cotton, and then dissolved in a mixture of alcohol and ether. That formed the collodion solution well known to the wet-plate photographer. That solution was forced through fine capillary tubes, and dried. The inflammable character of the fabric was removed by a special process. Although the fabric had a very high lustre, it was deficient in strength and elasticity, especially when wet with water, and that caused difficulty in dyeing. This form of artificial silk was, nevertheless, being widely manufactured in France and Italy. Another form of artificial silk, called "Vanduaara," was made from glue or gelatine. This new fabric was being made by a process remarkable for its simplicity. Gelatine was the material from which the silkworm produced its filaments of silk. The machine used in the production of Vanduaara silk consisted of a vessel for holding the liquid gelatine and keeping it at a uniform temperature. It was furnished with a series of small sized nipples or glands, from which the gelatine exuded in the form of very fine threads. These fell upon an endless band carried by a set of drums, and arranged in a compact form, so as not to take up much floor space. Before the traveling band had made its complete round, the fine streams of gelatine had dried into as many fine filaments, perfectly regular and uniform in thickness, and having a smooth, lustrous surface. They were wound upon a large bobbin. The machine was perfectly automatic, and needed no attention after starting, except when it was necessary to remove a full bobbin, and put on an empty one. A set of ten machines, attended by one worker, would produce 480,000 yards of thread in ten hours, the thread containing from nine to eighteen filaments, or a quantity equal to the quantity of silk obtained from 24,000 cocoons. To render the thread of gelatine insoluble in warm water, it was reeled off, a slight twist being given to it in the process,

and the reels were placed in a closed chamber and subjected to the action of formaldehyde for several hours. This rendered the thread insoluble even in boiling water. Indeed, no solvent for it has been discovered. The dyeing of the material was remarkably simple, and was so perfect that it could not be surpassed by the best work of the silk dye by the usual method. A small quantity of soluble coloring matter was added to the dissolved gelatine, and as this was quickly diffused throughout the mass, the filaments were at once produced in the required color. The color permeated the body of the filaments without in any way or degree reducing the lustre of the yarn. One pound of dye was sufficient for 3 cwt. of yarn when a deep shade was required, and for 60 cwt. of yarn for the pale art shades at present in demand. Silk ranged in prices from 7s. to 24s. a pound in the dyed state, and Vanduaara could be manufactured at 3s. 6d. per pound, and still leave a fair profit for the manufacturer. Collodion silk cost from 9s. to 10s. 6d. a yard. The new yarn could be combined with threads of genuine silk, with spun silk, with fine worsted, with cotton, and with "mercerized" cotton. The combination produced warps of great strength. The Vanduaara fabric itself was deficient in strength. Another artificial silk was made from "mercerized" cotton, which was cotton which had been treated with strong caustic soda, as suggested by the Lancashire chemist, John Mercer, fifty years ago. As produced by the inventor, the yarn had the valuable qualities of being stronger than the original fiber, and an increased affinity for coloring matter, but it had the great defect of shrinking. For that reason the process was never a commercial success. Recently an improvement had been introduced by the English chemist, H. A. Lowe, and by the Germans, Thomas and Prevost. The cotton fabrics were "mercerized" while in a state of high tension. The defect of shrinking was entirely removed, and a new and very important fabric of highly increased lustre was developed. It had the advantage of being very strong. Fabrics could be made entirely from it, and it also had the merit of being very cheap. Its commercial success was assured, and it was now being made in large quantities.

#### HAND SPINNING V. MACHINE SPINNING.\*

The nature of the raw material naturally influenced the style of preparation to which it was subjected, such fibers as wool, cotton, flax and rhea requiring very diverse methods. In the case of wool, it might either be prepared, combed, and drawn, or willowed and carded previous to the final spinning operation; but whichever style of preparation it was subjected to, there could be no doubt that it was these preparatory processes upon which the quality of the yarn depended. The study of these preparatory processes was the key to the successful study of spinning in all its branches. Following distaff spinning came two styles—viz., the ordinary spinning wheel and the flax wheel, respectively employed for wool and flax. The

\*Extracted from a lecture delivered by Aldred F. Barker, Bradford Technical College.

drawing of wool by means of rollers by Lewis Paul in the seventeenth century had prepared the way for the transformation of the flax wheel into Arkwright's "water frame," but there could not be said to have been any similar forerunner for Hargreaves' "spinning jenny," in which the main operation was a spindle draft. These two styles of spinning, however, prepared the way for Crompton's "mule," in which roller and spindle draft were combined. The inventions of Lewis Paul, Higgins, Hargreaves, Crompton, Arkwright, Heathcote, Cartwright, Roberts, and some few others exhibited the same evolutionary principles as those observed in the world of nature, and the same principles were at work to-day, culminating in all cases in the survival of the fittest. Curious to relate, however, in certain out of the way corners of the country the textile industries still survived in their primitive form. For example, in Bala and Dolgelly, North Wales, the old carder worked in conjunction with the "slubbing billy" and "jenny" might still be found, and the workers of these were by no means badly paid, as much as 21s. per week being earned by a spinner on a 40-spindle jenny. In the worsted trade the chief innovations had been the introduction of the "Danforth throstle," which was introduced into the cotton trade about 1829, and was now employed in the spinning of Botany yarns under the name of the "Cap spinning frame," and the ring frame, which was introduced later, and was not yet thoroughly acclimatized in the spinning, although it was extensively employed in the twisting of all kinds of wool yarns. The flyer frame, although running at only, say, 2,400 revolutions, against 8,000 revolutions of the cap frame spindle, was extensively employed in the production of smooth, compact yarns, which the cap frame could not touch. On the other hand, the cap frame produced a yarn which was the nearest possible to a mule-spun yarn in softness and bulkiness. Hence its great hold on the Botany trade. The length of the flyer or cap spinning frame was not limited, as in the case of the mule, by the difficulties in construction, but by the practical conditions under which the frame was to be worked, the main factor being the quality of wool spun to a given count, as the difficulty of attending to broken ends must always be reckoned with. In one mill a girl might with difficulty attend to 144 spindles, and in another a girl might attend with ease to 260 spindles. In the year 1840 flyer frames were made with 80 spindles only; in 1862 both flyer and cap frames were made with 144 spindles, and in 1898 from 180 up to 260 spindles is a general number. In cap spinning various styles of caps had been invented and various styles of drive. Although the work of the frame could not be considered perfect, it was undoubtedly very good, and the great speed at which it could be run—say, 9,000—while detrimental to cross-breeds, might actually be an advantage in certain styles of merinos, yielding a softer and more bulky yarn. The latest introduction was a doffing motion by Messrs. Prince Smith and Sons, of Keighley. The ring frame had successfully made a place for itself in the cotton trade, and the improvements which had resulted from the introduction of the Rabbeth spindle, travelers to

give a tangential pull under all conditions, and other improvements had practically effected a revolution in cotton spinning. In 1864 ring frames were made with about 160 spindles, running at 7,000 revolutions per minute. Notwithstanding the possibility of such a high speed being attained, the Bolton spinners in spinning fine counts frequently run at a slow speed with greater profit. Again, the slant of the drafting rollers was an important matter, which had continually to be adjusted to the particular requirements of the yarn to be spun. The latest achievement in ring spinning was forming the cop on the bare spindle. In 1840, Messrs. Platt Bros., of Oldham, took out a patent for effecting this, but it was only within recent times that it had been made a practical success. Mule spinning was undoubtedly on the increase, as the yarn produced always possessed certain useful characteristics. There were two distinct types of mule, represented by the cotton mule, which was also employed in the worsted trade, and the woolen mule. In the former, roller draft was employed along with spindle twist. In the latter no roller draft was employed, but spindle draft and twist at one and the same time. The man who best understood the difference between roller and spindle draft was the spinner of union yarns—wool and cotton in various proportions—in which the delivery of the yarn, the draft of the spindles (early or late), the jacking-up, and the insertion of the twist must be regulated by the amount of cotton present. With reference to the number of spindles per mule, there had been an increase, chiefly due to improved methods of constructing tin drums, but not such a marked increase as in the case of the spinning frame. Thus in 1836 hand mules were made with 400 to 500 spindles; in 1844 up to 600 spindles; and at the present day self-actors were made up to 1,000 or 1,200 spindles coarse pitch, equivalent to 1,400 spindles fine pitch. As illustrating the difference between mule and ring spun yarn in the case of 100's counts (cotton), the mule yarn was the weaker, breaking at 13 pounds, where the ring yarn broke at 17 pounds. What was apparently lost in strength, was gained, however, in softness and fulness. In the old days, the billy contained 60 to 80 spindles, and the jenny about 40 spindles, so that the increase of production, in comparing the end of the last century with the end of this, had been simply marvelous. Going back about 40 years however, the increase has not been so great; it might fairly be placed at about 10 per cent. The chief present-day improvements in the mule were the introduction of corrugated drums to deliver the condensed sliver, and a patent reversing motion to obviate the necessity of changing the spindle-bands in reverse twist. In conclusion, the lecturer urged upon intending students the absolute necessity of thoroughness in their work. Great industries could only be built upon the smaller, so that the question of commercial greatness ultimately resolved itself into individual aptness.

The Star White Wear Manufacturing Company, composed of E. Reitzel and J. K. Wing, Berlin, Ont., and J. Weber Toronto, will receive exemption from taxes if they begin business in Berlin, employing 25 hands.



## OIL, WAX, ETC., IN FINISHING.

Finishing materials of this kind are mainly added to stiffening compositions to increase the lustre or gloss of the finished cloth and at the same time to make this gloss more permanent. A few enable this gloss to be obtained without making the cloth too stiff and hard, and among these may be reckoned soap, oils, fats, wax, paraffin and spermaceti.

In addition to acting as a softener soap assists in the glazing of the cloth. Tallow is occasionally added to finishing compositions, partly to give suppleness to the cloth and partly to help in the glazing. It is the solid fat of the sheep and oxen, and we usually understand by the word the grease obtained from the omentum or skin and from the fat surrounding the muscles and bones of the animal. It is also obtained from other parts, bones, feet, stomach, etc., but this is of very inferior quality to the tallow proper, although tallow melters are not above offering it when occasion serves. For finishing when used as a glazer, the best hard beef or mutton tallow only should be employed; for softening purposes, any good white tallow may be used. Good tallow is hard at 60 degrees F., melts at from 97 to 120 degrees F., and solidifies at a few degrees lower. It is liable to grow rancid, but the purer the tallow the longer it will keep. Common qualities of tallow frequently contain traces of nitrogenous animal tissue and this decomposing causes the tallow to become rancid much easier than if it was absent. Where it is not desired to use a deliquescent softener, tallow or other fat is a convenient medium for softening down the harsh feel of a starch-finished cloth. Bone tallow and tripe tallow are used because they are cheaper than ordinary tallow, but they possess an unpleasant odor, which is liable to be communicated to the cloths. If, however, care be taken in refining them, so that they are free from odor, they can be used in place of tallow.

Cocoonut oil is got from the fruits of the cocoa palms, *Cocos nucifera* and *Cocos butyracea*. These nuts contain a large quantity of oil which is extracted by pressing and boiling the fatty pulp of the nuts after breaking them open. It is a soft, white fat, melting at from 70 to 80 degrees F. to a water-white oil. It has a peculiar odor, and if used in large quantities this may become communicated to the cloths. Sometimes the common qualities contain vegetable matters which make them grow rancid quickly. Thorough washing with water frees them from this impurity. Cocoonut oil mixes well with starch size, especially with sago size, better than any other fat, and owing to its pure white color is largely in request with finishers. It enters into the preparation of tracing cloths. It makes a good, firm, white soap, and gives a smoother, softer feel to the cloth than tallow or bleached palm oil. Palm oil is obtained from various species of palm trees, especially the *Elaeis guineensis*, as an orange buttery mass, in which form, however, it is not used by finishers on account of the color. It can, however, be bleached by many processes, forming a white, hard fat, closely resembling tallow, but having a peculiar, pleasant odor of violet. It can be used in place of tallow, its properties being identical. Other oils and fats, although occasionally used, do not require mention here.

Beeswax is well known to every person as the product of the insects belonging to the bee family. Naturally, it has a bright yellow color, is rather granular in appearance, soft, easily marked with the fingers, melts at about 145 degrees F., and has a pleasant odor. In this form it is not used in finishing, but it can be bleached, it is then known as white wax. It is sold either in small round cakes or large flat square blocks. Beeswax is a mixture of two bodies, 12 per cent. of cerotic acid,  $\text{HC}_2\text{H}_4\text{O}_2$ , and 88 per cent. of myricyl palmitate,  $\text{C}_{26}\text{H}_{52}\text{O}_2$ . It is insoluble in water, lighter than that body, dissolves in hot alcohol, but part of it—the cerotic acid—settles out

on cooling. It is not saponified by aqueous solutions of caustic alkalis, but alcoholic solutions gradually saponify it; the soaps thus produced are not readily soluble in water and the alcoholic body that is formed is quite insoluble. It is used in finishing to enable a high degree of gloss to be given to lustre finishes. Too much must not be used, as the wax would tend to come off in flakes. Wax somewhat adds to the stiffness as well as the gloss of a finish. Of the other natural waxes used in finishing, few in number, one or two may be mentioned. Japan wax is a curious fatty substance consisting almost entirely of palmitin derived from the leaves of various species of *Rhus* trees. It has a melting point of about 110 degrees F., and resembles ordinary beeswax in its finishing properties. Chinese wax is the product of a species of *Coecus* insect which lives on the *Rhus succedaneum*. It is very pearly, somewhat crystalline in appearance, melts at 180 degrees F., and consists of the cerolein (cerotate of cryl). When used in finishing it enables a fine lustre to be obtained.

Spermaceti is the product of the sperm and bottlenose whales, and is obtained from the fatty portion of the whole body of these animals. This is done by first melting and getting the whole of the oil out, then freezing and pressing, whereby the spermaceti is separated from the sperm oil. Spermaceti is a white, pearly, crystalline body, melting at 109 to 120 degrees F.; it consists principally of cetyl palmitate,  $\text{C}_{26}\text{H}_{52}\text{O}_2$ , with other closely allied substances. It is not used to any great extent, its price being against it. It gives a fine glaze and rather pearly appearance to cloths.

Paraffin wax is obtained in large quantities from the paraffin shale of Scotland and the petroleum oil of America. It is sold in many qualities, from a soft, faintly yellow to a hard white wax, melting at different temperatures, the various qualities being distinguished commercially by their color and melting point. The usual grades are yellow semi-refined, 108 to 110 degrees; white, 110, 120, 125, 132 and 140 degrees, the last being the highest that is made; the higher the melting point the harder and more solid the wax, and the high melting point waxes, when stuck, have a metallic ring. A white wax melting at from 120 to 125 degrees will be found to suit well for almost all finishes. Paraffin wax is not saponifiable, and remains quite unacted upon by alkalis. It does not mix or make an emulsion in water, and on this account it does not form a homogeneous mixing, especially when used in large quantities it is liable to separate and float on the top of the mixing box in patches. The cloths, therefore, become irregularly impregnated with it, a most undesirable feature. It is advisable, therefore, to use it as sparingly as possible and to keep the contents of the mixing box well agitated. The use of soap and starch prevents the separation to some extent, but not entirely. It assists glazing very much, giving a fine gloss which is lasting, and, not being brittle, it leaves the cloths elastic and supple without being greasy. Although there are few objections to the use of paraffin in finishing, it may be mentioned here that it should not be used in sizing, although it is frequently and sometimes unwittingly added. When once in it cannot be got out of cotton cloths by the ordinary processes of scouring and bleaching. It is, therefore, left in, and if afterwards these cloths have to be dyed or printed serious defects present themselves. Further, the chlorine of the bleaching process acts upon the paraffin, forming derivative products, which, although at first colorless, gradually acquire a yellow tint, which seriously reduces the value of the goods; unfortunately, there are no ready means of taking out these stains. This wax differs very much from all other waxes, not only in its chemical composition, but also in its properties. It is not a simple chemical compound, but a mixture of several compounds having a similar composition and very similar chemical properties, but differing one from the other

in their hardness and melting points, and in the proportion of the two elements, carbon and hydrogen, of which they are composed. All these bodies are compounds of the two elements named above, and are called hydro-carbons. They belong to one of the great families of such compounds known as the paraffins, because at the ordinary temperatures they, more especially the higher members, are not acted upon by acids and alkalis. There is a complete series of these paraffin hydro-carbons, varying one from the other in the proportion of carbon and hydrogen they contain, and in their physical properties. The lower members are gaseous, the higher members solid, the intermediate ones liquid.

### THE DYER'S ART.

A century is nearing its end which has been well named the iron age, the generation of discoveries. It is characteristic of this cultured epoch, writes Dr. E. Reisse in *The Berlin Farber Zeitung*, that in all matters it is penetrated, as regards the practical questions of life, by the clear and elucidatory spirit of science. New points of vantage have been always reached by means of scientific explorations and scientific analysis of what has gone before, and have enabled us to get a better idea of the secrets of nature.

All kinds of progress testify to the co-operation of science and trade in an astonishing manner, as we look back upon the achievements of the nineteenth century. There are many real triumphs celebrated by theory and practice hand in hand, and they continue to be gained. Above all, it is natural sciences—and particularly the sister sciences of chemistry and physics—that have set their mark upon the present age, and one branch of industry which chemistry has revolutionized and mightily advanced is the art of dyeing. In the beginning of the present century Vitalis wrote in France, "Of all the services which chemistry can render to the arts, there are none finer than those by which it has laid securely the foundations of the art of the dyer. Till chemistry had turned its light upon dyeing it was not worthy to be called an art. There is no trade which presents greater difficulties, both in theory and practice, and which, therefore, requires deeper knowledge. How great the labor has had to be, and how persevering the study of nature before people learned how to use colors and to impress them durably upon the fabrics, the value of which they so largely increase!" If this learned man could write in such a fashion at a time when chemistry was only just beginning to develop into an independent science, and the foundations of the since ever increasing art of making artificial organic coloring matters had only just been laid, an art which opened up an entirely new field for the dyer, what words of inspiration would he have used had he foreseen what chemistry would be to the dyer now, what influence it has over him, and with what abundant proofs of its creative power it has now endowed him? To recognize the effect of chemistry upon dyeing and properly to appreciate it, we must look more closely into both earlier and more recent times.

Up to the middle of the century the dyer was exclusively dependent upon the natural dyes. These had been used from remote antiquity to improve the appearance of fibers and to satisfy the taste of men for harmonious colors. With time the range of natural colors widened, and some of them have such excellent qualities that they still enjoy the preference of many dyers. Among these logwood, redwood, madder, sandal wood, fustic, quercitron, woad, curcuma, catechu, archil, indigo, cochineal, and some others of animal, vegetable or mineral origin, still hold their ground. These dyes were used by strictly adhering to certain recipes, transmitted from one person to another, both verbally and in writing. Experience and close observation had taught under what conditions the dyeing pro-

cesses were most successful, but the why and wherefore of the precautions to be taken was either known imperfectly or not at all. The dyer usually worked more or less in the dark, and his art was wholly empirical. As a material result, inexperienced hands used processes requiring all sorts of really unnecessary labor, and the art at last reached a point beyond which the knowledge in existence could not bring it. As soon, however, as chemical science acquired strength it was at once applied to dyeing, and with the wonderful results which we all know. It replaced isolated and inadequate efforts by the organized research of learned men, and those enlightened members of the trade who foresaw what science was likely to do for them.

Wilhelm von Kurrer writes in 1848: "What science has done during the last fifty years for the dyers' art, before then entirely carried on by rule of thumb, surpasses the whole progress of the art before that time. Such thinking and creative spirits as Baueroft, Berthollet, Dingler, Hermstadt, Kreyrig, Kurrer, Koechlin, Vitalis, Schlumberger, Thilloge, Chevreul, Persoz, Dumas, etc., have caused the dyeing and coloring trades to make enormous strides by basing them upon fixed and well-defined principles, and have given them their present degree of perfection, both scientific and practical. Results are no longer left to chance, but are based on scientific knowledge of the various coloring matters, and of the materials, such as wool, hair, feathers, leather, silk, cotton and linen, to which they are applied. During the last half century men have arisen, thanks to the propagation of works on dyeing, to the institution of research laboratories, who have been induced to devote themselves with enthusiasm to the application of chemistry to dyeing. This has happened in every European country, and they have devoted themselves to its scientific and practical application to the trade. The light has found its way even into the smallest workshops, and has rooted out many a deep-seated prejudice, and paved the way for a knowledge of better things."

Thus we see dyeing becoming a branch of applied chemistry, and subjugating itself and its processes to the wide-reaching laws of that great science. But what had only begun in the first half of this century was vigorously continued in the second. The artificial dyes were yoked to the triumphal chariot on which the beneficent science made its entry into the dyehouse. Scientific investigation of the products of the distillation of coal tar has led to the erection of the coal tar color-making industry, a monument more enduring than bronze to those to whom it owes its existence. The first of these colors did not appear until at the end of the first half of this century, but by the happy combination of science and practice the number of these dyes has been increased in unexampled fashion during the last few decades. While the dyer was previously dependent upon the comparatively few dyestuffs furnished to him ready-made by nature, he has now unbounded choice at his disposal. This immediately put him into a position to produce shades such as are only seen elsewhere in the productions of nature, and at the same time dyeing processes became to some extent simpler than formerly, because the accurate knowledge of their constitution, which was possible in the case of the artificial dyes, enabled the best methods of using them to be worked out. Light was thrown on all dyeing processes by the exact chemical researches carried out in the laboratories which were erected in connection with all the larger dyeworks, and it became possible to regulate the methods with precision. The researches into the nature of the dyes were combined with investigations into the properties of the substances which had to be dyed, and the two kinds of work laid the foundations of the art securely. Not a few new branches of the art owe their origin to the discovery of artificial methods of making dyes, and all others owe at least immense development to the same cause. For example, the turkey-red process was directed into entirely new channels by the discovery of artificial alizarine, and the troubles caused by having to use mad-

der, never pure and never the same thing twice running, disappeared.

We must also remember the immense impetus given by the coal-tar colors to silk dyeing. Cotton dyeing, too, has become quite a different industry since the introduction of the substantive colors and of basic mordant dyes fast to washing. The former are the cotton dyes par excellence. Everyone knows the part which acid and alizarine dyes have played in the growth of wool dyeing. Just imagine a piece dyer now without artificial coloring matters! There is no kind of textile material which has not benefited by the discovery of these bodies.

One thing remains to be noted in conclusion. The present colossal dimensions and many-sided character of the dyeing industry require corresponding qualifications on the part of its masters. Without theoretical knowledge they stand on very slippery ground and prove helpless at every turn. Chemical knowledge is now a vade-mecum for the intelligent dyer and enables him to conduct his business with success. Knowledge

#### ELECTRICITY IN THE MANUFACTURE OF OIL CLOTH.

Improvements at the Dominion Oil Cloth Company's Works.

Five years ago there were three oil cloth factories in Canada, now there is only one. It is not that the demand for oil cloth has ceased, or that there is no encouragement to home industries, but because in this line of business it requires both ample capital and skill to achieve success, and the Dominion Oil Cloth Co., of Montreal, the only factory in Canada, evidently has both requisites. This journal has noted from time to time the progress the Dominion Oil Cloth Co. has made during the past fourteen years; first, under the management of J. J. McGill, and for several years past under the management of John Baillie. Mr. Baillie saw that the only way to hold trade already acquired and to compete against the ever increasing activity of foreign manufacturers, was to adopt the most efficient machinery obtainable and keep abreast of the times in all the



OIL CLOTH PRINTING MACHINE.

of the importance of these matters has persuaded State authorities to provide opportunities for dyers to acquire chemical and technical skill during their earlier years. The high position of chemistry to-day gives every reason for expecting that it will long continue to guide the dyers' art in the paths of progress. Much has already been done, but more remains behind. May the century to come do more than the nineteenth in spreading scientific and technical knowledge.

The business of the Quebec Clothing Mfg Co. is being enlarged consequent upon some changes in the partnership. Geo. Lefavre writes us that he was appointed liquidator for this purpose, and not owing to the insolvency of the company as was stated in a former issue.

D. Breckenridge, Cornwall, Ont., is removing his family to that town from Carleton Place. The C P Herald says: "We regret very much the loss of this large and interesting family, and can only console ourselves with the thought that what is our loss will be Cornwall's gain."

processes of the trade. Having examined all the processes in use in Great Britain and the United States he advised the directors to import a new printing machine, which marks a great step in advance in oil cloth printing. As most of our readers are aware, oil cloth printing has hitherto been a hand process, each color and each pattern being laid on the cloth by large hand stamps of a uniform size, and capable of printing only one square and one color at a time; a stamp covering a square foot or so of space on the cloth. From this slow process to a machine that will print a section of cloth  $2\frac{1}{2}$  yards wide by 18 yards long, in six to nine different colors at one movement of the machine is a remarkable stride, yet this is what is accomplished by the new machine recently set up in this factory, and of which the accompanying is an illustration. The machine weighs 30 tons, and is 30 yards long, but is easily operated by a  $7\frac{1}{2}$  h.p. electric motor.

The almost universal employment of electricity in the arts and manufactures has had until recently a few well defined limitations, and electric motors have been excluded from all industries in which inflammable gases or vapors are present in the

atmosphere of the factory, for the reason that even the slightest spark, which might be present at the brushes, is likely to cause an explosion. Such an industry is the manufacture of oil cloth, for here the large quantities of naphtha used about the machinery causes the air to become at times charged with an explosive vapor, while the fumes given off by the oil-cloth during the process of drying, are inflammable—so inflammable, indeed, that several fires in these factories have been started by even the small spark caused by the electro-static discharge from ordinary rapidly-running belting, such a spark as anyone may produce by presenting his knuckle to a belt running in a dry room.

All direct current motors have, while in operation, a slight spark where the brushes touch the commutator, and sometimes this sparking is not very noticeable, but often so violent as to partly fuse the brushes and commutator bars. Consequently, the use of electric motors in factories of this kind has been out of the question until the danger of fire from sparking was removed by the advent of the induction motor, which is so constructed that there is no possibility of sparking. There is neither brush nor commutator. The two-phase or three-phase alternating current supplied to the field magnets, sets up in the motor a rotating magnetic field which causes the armature to revolve, while the currents in the armature flow in closed circuits with no connection to any external circuit, so that sliding contacts are not used and sparking is impossible.

Inside the building all the switches, large and small, are immersed in a tank of heavy oil, which suppresses any spark that might be produced in opening a circuit. The most important machine in the manufacture of oil cloth is the printing machine, a general view of which is shown in the photograph. The roll of unprinted cloth is fed into the machine at one end, and as it passes across the platform large carriers (each holding a block or die), shown in the photograph, move up and down simultaneously, each leaving on the cloth an impress of a part of the desired pattern in its own color of paint, so that when the cloth arrives at the other end, the completed pattern appears, made up of many impressions, in as many colors as there are printing blocks. The operation is continuous, each die adding its part of the pattern, and while the unfinished cloth is passing in at one end of the machine, the finished product is being drawn into the drying racks at the other end. This machine is driven by a motor set inside the frame and geared to the main shaft.

The drying of oil cloth requires large stationary racks and a great deal of room, and as each drying rack becomes full, it is necessary to move the whole printing machine sidewise until it comes opposite to another rack. This is accomplished by having the machine mounted on wheels which run on accurately levelled tracks, the rails of which are set flush with the floor. To this end the current for the motor is supplied through a flexible cable, so that the whole machine may be moved across the room without the necessity of breaking the electrical connections. It is started and stopped by means of a switch and starting device immersed in a tank of oil carried upon the side of the machine. Other motors are used for mixing the paint, drawing the oil cloth into and out of the drying racks, and for the large freight elevators. In the latter case reversing switches are used, worked from the car. Experience has shown that the motors must have an abundance of starting power.

Besides the addition of this machine and the electric color mixers, the Dominion Oil Cloth Co. have recently erected an extension, 120x45 feet, three stories in height, and have made various improvements in hot blast drying apparatus, sizing and calendaring machinery; mechanical stokers for the engine room, etc. The company manufactures floor oil cloth of all kinds, enameled cloth, stair oil cloth, carriage and shell oil cloth, imitation leather, trunk and valise leather, and upholsterers' cloth.

## Foreign Textile Centres

MANCHESTER.—One of the points frequently discussed, now that the war scare is on us, is the probable effect upon cotton imports of an outbreak of hostilities. Most of the cotton arriving at our ports is conveyed in British bottoms; but it does not seem likely that France can seriously interfere with the regular movement to England of the raw material from the States. Locally, the effect of the scare has not been important, except in a few cases where exceptionally cautious or timid individuals have been affected. The recent troubles in the Calais lace trade have attracted a considerable amount of attention. Although the places of the Calais strikers have been filled up, at the neighboring town of Caudry a deadlock prevails, 90 per cent. of the machinery being at a stand. The dispute, the latest of many of a similar character, arose over a misunderstanding as to the prices to be paid for certain classes of work. There are two lists, one drawn up in 1897, the other, referring to veilings, in 1896. A firm affected by the dispute refused to pay a higher price for veilings than that referred to in the 1897 list, and this gave rise to disturbances. The amount involved was about 2½ per cent. on the men's earnings. A strike followed, the places of the men being filled by non-unionists. The scene of operations was now transferred to the neighboring town of Caudry. Selecting a time when manufacturers' order books were pretty full, the workers presented a new list, and for a time the masters submitted to the demands imposed upon them. Subsequently, however, disputes arose, terminating in a lock-out, by which 90 per cent. of the local machinery has been thrown idle. Assisted by the Calais operatives, the Caudry workers subsequently presented further demands, which the employers rejected. Thereupon certain firms were placed on the "black list," which means that the workers determined to adopt the Napoleonic plan of destroying the enemy in detail. This idea was checkmated by the masters' combination, the works of all the members being closed about eight weeks ago. Attempts at conciliation have so far proved ineffective. The operatives of Calais and Caudry, who in the past, as probably now, included a fair sprinkling of English lace hands, have often exhibited pugnacious inclinations. Many of them get good wages, and I have heard it said that it has not been unusual for them to partake of champagne and oysters at Boulogne on the occasions of the junketings in which they periodically indulge. The list of Calais manufacturers includes several English names, such as those of Smith, Watney and Topham, and West. At one time some of the lace operatives were believed to move to and fro between Calais and the Midlands, according to the state of trade in one or other of the centres, and a well-known Calais man told me some time ago that he had known of cases where an operative had a wife on each side of the Channel, although that is a statement for which I do not care to accept responsibility. The situation has proved somewhat harassing to producers, who find a solution of the difficulties impossible at present, although the sub-prefect of Cambrai has offered to mediate. Under the title of the "Mercerizing Co., Limited," a concern has been registered, with a capital of £25,000, to enter into two agreements with H. A. Lowe for the acquisition of certain patents, and to carry on the business of mercerizers, dyers, etc. The progress of mercerized goods continues very marked. Sewing silks have been produced in Leek. The color and lustre were excellent, and the resemblance to silk very close, although the "feel" of these goods is "ask," as they say in Yorkshire. But there does not seem to be much doubt that silk to some extent must be adversely affected by the mercerized article at any rate for a time. Artificial silk itself, in the opinion of the many, is likely to have what little life it may possess taken away from it by

the mercerized product. The scheme for amalgamating the various linen thread concerns is believed to be proceeding quietly. The provisional board already in existence meets at Glasgow, and includes two members of the Coats family, and representatives of Finlayson, Bousfield & Co., and Crawford Bros., of Leith. The firm of Wm. Barbour & Sons is, of course, represented, but members of the trade are asking with some curiosity whether the Scotch element is to predominate in the working of the contemplated organization. It will be surprising if the Barbours, who are without doubt the largest linen thread producers in the world, rest satisfied with any post that does not keep them in the foreground. The pity of it in connection with the large combinations that have taken place of late is that they inevitably result in placing upon the shelf able men at a time of life when it is not so easy for one to adapt himself to new conditions. Even for those who retain their connection with businesses that are amalgamated, the change is only too often one for the worse. One need not go into details in connection with a matter of this kind, but I think it is pretty well known in well-informed circles that one combination was responsible for the death of a well-known and respected member of the trade, who succumbed under the worries which the new condition of things involved.

**LEEDS.**—There is not much change for the better in the home trade, especially for London, the mild weather being altogether against any improvement. The provincial demand for medium and inferior overcoatings and suitings is well maintained, and there is not so much haggling about prices as was expected, manufacturers being more reasonable. Only small repeats are coming in from Ireland, whereas a steady influx of business had been expected; but values are not depressed because it is believed that further orders will soon be forthcoming. There is not much animation in spring orders, but prices for the most part keep quite firm. If the values of serges, vicunas, all-wool checks, and hairline tweeds are any weaker it is because Canadian buying has been restricted and Continental buyers have adopted a waiting policy. Meltons, both wool and mixture, are rather better, but quieter than is usual at this season of the year. Mantle and costume cloths are quiet and unaltered. Blankets are quieter. Railway rugs are still in good request. Many yarn spinners are working overtime. The business of the last week has shown some little falling off, but this may be accounted for by the wet and stormy weather which has been general, and no doubt a few fine, cold days would at once set things right again. Business generally in the heavy woolen districts is quiet, and there is no real push in any class of winter goods, and it is reported that at least one of the mills recently burnt down will only be replaced on a smaller scale.

**HUDDESFIELD.**—The tone of the Huddersfield market is hardly as cheerful, although the makers of the best class of fancy woolsens are still well supplied with orders. The continuation of the mild weather is keeping back the season's demand for both blankets and flannels, and makers are not as busy as usual for this part of the year.

**BRADFORD.**—The uncertainties of the political situation have no doubt had the effect of checking any tendency towards recovery of tone in the wool market here, and as so large a proportion of the textile products of this district are sent beyond the seas the commencement of a big naval struggle would have a most discouraging effect on our trade. The result of a consideration of the possibilities of the situation is a display of the greatest caution amongst consumers in all departments of the wool market, and although the quotations of the finest crossbred wools and of merinos show no actual change, probably all other classes of both Colonial and home-grown wools could be purchased now at slightly lower rates than recently. The very finest class of merino wool tops are

well held, as the stocks are certainly less than normal, but second class 60's tops, which are more plentiful, show some weakness, and this is largely accounted for by the extreme quietness of the fine worsted coating trade to America, for which branch of the trade the cheaper 60's tops are largely used. In the past twenty years an immense development has taken place in the production of the long stapled or combing classes of Colonial crossbred wools, and Bradford has constituted herself the undoubted centre or metropolis of this part of the wool trade, and it is here that the great bulk of these longer crossbred wools are worked up. As a rule, a great fall in the price of any raw material decreases its production, but the fact that mutton has become of late years a much more marketable commodity, to a large extent neutralizes this law so far as regards these long crossbred wools, as the sheep producing this wool are specially suitable for mutton production. There seems little reason to expect any early relief from the Continental users of two-fold worsted yarns, who until recently took large quantities of crossbred worsted twofold yarns, and for the moment the cheap men's wear serges are displaced for goods of a finer appearance and softer touch, composed mainly of shoddy and cotton warps, and even the dress goods worsted serges have recently been made to a great extent of somewhat finer wools than used to be the case. The remedy, it seems then, must come from introductions of new styles of fabric in men's wear goods, in which cotton has been supplanted by worsted, which would not only be more durable in shade and texture, but would also form much more healthy garments, for one medical authority recently gave it as his belief that the prevalence of certain constitutional weaknesses was due to the amount of cotton which now entered into the wearing apparel of most children and grown people. As this long stapled crossbred wool is of a strong, reliable nature, it certainly seems as if the inventive resources of this trade should be able to produce some novelty in dress goods fabrics which would be an able successor to the Bradford worsted serges, which have had so long and successful a reign. All classes of English wools continue in very slow demand and although there is still some occasional small attempt at speculation in pure lustre wools these prices are barely firm. The demand for raw mohair and alpaca is quiet, but neither the prices of the hair or the yarns made from them show any difference in price, and spinners of these yarns are still well employed. From a private report from the centre of the American worsted industry it is learned that there is still a good deal of the wool imported free still to be used up, and that American spinners are finding prices and competition more keen to-day than they did before the reimposition of the duty on wool. The representatives of the Bradford exporting houses who are now returning from their recent journeys offering Bradford textiles in the United States market, report that in most cases the results of their journeys had hardly fulfilled their expectations, but that they have been most successful with bright goods in both plain and fancies. Business in dress goods in the home market for the present season still leaves a good deal to be desired, although makers of mixture coating costume cloths still continue well employed, and there is a distinct revival in the enquiry for good-class black fancy mercerized cotton crepons.

**HALIFAX.**—The following is the Halifax Chamber of Commerce trade report for October: Wool—The market has been exceedingly quiet all through the month, and very little doing. Botanies have eased from extreme prices, but are now steady again. Spun Silk—There is no change to report this month. Machinery has been fairly well employed and prices steady. Cotton—Two-folds still keep very dragging and unprofitable the production being reduced by short time. Fustians and Ready-mades—The improved demand reported last month continues, some firms being rather busy. Carpets—Orders have

come to hand fairly satisfactorily, and the output has increased correspondingly. Worsted Yarns.—There has been little, if any change, in this branch during the month. Some spinners engaged on super qualities are fairly well employed, but those engaged on lower grades find orders scarce. Prices are unsatisfactory. Pieces—No great change for the better, but yet there is a slight improvement, although prices are very unremunerative.

ROCHDALE.—Rochdale has been a long time in making a move in the direction of adopting sprinklers, but evidently there is now a change. The absence of seasonable weather is preventing the volume of business in the flannel market which was expected at this period. Fresh business is, however, coming forward—not so much as was hoped, but still sufficient to keep the machinery fairly well employed. Owing to the better condition of things in the Australian Colonies the orders for the shipping market have been on an improved scale, and this to some extent has made up the deficiency in the home trade. Prices keep practically the same. The Yorkshire goods trade is rather quiet. Prices keep firm. An average business is being done in wool without any special feature, and the market may be said to be fairly cheerful.

KIDDERMINSTER.—The feverish excitement with regard to the Fashoda incident and the strained relations between England and France have somewhat retarded trade. Travelers in the home markets report that dealers have shown a desire to hold their hands for the moment. It is now, however, believed that diplomacy will quickly overcome all obstacles, and already greater confidence is being shown in commercial circles. The local trade is fairly good and more machinery is slowly coming into work. The orders which come to hand are, however, more of a retail character. A few buyers have been about of late and left some moderate-sized orders covering all branches of the local industry. The price of wools keeps very low, and spinners have now pretty well covered their requirements for some time to come. Some few carpet buyers have been in the market during the last few days, with results that are encouraging to the manufacturers. The demand covers a wide variety of makes, patterns and colorings, and is fairly evenly distributed over the trade. On the whole it appears that the home trade in carpets is likely to be rather better than of late years, and the shipping trade, barring political disturbances, a good deal better. The yarn trade is very dismal. Yarns are bought or taken in as they are wanted, but, although many spinners decline trade in carpet yarns at present prices, they can still be bought at the bottom.

NOTTINGHAM.—In some branches of the cotton lace trade orders are not only numerous, but of good volume. Some surprise is expressed at the continued paucity of American orders, but consolation is found in a better demand for continental and colonial markets. Valenciennes assortments are very varied, and specialties are selling well. For torchons in linen and cotton the aggregate of sales is satisfactory. This is evidently a growing department, and the assortments are large in the higher and lower qualities. However, there are no striking novelties being launched to give any special impetus to the demand. Ordinary goods are scarcely so much in demand, but in some departments there has been a mild revival. Thus, more has been doing in everlasting and other cotton embroidery trimmings. Oriental laces are also more active. Irish trimmings, crochet laces, tattings and warp goods are somewhat dull. Recently there has been a partial revival in the bobbinet trade and prices have improved, the machinery being required for silk nets, for which there is a renewed demand. Mosquito and corset nets are selling very freely and orders have been booked forward to January. There is a steady demand for Honiton braids in linen and cotton, also for beadings and purls both for the home trade and for some of the continental markets. Business in ruffles, frillings and other fancy goods has slightly im-

proved, though orders are carefully placed. In the lace curtain, window blind, furniture lace and toilet branches there is a moderate degree of activity and prospects of a good trade to follow are more than fair. The hosiery trade, as a whole, has exhibited a rather marked improvement of late. Manufacturers of vests and combinations are well occupied on merino, cashmere and natural wool goods. There has been some unsteadiness in some prices, but, generally speaking, there is firmness and an upward tendency, which is having a favorable influence. Cashmere hose and merino half-hose are steady in value, and a moderate business is doing. A few specialties of cotton hosiery are selling, but prices are unremunerative. The shrinkage in this branch has been continuous and there does not appear much prospect of any early improvement. There has been a better feeling of late in the home trade, and a hopeful sign is that failures in the retail section of the business are much less frequent than usual. The show of hosiery by many of the principal shipping houses in London, Manchester, etc., is very attractive.

SOUTH OF SCOTLAND.—Nothing new is reported from the South of Scotland tweed districts. As has been the case for many months, some firms are well employed, while others have very little to do. It is stated that the Hawick makers have plenty of orders on hand. Spinners complain of unremunerative rates. Very few wool transactions are reported. A good deal of interest has been created by the announcement that the famous Polytechnic, which was founded a great many years ago by the late John Anderson, has been acquired by a syndicate of Glasgow gentlemen. It is reported that the price paid for the concern, one of the best of its kind in the country, was £200,000. It is understood that the Polytechnic building has been leased by the syndicate for the carrying on of the business for the period of 21 years at an annual rate of £3,000. It is said that the syndicate wished also to purchase a flourishing business in the West End of the city, but the negotiations fell through. The clothing and hosiery houses in Glasgow are doing fairly well at present. Orders for new overcoats have been placed freely during the past ten days, while underclothing has also been in demand.

KIRKCALDY, ETC.—The linen trade at Dunfermline is in a satisfactory condition. All hope of an American boom has been abandoned, but it is reported that the improved demand which set in at the close of the war is well maintained. Makers have good orders on hand. Favorable reports have also been received from Kirkcaldy, a local manufacturer having booked a large Government order. The floorcloth and linoleum factories are in full operation, and likely to be so for a considerable time. The Ayrshire lace trade is in a fairly satisfactory condition. There is a good demand in the home markets for curtains, nets, and window-blinds. Double-action goods are mostly in request. To keep pace with the demand, wider looms are being fitted in the mills. This has been rendered necessary by the keen competition in the trade. There are a good many buyers from the States and Canada in Scotland just now, and they have placed several good orders with Scotch manufacturers.

BELFAST.—The gradual improvement in the linen market has been maintained. The advance is not great, but it is likely to continue. There is no quotable alteration in prices. There has been somewhat more movement in the yarn market, and the week's production is accounted for, but more might easily be done without causing abnormal activity. Prices are steady. In the brown cloth market trade continues fair and steady, a little better than last week. Powerloom linens for bleaching continue to meet with a ready sale. Tow-made goods are in improving demand, and unions are selling freely. Household linens and damasks are also moving off satisfactorily, and handloom linens are holding their own. The handkerchief trade is steady, and prices all round are the same. Demand for bleached

and finished linens is slightly more active. Home buyers are operating a little more freely, but are still very cautious. Manufacturers are taking fairly considerable quantities of white linens and unions, and the demand for damasks and housekeeping goods is fully maintained.

**LYONS.**—The Lyons market for silk goods remains very quiet. Spring orders are not large, and buyers, on account of higher prices necessitated by the rise in raw silk, and the grave aspect of political affairs, are very cautious. However, from trustworthy reports, the mills at Zurich, Crefeld and Como are in the same position, the lull being the natural consequence of the preceding very active seasons. The enquiry for velvets continues good, but prices for the cheaper grades of plain colors are slightly lower. White and cream velvets are much sought and scarce; in other shades golden brown has gained prominence. Plaid velvets are once more very fashionable, and stocks of these find ready buyers. Brocaded velvets, too, enjoy a good demand. The ribbon trade is not good. Orders are disappointing, both as regards size and prices. Narrow widths are mostly ordered, the medium widths being quite neglected. Moreover, better grades are little sought, low-priced goods receiving the preference. On these profits are small.

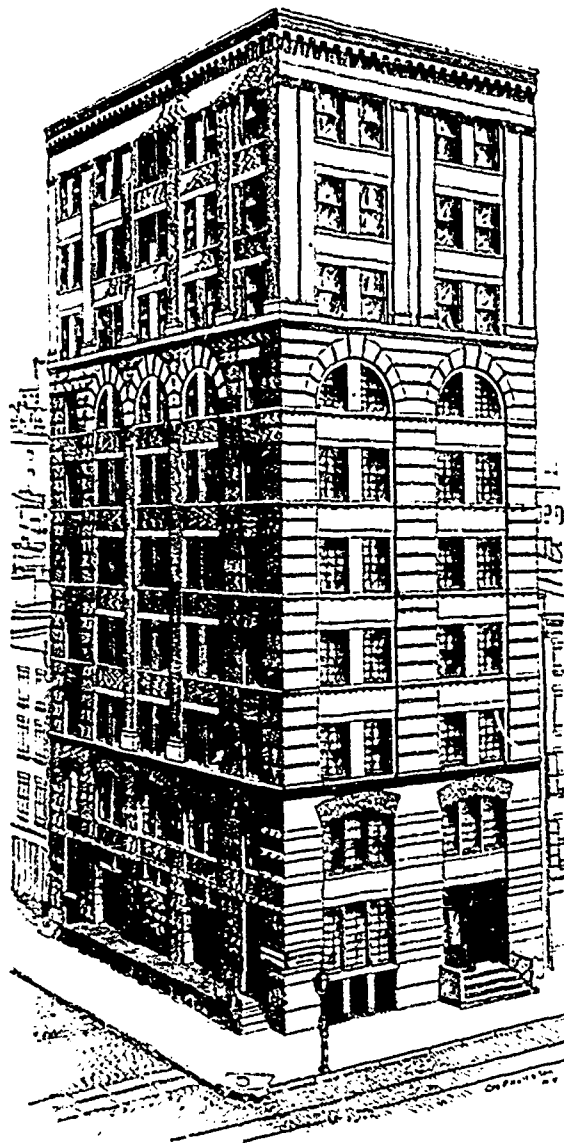
**CREFELD.**—The week under review witnessed a marked improvement in the condition of the Crefeld market. After a prolonged lull orders are arriving, providing in some cases work for a considerable time ahead. Necktie silks for the home market are in heaviest demand, while the English market is still backward in ordering. In other silks taffetas again lead, and will unquestionably continue at the front during the coming season. The demand for black and plain colored taffetas has considerably increased. For black dress silks, in plain and fancy weaves, the call is also much more pronounced, and indications are that black will be particularly favored by fashion. The velvet trade remains good, although the demand is not quite as active. Stocks of velvet have, however, been greatly reduced, and orders for spring are beginning to arrive. Velours du Nord continue in fair demand.

**MILAN.**—The Milan raw silk market shows no material change. Though a slightly better sentiment has developed transactions are difficult. In some cases concessions of about one-half franc were obtained, but prices generally remain unchanged. Holders are firm and are not inclined to consider lower bids. There can be little doubt that with lower prices a more active demand will show itself, but present quotations, and, above all, the unsatisfactory status of political affairs in France, have an unfavorable effect on the development of the market. Greges for throwing receive most attention, while weaving greges are little sought. On the other hand reelers find that the yield of cocoons is still below the estimate made during the crop season, and for this reason the cost of this year's product is higher than had been anticipated. Reelers are therefore even now firmly determined to resist the efforts to lower prices. The demand from America remains very slack.

**ZURICH.**—During the week under review the raw silk market was apathetic. Transactions were small, but prices were fairly well maintained. A more active demand has been expected for some time, but will hardly develop before an improvement in the position of mills induces manufacturers to renew their purchases. The demand for silk goods is very light. Some buyers who placed unimportant orders for novelties were in the market, but their orders were not sufficient to change the tone of the market. As long as the large orders for plain silks such as glace taffetas are not forthcoming there will not be sufficient work for the mills. Meanwhile some of the mills are working for stock, and it is feared that there will be an overproduction. Warp-print taffetas have been taken up and were ordered fairly liberally by some buyers, while others are afraid to buy these

fabrics. Concerning warp prints, they may prove good in moderate quantities. Marcelines have attracted more attention at rather better prices.

#### NEW WAREHOUSE OF W. J. MATHESON & CO., NEW YORK.



A description of this fine building appeared in the September issue of *The Canadian Journal of Fabrics*.

#### PREPARATION FOR GIGGING

(Concluded from last issue).

The main element in producing good broadcloth consists in proper finishing. First run the nap the reverse of the finish nap and run light at first, taking care to clear the face well. Next reverse and run the nap the opposite of what it is to be in the finish. Continue until the nap is full and smooth. Fairly sharp teasels will be required. Keep the goods moderately moist while working. We now reverse the nap every eight runs, aiming to get to the base of the felt, and work up a good, flowing nap without injuring the fiber. Next the nap is cut off, high up and the goods run again on the gig. This time we must get a very full nap. When no threads show, again cut off the nap and the piece is ready for second cropping. A treatment in a

bath of fuller's earth solution and rinsing follow. Then run six times on wet gig, steam, roll, immerse in hot water, run again on wet gig, dry, brush, and then the final shearing is given.

To get good results at the gig on all-wool flannels, first dampen the goods, and run with old work until the nap is straightened, when new work may be put in, and the nap brought up full and level. It is desirable that the nap be so heavy in these goods that the weave will not show. The full and soft feeling can be preserved by pressing the goods while yet moist. The conditions which govern the finish of these goods are the weave, the character of the raw material of which the fabric is made, the sizes of the yarns, the shrinkage, and the weight in ounces of one yard. If the weave is loose and open, care must be taken not to weaken the texture by removing too much fiber. Full, round and compact yarns will stand more gigging than fine and irregular ones, and if well shrunken, a good body is procured upon which to operate.

Fancy back covert cloths are taken from the roll direct to the gig or napping machine, run once, cropped, and again run on the gig. Two or three runs are given on each side, and then the piece is run on the wet gig, four to six times both sides and rolled. Next day we brush both sides and dry.

Although napping machines are largely used for raising a nap or pile on the surface of the goods nowadays, the ordinary form of teasel gig is employed in many mills. The teasel is a species of the thistle family. It is a biennial, which grows several feet high, with sessile, serrated leaves, the stem and leaves prickly, and with cylindrical heads of pale or white flowers, between which are oblong, acuminate, rigid bracts, hooked at the point. The rigidity and elasticity of the points are admirably adapted to perform the work required so long as the teasel is kept in proper condition. Racks should be provided in which to keep and dry the teasels and only a practised setter ought to be given charge of fixing the teasels in the gig slats. The slats must be true to avoid streaking the goods. Various things cause steel slats to bend, and if bent much or telescoped or dented, it is best to put in new ones, as it is probable there may be hidden weakness left if the slat is trued and put in use after a smash. When a slat is only slightly bent it can be straightened, and every mill has its own methods. Clamps and screws of various devices are used, but one of the simplest methods which has also the merit of being quick and powerful, is this: A piece of oak some six feet long (an old cart shaft) is secured to a timber by a strong hook and staple. A block of pine is bored through with a bit the size of the slat, and split in halves with a saw. Then the block with "half a hole" in it is placed astride on the slat side; the lever, which is then a little above horizontal, dropped on the block, and bore down easily at first until the slat is straightened.

A bent square is a nice tool to use with the above. It can be worked out of sheet steel or brass, quite heavy, and after the bend is made should be trued up. One side of the square is like any other similar tool, but the other one has a curved offset in it, which allows it to fit into the curve of a slat, or hug close to the inner side, according to which side of the slat it is placed. The flat top and bottom bear on the edges of the slat, while the other one rests on the angle on the radial line.

It is very essential that gigging apparatus be kept in good running condition. A common cause of imperfect gigging is untrueness of the cylinder shaft. It becomes bent close to the head, usually on the end next to the pulley that drives it. A sharp awl will tell the story if carefully applied when the shaft is slowly revolved. Once the bend is located, take the shaft out either by rigging a pry over it with a long lever, or by putting on pressure with a screw. Proceed to straighten the shaft by finding the exact location of the bend, then spring the shaft in the opposite direction until straight again. Sometimes the

trouble with a cylinder is in the balancing. Even when a perfect standing balance is shown, the same may not exist when the cylinder is running. This may be caused by a difference in the weighted metal which is set screwed just inside the rim of the drum for this purpose. It having been proved that the centres do not actually coincide, make them do so by removing some of the metal on opposite sides.

#### THE TEXTILE SCHOOLS OF PHILADELPHIA AND LOWELL.\*

The Textile Department of the School of Industrial Art takes its place, as a natural sequence of the training in design; and its development and realization have been accomplished through the generous support and co-operation of the most influential members of the Philadelphia Textile Association. It is exceedingly well equipped, with a great variety of American and foreign machines and appliances for the complete treatment of the fiber and fabric, including, in the case of wool, washing, scouring, carding, spinning, weaving, fulling, dyeing and finishing.

The school prides itself on its splendid equipment of textile machinery for dealing with silk, woolen and cotton goods, and claims that no other school in the world excels, or even equals it in variety and excellence, the result of private liberality. The students do everything themselves alike with respect to the manipulation of the fiber, the adjustment of the machinery, the drawing-in of warps, and the cutting, lacing and mounting of the cards.

The confidence which the school has gained through the excellence of its training enables its graduates to obtain positions readily as superintendents or designers, who would get as a commencing salary \$50 to \$100 a month. Instances were given of former students who were now receiving \$1,800 and \$2,600 a month. The textile schools of America are required to prepare men for responsible positions, and they succeed in doing it. Whilst there had been difficulty in the earlier years of the school in securing the sympathy and recognition of manufacturers, there was none now. They come to the school for their recruits, as they have found the advantage of employing young trained men; and so the graduate of the school goes into the mill as a "boss" designer or assistant superintendent.

The students come to the school usually at about 20 years of age, and are expected to possess on entrance a considerable proficiency in freehand drawing, and to be well versed in the common English branches of the Grammar School course, and especially in arithmetic. It is said, however, that it would be of great advantage if the teachers of the common schools were more practical in their methods, and took their examples, say in mathematics, from the conditions of the chief industries of the district. Students much younger than 20 would not be accepted unless they had passed through the subjects of the High School and had been three years in a mill. Only then would the school attempt to qualify them for a responsible position. English and American youths want to become masters too soon, and are not so patient as the French, Germans, or Austrians. At Lowell, the great centre of the textile industry of the New England States, a very important textile school has recently been founded. It has been in operation since the 1st of February, 1897. It is established for the purpose of giving a thorough grounding in the theory and practice of the art of manufacturing all fibers known to the textile industry, and for its efficient equipment the organization, methods, and scope of the textile schools of England, France, Switzerland, Germany, and Russia have been carefully studied. The trustees of the school, with two exceptions, represent the chief man-

\*Report of a visit to Technical Colleges, etc., in the United States, by J. H. Reynolds, Director and Secretary, Technical Institution Committee, Manchester.



agement of the great industrial textile concerns of Lowell, Lawrence, and vicinity, in the valley of the Merrimac, a splendid river, which for a mile along its right bank at Lowell is fringed with great mills manufacturing all classes of textile goods. The aggregate capital of these great corporations is stated at over £5,000,000. This policy ensures for the school a thoroughly practical management. The City of Lowell and the State of Massachusetts have given very considerable aid in the establishment of the school, but the manufacturers of New England have been no less liberal.

The school occupies hired premises, which have been adapted for the purpose, and the expenditure for the first year, including maintenance, has been about £10,000. When the equipment is complete the school will rank with the best organized textile school of the American and European continents. The institution is regarded essentially as a trade school for the express purpose of training those who will have the management of, or at least will fill important positions in, textile concerns, and with the further special purpose of improving the process and methods in any particular branch of the textile industry, or of introducing new branches of the industry.

The school seeks to accomplish its purposes in four different ways: (1) By day classes, covering a period of three years' instruction, and arranged in four separate courses: Cotton manufacturing, woolen manufacturing, designing, dyeing, printing and finishing. (2) By evening classes for men employed during the day, which classes are divided into courses similar to those for day students, except that weaving is treated as a separate course. (3) Popular illustrated lectures on textile subjects by recognized authorities. (4) Textile designing for women.

The courses of instruction are purposely made exceedingly elastic, the object being to endeavor to meet as directly as may be the real wants of the students—for example, the five main courses admit of as many as 25 different options based upon them. The fees for day students are \$100 for the session; for evening students, spinning or weaving are each \$5 per session, and for chemistry and dyeing, or for designing, \$10 for the session.

The equipment of the cotton-spinning room comprises 18 machines from breaker to mule, 10 machines for wool spinning, to which is to be added a worsted plant. The plant for preparation comprises machinery for cotton warping, pooling, slashing, beaming and drawing-in, etc., and there is a corresponding equipment for wool and worsted-warp preparation. The power looms number 23, including a very great variety of make and style, together with 15 iron hand looms, made by Atherton, of Preston, but based on those designed by Mr. Fox, of our own school, all of which weaving machinery is in charge of one of the former students of the Manchester Technical School. The silk equipment comprises six machines from winder to doubling frame, and the whole of the machinery is driven by one 30 and two 20 horse-power motors. Most, if not all, of the machinery has been given or lent.

Noticeable amongst the looms is the Northrop loom, which cost \$175, and which is so arranged that if a thread breaks the cop is thrown out of the shuttle and is automatically and instantly replaced by another cop, self-threaded, without stopping the loom or damaging the cloth. Sixteen looms can be managed by one weaver, and it is stated that there is a mill in New England now running equipped with 800 Northrop looms controlled by only 50 work people. The loom is said to be in all respects a commercial success. Its introduction, however, in the mills in Fall River—the Bolton of New England, where English operatives abound—had been found difficult, if not impossible.

It was stated that the doubling and spinning frames are better than those of English manufacture, but that the carding,

slubbing and roving machinery is not nearly so good as those of English makers. The American looms were also, it was said, of much better quality and more efficient than those of England, but much more costly. The great adaptability of American loom makers was a matter of comment. As it was found impossible to buy a Scotch lappet loom, a loom for the purpose was designed and constructed, better, so it was claimed—than that made in Glasgow. Though the school has been open only twelve months, there are 61 day students, 21 afternoon students and 160 evening students. Amongst these are a few women who study with a view to becoming textile designers and dyers. It was remarked that in an American mill there is absolutely no "rule of thumb"—the manager knows the cost of everything, the yarn produced, the wages paid, the cloth woven, the coal used, the steam raised, etc., etc., and any departure from the standard in any of these details is at once made the subject of enquiry, with a view to apply an immediate remedy where remedy is needed.

There is no question that the Textile School of Lowell, which is the outcome of a demand springing from the industry itself, having regard to the keen competition of Europe, and of the Southern States (which promises to be more serious still) will prove of great service to the textile industry in training a superior class of men capable of producing goods of higher quality, style, and finish. So severe has the competition become that it has led many cotton manufacturers in some of the New England States to devote themselves to the manufacture of silk goods. The value of these Textile Schools has become so patent that the authorities at the Technological Institute of Boston are now considering the desirability of instituting and equipping a Textile Department on the same lines as the other great departments of the Institute, which, if successful, will bring into the industry a body of men of extraordinarily high qualifications.

#### MERCERIZED COTTON.\*

J. R. MONTGOMERY, WINDSOR LOCKS, CONN.

The subject of mercerized cotton has aroused a good deal of interest among textile workers for some months past. The fact that European chemists had for some time been able to produce a lustre upon cotton yarns that rendered them difficult to be distinguished from silk, became known in this country about two years ago, and it was some months later before it was found that this result was produced through an adaptation of Mercer's process, which was discovered by John Mercer, a cotton printer of Lancashire, England, as early as 1844. He made his discovery the basis of broad patents which were issued to him in England, and in continental countries in 1850. A reading of his claims in the original patent application will show that it was no part of his purpose to produce cotton yarns or fabrics of the high, silk-like lustre now obtained by the so-called mercerizing process. To quote from his application: "The invention consists in subjecting vegetable fabrics and fibrous materials, cotton, flax, etc., either in the raw or manufactured state, to the action of caustic soda or caustic potash, dilute sulphuric acid, or chloride of zinc, of a strength and temperature sufficient to produce the new effects, and to give the new properties to them which I have hereafter described. The mode I adopt of carrying into operation my invention to cloth, made wholly or partially from any vegetable fibers, bleached, is as follows: I pass the cloth through a padding machine charged with caustic soda, or caustic potash, at 60 or 70 degrees Twaddle's hydrometer, at the common temperature, at say, 60 degrees F. or under, and, without drying the cloth, wash it in water, then pass through dilute sulphuric acid, and wash again.

\*Extracted from a paper read before the New England Cotton Manufacturers' Association.

or I run the cloth over and under a series of rollers in a cistern with caustic soda or caustic potash, at from 40 to 50 degrees of Twaddle's hydrometer, at the common temperature of the atmosphere, the last two rollers being set so as to squeeze the excess of potash back into the cistern; the cloth then passes over and under rollers, placed in a series of cisterns charged at the commencement of the operation with water only, so that, at the last cistern, the alkali has been nearly all washed out of the cloth; when the cloth has either gone through the padding machine, or through the cisterns above described, I wash the cloth in cold water, pass it through dilute sulphuric acid, and wash it again in water. When I adapt the invention to gray or unbleached cloth, made from the fibrous material before mentioned, I first boil or steep the cloth in water, so as to have it thoroughly wet, and remove most of the water by squeezers or hydro-extractor, and then pass the cloth through the soda or potash solution, etc., and proceed as before described. I apply my invention the same way to warps, either bleached or unbleached. By this process I produce on cotton and other vegetable fabrics and fibres, effects somewhat analogous to that which is produced on woolen by the process of fulling or milling. It will have acquired greater strength and firmness, each fiber requiring greater force to break it. It will also have become heavier than it was before it was acted on by the alkali, if in both cases it be weighed at the temperature of 60 degrees F. or under. It will have acquired greatly augmented and improved powers of receiving colors in printing and dyeing. The effects of the application of my invention to the vegetable fiber in any of its various stages before it is manufactured into cloth will be readily understood by reference to its effects upon cloth composed of such fibers."

He also described secondly and thirdly two other processes for producing the same effect. By using diluted sulphuric acid in the one instance, and solution of chloride of zinc in the other, neither of which are of practical value, and need not be considered at this time. He then proceeds: "When I operate on mixed fabrics, partly of vegetable and partly of silk, woolen, or other animal fibers, such as delaines or leans, etc., I prefer the strength of the alkali not to be above 40 degrees Twaddle's hydrometer and the heat not above 50 degrees F., lest the animal fibers should be injured. I may, in conclusion, remark that the description of the apparatus or machinery, and the strength and temperature of the soda or potash, sulphuric acid or chloride of zinc solution, may be varied to a considerable extent, and will produce proportionate effects without at all deviating from my invention. For instance, caustic potash or soda may be used even as low as 20 degrees Twaddle's hydrometer, and still give improved properties to cotton, etc., in receiving colors in printing and dyeing, particularly if the heat be low, for the lower the temperature the more effectively the soda or potash acts on the fibrous material above described. I therefore do not confine myself to any particular strength or temperature of the substances I employ, but the particular strength, heat and processes here described, are what I have found the best, and what I prefer. And I claim as of my invention the subjection of cotton, linen and other vegetable fibrous material, either in the fiber or any stage of its manufacture, either alone or mixed with silk, woolen or other animal fibrous material to the action of caustic soda or caustic potash, dilute sulphuric acid, or solution of chloride of zinc at a temperature and strength sufficient to produce the new effects, and to give to them the new properties above described, either by padding, printing or steeping, immersion or any other mode of handling."

It will be seen that Mercer's invention was for the purpose of producing in cotton goods a fabric that would be somewhat analogous to fulled or milled woolen goods, the fabric to become heavier and of greater strength. But principally, and this is

the point upon which he lays the greatest emphasis, "It will have acquired greatly augmented and improved powers of receiving colors in printing and dyeing."

I have recently seen the translation of an article printed in a German textile paper more than 40 years ago. It is headed, "Process for obtaining fine and contracted cotton goods." "Very curious, and of great value, not only for cloth printing, but also for obtaining fine linen and cotton goods of all descriptions, is the discovery on which Mercer has taken a patent, in the year 1850." It goes on with full particulars of the claims under the patent, and of the structural change which takes place in the fiber itself, as shown under the microscope. It does not allude in any way to an increased lustre of the fiber, nor will Mercer's process produce a lustre.

Mercer's anticipations of the value of his discovery were never realized, for the contractions of the cloth in all directions after passing through his process, made them more expensive, and the advantages gained were more than overcome by their increased cost of production, so that the process was for many years practically forgotten.

The next application of the process was in the manufacture of silk, and of worsted crepons, a light dress fabric, a distinctive feature of which is its crepe or crinkly effect produced in weaving. Goods of this description are made that are washable, and that will not lose the crepiness through washing, and are commonly dyed in plain colors.

These goods were very popular and the height of fashion for ladies' wear some four to six years ago. They were woven with two warps, a back and a face, the back warp being tight under a severe tension, and the face warp loose and slack. This, with the peculiar weave, produced the crinkly or crepe effect.

Foreign goods were soon brought into market that had this peculiar crepe effect greatly exaggerated into large puffs, which took the popular fancy, and drove their more modest predecessor out of the market. The domestic manufacturers were unable through any of their arts of weaving to produce these more pronounced effects.

Examination showed that the back warp was of cotton sparsely scattered across the width of the goods, and that filling threads were also thrown on the back in regular or irregular patterns as desired, and it was only too late, and not until fickle fashion had bowed down to some other idol, that it was discovered that the much sought after effect had been produced by passing the goods with its cotton back and worsted or silk face through the mercerizing process, shrinking the cotton in all directions from 20 to 25 per cent., throwing the face of closely woven animal fiber, which was unaffected by the cold caustic alkali, into great puffs and blotches.

Later, a firm of German dyers, experimenting on some hali silk and cotton goods, which they desired to piece dye, found that the cotton did not take the dye with the same intensity as the silk. They concluded to mercerize it, and, to prevent the loss in the cotton by shrinkage, determined to put it through the concentrated solution of caustic soda in a strongly stretched condition. Their experiment was a perfect success. They found they had achieved all they desired, and to their astonishment, the cotton had assumed a lustre equal to that of silk. They developed this discovery into a process to produce the silk lustre upon cotton, now known as mercerized cotton, silklike, sub-silk, silk lustre, etc.

An attempt was made by them to patent this process in England, but the English patent office refused on the score of anticipation, and as there is now no restriction to its use, the process is becoming quite general.

To obtain this silk lustre the general method to be pursued is as follows: Skein yarns, warps or piece goods in a stretched condition are immersed in a solution of caustic soda for about 12 to 15 minutes in a strength of bath about 50 degrees Twaddle,

The goods are then lifted, and the surplus liquor is removed, either by squeezing the goods through rolls, putting them through the hydro extractor, or any other process to remove the excess of the alkali. They are then thoroughly washed with clear water. A second bath of diluted sulphuric acid neutralizes all remaining alkali, when a final rinsing leaves the goods in condition for either bleaching or dyeing. As a result of the uniform contraction of the fiber under tension, and of the chemical change of the fiber itself, the goods have a tensile strength of from 15 to 25 per cent. greater than before treatment. The ordinary cotton fiber under a microscope reveals itself as an irregular, flat, but twisted ribbon. The moment, however, that the caustic soda touches the fiber, it untwists, contracts and swells, taking a firmly rounded form. The fiber retains this rounded form after the caustic soda has been washed off, and through all subsequent treatment.

The question is invariably asked when showing this product, is this silk like lustre permanent? Will it remain after bleaching and dyeing. The reply is that the lustre is permanent, and will not be affected by any subsequent treatment. It can be so covered with starch, China clay or other extraneous matter as to be obscured, or it may be so dyed as to leave a precipitate upon the goods or yarns that will obscure the brilliancy of the lustre, but these removed, the silk-like gloss is still there. It is often asked why does the mercerized cotton take on this high lustre? The best reply to this question is that the cotton through the action of the caustic soda, is brought to a gelatine or parchment like condition, the extreme tension rounds and concentrates the fibers, so that the rays of light as they fall upon them are reflected instead of being absorbed. The quality and degree of lustre, and the silk-like appearance are largely dependent upon the quality of the cotton used. Long staple Egyptian and Sea Island cotton, so twisted as to leave the fibers as nearly as possible loose and parallel, show the best results. If the yarn is gassed, removing the ends of the fibers, the result is a further improvement.

To what use may this new product be put? I cannot do better than to quote an extract from a letter, dated Leeds, Eng., Feb. 12, 1898, and published in The Wool and Cotton Reporter, March 3. The writer says: "For a long time there has been a feeling in the textile industries for a new fiber, or some invention or adaptation of the old fibers, wool, cotton, silk, etc., which would produce at any rate a new cloth. Men in the trade who possessed a scientific knowledge have made experiments with various substances, each hoping to strike something which would create a new fabric, and lead him on to fortune in the same manner that Titus Salt, who founded the great firm in England and in the United States, discovered the capabilities of the hair of the Alpaca and Angora goat. At one time ramie fiber was to revolutionize the trade; then it was China grass; and I know a manufacturer who even made a length of cloth from human hair. None of these, however, proved successful. It seems at last that something has been discovered, or rather, I should say, applied, which is bound to have an important effect on the cotton industry. I refer to the new mercerized cotton, which is the closest imitation of silk that has been put on the market for years."

He predicted that next season the dress goods makers would show exquisite design and effects with this mercerized cotton. The prophecy was more than realized, and those manufacturers who used this product in their goods were amply rewarded for their enterprise.

George R. Gordon, wholesale clothing, Vancouver, and others, have been incorporated as the Geo. R. Gordon Co., Ltd., capital \$100,000. The applicants for incorporation are Geo. R. Gordon, Chas. Putnam, T. Mathews, G. McIntyre and E. D. Putnam.

## THE MANUFACTURE, USE, AND CARE OF LOOM HARNESES AND REEDS.\*

BY JOSEPH H. KENDRICK, PROVIDENCE, R.I.

In order to present clearly the different styles of loom harness, I have prepared samples, which will be distributed, each kind by itself. Number 1 is the hand-made harness in general use up to 1846, when the first machine for making loom harness was invented. You will see by this sample that the eye is formed by a double knot at the top with both legs of the heddle on the same side of the shaft. The bottom of the eye is made by loops, which stride the shaft or one leg on each side. The loop side of the harness was often loosened by the drawing-in process when the drawer in forced the hand between the legs of the heddle and as near the bottom of the eye as possible in order to control the eye of the harness while drawing in. The loop side of the harness formed this way was always the weak side and would give out when the rest of the harness was good, as when loosened in the loop the harness soon became useless. Up to this date, 1846, little or no improvements had been made in the manufacture of loom harness. About this time a Scotch machine was produced and used to some extent in this country, which made the easy side, so called, or loop side of the harness, but still left the most difficult or knot side to be made by hand. Also, a little later, a machine was invented and used in Sacarappa, Me., which made a harness by braiding several threads together, leaving the eye in the centre, which was kept open during the process of finishing by a wire running from end to end of the harness. This harness had some good points, but after running for a time the tendency of the eye was to close up and catch the warp yarn and chafe and break it. This harness never came much into use and the main reliance for the production of harness was still by hand. At this time harness was about three cents per bier.

Early in the fifties John Kendrick opened a shop in Providence and employed about sixty girls to knit harness by hand. Two kinds of wooden needles were used, one for each side of the harness. Filling these needles with twine by hand was a slow process. At this time a winding machine was brought out for the purpose of filling these needles by power, for which a large price was paid (about \$10,000). This machine enabled a girl to wind for thirty hands, which was a great saving, and enabled the harness maker to reduce the price of the article about 10 per cent.

About 1855 or 1860 there appeared a hand-made double-knotted harness, with knots at both top and bottom of the eye. This harness was intended as an improvement upon the loop harness, then in general use.

This harness was made by Gray & Fish, Worcester, Mass., by Willard Leavens, at Danielsonville, Conn., and John Kendrick, Providence, R.I. These harnesses were on the market for several years and although superior in some ways to the loop harness, the expense of manufacture was too great to allow of their general use, and their manufacture was finally abandoned, and the ideal harness was yet to be brought out.

The next that appeared was the so-called double-knot harness, and marked number 2 on sample. This harness has a double knot at each end of the eye and exactly alike. This did away with the loop described in number 1 and produced a harness just as lasting at the bottom of the eye as at the top. This proved a strong, durable harness. The machine for the manufacture of this harness was invented by Joseph S. Winsor, of Providence, in 1846, and was the first machine in the world to make a complete harness automatically. This machine being patented and the owner not caring to allow others to use his invention, other makers were forced to find some way to pro-

\*From a paper read before the New England Cotton Manufacturers' Association

duce a harness that could, if possible, prove as good as the double knot, as that was taking the lead in the market.

The next, sample number 3, was made on a machine made in England, invented by Joseph Sladdin and called the Bolas machine. Sladdin later came to Lawrence, Mass., and under the firm name of "Sladdin & Lord" improved the Bolas machine, built several and put them on the market. This machine produced a harness similar to the hand-made loop harness, marked number 1, except the top of the eye was made by a single knot instead of a double knot, but the bottom of the eye was still a loop. The bottom legs of the eye strided the shaft, which left it open to the same objection as the hand-made harness in its liability to work loose.

Sample number 4 is a later improvement, which reversed the eye of the harness, putting the loop at the top of the eye and both legs the same side of the shaft, and the knot at the bottom, where the legs stride the shaft with less danger of working loose in the loom. The loop being at the top, both legs of the heddle being on the same side of the shaft, the effort is made to fasten the two legs together as far as possible, thus to prevent the loops getting loose. When the legs of this loop are perfectly fastened it has much the same effect of a double knot as is intended, but perfection in fastening the loops is somewhat difficult. Some have an idea that knotted harness creates more friction on the yarn, but the peculiar construction of the knot is such that no extra chafing is caused, and the experience of fifty years has proven that this harness will weave any goods made in the country that any harness will weave, and that it is a strong and durable harness no one will question who is acquainted with the facts. I have no intention to question the value of the different kinds of harness being made. The firm I represent make both kinds, and as all patents have expired any harness maker can purchase any and all the different machines in the country. I also will say that the manufacturer was never better served or got more for the money than he does to-day from the loom harness makers.

When the loop harness machines spoken of in this paper were put upon the market it was claimed that they infringed the patent on the double-knot machine, for which the owner, Kendrick, had paid a large sum. The matter was finally referred to the United States Court, who decided in favor of the plaintiff. This decision made it possible to stop most of the harness machines in the country, but that would have worked a hardship on both the harness maker and the manufacturer. There were also other patents brought into the country from England, which with those already here promised endless litigation and expense. As all harness makers in the country were dependent on the use of some one of the machines for their business, it was mutually agreed to form an organization of all the harness manufacturers for the purpose of buying these patents, which was done, and these patents put into the hands of three trustees to be held by them during the life of said patents, and during the said term all users of these patents (not owners), paid into the hands of the trustees a royalty on each bier produced, to be paid to the owner of the patents as reasonable compensation for the money they had expended in obtaining their patent rights. This plan was carried into effect and a reasonable price fixed at which all harness should be sold, and this action ended what might have proved a long and expensive contest in the courts.

It is not always that an organization of this kind lowers the price of goods produced to the consumer, but it did in this case, for while the harness manufacturer had the power to fix the price on an article the mills must have, they actually made a lower price than had ever been known before, giving a large part of the saving between hand work and machine product to their customers. We are glad to be able to say that in no branch of

manufacturing has there been greater improvement than in that of loom harness.

Formerly harness were varnished in the mill by the overseer of weaving, and it was a common thing to see a section hand brushing a harness for an hour or two with tallow before drawing in, and nothing was dreaded more by the weaver than a warp with a new harness, but now a weaver would rather see a new harness coming to her loom than an old one, and it would be impossible to run looms at the present speed in those days. Harness makers should have the credit of making the present speed possible.

In ordering harness it is important for the maker to know the number of warp yarn to be used, which enables him to better determine what size of twine to use in the harness. It is a common thing for a mill to order harness for fine yarn and not mention the fact that fine yarn is to be used, and the harness maker uses a twine suitable for weaving number 30 to 36 yarn, supposing the mill is to weave same cloth as usual, while it is possible the mill intends to use number 60 to 70 yarn in the warp. This causes considerable trouble which could be easily avoided. It is also a common thing for mills to order harness  $\frac{1}{4}$  to  $\frac{1}{2}$  inch wider than reeds. This makes considerable friction on the selvages, just where it ought to be easiest, and all harness would give better satisfaction if they were made exactly same spread as the reeds.

In this country the idea prevails that all rooms should be run as cheaply as possible, and in carrying out this view the fact that cheap help is not always the most profitable is lost sight of. Most mills hire a good overseer of weaving and they insist on his running the room with just so many fixers at a stated price, which means that he must hire such fixers as will work at the price named, which does not always command the best workmen. The work runs bad and the cost of supplies increases. I know of some fixers who understand running a loom so well that their sections are always running, the weavers satisfied and the looms turning off the proper amount of cloth with the least possible expense; while in the same room, with the fixer who does not understand his business, the work runs bad, the weaver complains and the cost of supplies doubles up. He uses double the harness and twice as many pickers, and all other supplies in proportion, to run a loom. If you examine his loom you will find twice as much power used to drive the shuttle across the loom as is needed, his harness strapped up tight as a drum, his lathe knocking against his harness, and his whiprow too high or too low, which means poor-looking cloth and high cost to produce.

In England they give a great deal of attention to the setting of a loom, just the right tension to the harness, and never depressing the harness so as to bring the warp against the lathe, but as near to it as possible and not touch; and then the swell in the shuttle box is just right, not too much tension, and the check on the picker stick is adjusted so as to take off all jar and save extra wear and the pickers. While in this country it is a common thing to see a harness jacked up so tight that it will wear out twice as fast as it ought to and cause friction on the warp and wear out strapping; then the harness is depressed so low that the warp is brought down on to the lathe; the swell in the shuttle box so tight that in order to drive the shuttle the picker stick is made to strike so hard as to often break the picker stick and to wear out the pickers.

After the expiration of the original patents others took a hand in the manufacture of harness, and in order to draw trade from the old makers, prices, already low, were cut still lower, and as usual the quality went down with the price. Many of the new and some of the old concerns went down under the pressure of competition and low prices.

About ten years since a loom-harness association was formed

composed of nearly all the harness makers in the country, and the price fixed at which they would dispose of their product. The price was put at 24 cents per tier of 40 eyes. This was a low price when it is considered that the twine used is almost entirely made of long-staple cotton and combed. On fine work Sea Island is the twine used by most of the harness makers without extra charge. Of this association nearly one-half have been compelled to abandon the business as unprofitable, and those that are left are compelled to give the business their closest attention in order to get any return for their investment, as their business is about on the same basis of print cloths at two cents. John Kendrick, of Providence, Mass., and G. W. Harris, Lowell, Mass., are the pioneers in the loom-harness business, and they or their representatives are still in the business, and their ranks have been increased by others who have learned the business thoroughly; but scores have in the last fifty years attempted the manufacture of loom harness, and have failed and disappeared. The changes in the style of doing business to-day, where the mills make a great variety of goods, and taking orders to-day to be filled in a very short time, demand that the harness maker shall be prepared to fill his orders with the least possible delay, and compel him to keep twice the amount of machinery on hand that he averages in use. The larger makers to-day are called upon to supply harness in from five to ten days and must be prepared to knit from five hundred to one thousand shades per day, that as little time as possible shall ensue between the knitting machine and finishing.

I would impress upon manufacturers the importance of giving from four to six weeks, if possible, for the making of their harness. Where this is done a more satisfactory job can be provided and this rule can be observed on standard goods. While a harness can be made in three or five days that will last a while on easy weaving, a longer time should be given when possible.

The question is often asked what rule a reed maker has for spreading the dents for a certain sley and to produce certain widths of cloth. It will be safe to allow seven per cent. for shrinkage in weaving, but it is impossible to give a rule that will work the same in all cases, but for an illustration: Suppose we want to manufacture 40-inch, 80 sley goods that calls for 3,200 ends, and to bring the goods 40 inches from loom we will add seven per cent. to the width of the cloth and set the reed 1,670 dents on 42 80-100. This is as near as the reed maker can come and under proper conditions will give the desired results, but the weighting of the warp or adjusting the temples and beating in the filling may vary the width of the goods and it will be found that in the same mill or different looms in the same reed the width of the cloth may vary a half inch or more, but for this variation the reed maker cannot be held responsible.

The manufacture of reeds is a trade that few have learned. There are some who try to see how cheap a reed can be made regardless of work produced. There is no objection to buying a good reed cheap if you can (?) but a poorly made reed will be dear at any price. Many reeds are being sold to-day at a price that makes it impossible that they should be anything but inferior. It is not easy for the manufacturer to determine whether the wire for the reed has been properly prepared or not. One-half the labor may be withheld from the rolling and finishing and the buyer perhaps not know the difference, but the yarn will know the difference, and the chafing in the loom will cost more than the higher price paid for a better article. A lighter wire may also be used, which makes a narrow dent where a wide one is needed and is worth more than the difference in cost. There are no two things more important in the mill than a reed and harness, and the cost of the best is so small that the amount can hardly be figured in a piece of goods. The difference between the highest price and the lowest on these

articles is next to nothing on a loom per year, but the difference in results may amount to much.

In the care of reeds and harness little need be said. Not much will be gained in revarnishing harness during their use unless it is done after each warp or two, and it is doubtful if that will pay. When harness are to be laid away and not used for a time they should be kept in a room with moderate temperature and no grease or other substance put on them. Reeds are often spoiled by being kept either open or in boxes in a damp place where steam or moisture can reach them. The keeping in a dry place is the only protection they need.

In closing I would say the dates mentioned in connection with patents and improvements may not be absolutely correct, but are substantially so, the intent being to trace as nearly as possible the changes in the making of loom harness for the last fifty years, which have resulted in giving to the manufacturer goods in this line well nigh perfect, and a price about 33 per cent. less than could be bought before these improvements were made.

### FLANNELS.

Flannels are a class of cloths that hardly need description. They are an undressed finish, free from luster, and are intended specially to furnish warmth and ease in wearing. Their purposes are manifold. They enter largely into undergarments, they are worn as dress cloths by women and as suitings to a considerable extent by men. The materials which enter into the make-up of the flannel are quite varied. Silk, cotton, wool and camel's hair all have a part in different grades of flannel, writes Randolph in *The Boston Journal of Commerce*. Silk enters in as warp stock in the highest and best grades of flannel. Cotton comes as a fiber which helps to cheapen the fabric and at the same time avoids excessive shrinkage which happens when the flannel is all wool. Camel's hair is used on medium-grade flannels, and as it does not felt it helps in the same way as cotton does. Flannels are used quite commonly in natural colors, white, and the light fawn color which is natural to camel's hair, and gray, which is a mixture of white and black sheep's wool. These are the natural colors. Piece dyes are very common, too; they are red and navy blue mainly, and in dress goods all colors to suit taste or market.

In making a flannel it is essential first to know the price at which the flannel is expected to sell. By using different grades of stock it is possible to regulate the goods to most any desired figure. The first factor necessary is thus: Some idea as to how much the goods are to sell at. After this is known it is necessary to determine the required width of warp, size of filling, picks, and so on, until it can be calculated about what the making of the cloth will cost. After some approximation has been reached, the kind of stock to be used can then be determined, and the grade selected should be the very best that the margin above cost of production will admit. A good flannel will make certain well-defined claims upon the manufacturer. It ought to be made from a fairly good grade of stock. No burrs, seeds or vegetable particles must be allowed to be present, for these things are the invariable accompaniments of cheap flannel. Shrinkage must be carefully noted, and wools which are not too freely given to shrinking must be selected for the better grade of flannels. Then the wool must be soft and open so that the flannel will have a free and agreeable feel. It will greatly add to the value of the flannel if whatever wool is used in its make-up is run through a dusting machine before it is washed. This will remove any possible dust or obnoxious particles which might remain. In the scouring a soft soap and an alkali not over strong may be employed. The heat of the washing bath must not be excessive. To make a good flannel, the wool should come out of the scouring white, elastic and

somewhat fluffy. It is not well if this process leaves the wool still yellowish and soaked with water so as to seem almost soggy in its appearance. Dry and pass through a picker to remove burrs, and then oil.

The oil for lubrication should be a lard oil, with alkali, borax and water; and on fine yarns it may be used in the proportion of about a gallon to the hundred pounds of wool. In the spinning the object is to keep the yarn as neat and clean as possible. All double threads and bad splicing must be avoided, and if knots must be made they should be as nearly perfect as possible, so that they shall not show any more than can be helped. A proper flannel list ought to be twice as thick as the warp, and there should be no less than ten threads on each side. This will give body and appearance to the whole cloth.

In all the work of manufacture grease and dirt must be kept away from the goods as much as possible, particularly from light and delicate colors. In the finishing such defects may be remedied and they may not; prevention is much better than cure. To full a flannel the soap to be employed must be something as follows: Take six ounces of a neutral soap and one-third as much soda ash and mix all well to the gallon of water. This liquor will answer for fulling and also for scouring as well. The only difference is that in the scouring the strength of the soap wants to be considerably reduced and a liberal supply of the bath may be employed. The scouring may be best done with warm water, and then rinsing must be done with cold. With white flannels the next important step after extracting is the bleaching. To produce a good, pure white on wool there is no other satisfactory way but the sulphur method. Methods that work all right on cotton will not answer at all on wool. The sulphuring is done in an oven. The cloth is hung in the oven or house on wooden rollers and the sulphur is placed in a vessel and a hot iron introduced. The chamber is closed tight to air and the fumes begin at once to saturate the cloth throughout every part. Eight or ten hours of this sulphurous acid gas is quite sufficient to attack the natural color of the wool fiber, and the result is a pure white cloth. A sulphur oven must, of course, be free from nail heads or any iron from which iron rust may fall upon the goods, and it is well not to attempt piece dyeing on woollens that have been sulphured for the reason that spots and blotches are pretty sure to follow.

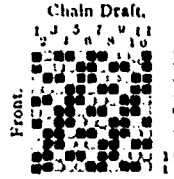
When the sulphured cloth is taken out of the oven it must be neutralized in order to take away all traces of acid and keep the fibers from being made weak and tender. A bath in a slightly acidulated solution with a generous supply of water will aid very much in this operation. Extraction, drying, and then shearing is the succession of operations which follows. Steaming is not an extensive operation and means little more than the mere smoothing down of the face fibers; then brushing and pressing prepare the goods for the market. Good, white, plain flannel is sometimes made from a lower grade burry wool. The flannel is unshered, and the stock is carbonized before it enters into the manufacturing processes. If the carbonization is done by the alumina process, a very acceptable white is produced at once without the necessity and expense of bleaching. The burrs and vegetable residues are all taken away and the cloth is bleached at one and the same operation, and on these lower grade cloths a very respectable flannel is the result. A flannel that will sell well, and attract the attention and interest of the consumer, must be clean from burrs and dust particles, it must be well shrunken, so that on washing it will not crowd up unreasonably every time; it must be bright and pure in color, it must handle pleasantly, being soft and elastic, and it must be uniform in width and finish.

Ker & Harcourt, bobbin manufacturers are now operating their plant at Parry Sound, Ont., having completed the removal from Walkerton, Ont., more than a month ago.

## Textile Design

LIGHT WEIGHT SERGE.

Dyed in piece. Finished weight 14 ozs. for 30 inch width  
Dressed. -2,640 ends, 2-26s worsted  
Woven -58 picks, 2-26s worsted. Drawn straight on 11 harnesses. Reed 65 inches inside selvage



Twill to right

2,640 ends, 2-26s., worsted warp, equal 6 44  
54 picks, " " fill, " 9 34

Weight 6-4 yard from loom equals 15 78  
15 78 ozs shrink 10 per cent., equal 17 1/2 ozs. yarn, necessary for one 6-4 yard; 17 1/2 ozs yarn at 64c equal 70c. A W & C R

### TEXTILE IMPORTS FROM GREAT BRITAIN.

The following are the sterling values of the textile imports into Canada from Great Britain for September and the nine months ending September, 1897-1898

|                           | Month of September. |         | Nine months ending September. |          |
|---------------------------|---------------------|---------|-------------------------------|----------|
|                           | 1897.               | 1898    | 1897.                         | 1898     |
| Wool .....                | £ 3,095             | £ 3,487 | £ 20,402                      | £ 30,881 |
| Cotton piece-goods .....  | 31,735              | 38,786  | 298,129                       | 379,441  |
| Jute piece-goods.....     | 15,679              | 10,814  | 92,327                        | 98,941   |
| Linen piece-goods.....    | 8,711               | 12,484  | 91,763                        | 116,169  |
| Silk, lace .....          | 507                 | 618     | 4,297                         | 5,979    |
| " articles partly of .... | 2,400               | 3,016   | 15,982                        | 24,905   |
| Woolen fabrics .....      | 18,475              | 29,893  | 195,291                       | 249,140  |
| Worsted fabrics.....      | 45,893              | 51,148  | 464,872                       | 482,308  |
| Carpets .....             | 10,857              | 17,280  | 115,893                       | 149,155* |
| Apparel and slops.....    | 35,991              | 47,691  | 236,877                       | 273,177  |
| Haberlashery .....        | 17,378              | 17,129  | 120,063                       | 126,068  |

### THE BELLEVILLE BRUSSELS CARPET CO.

A local company has been organized in Belleville to establish a carpet factory in that city. The provisional directors are: President, Thos. Ritchie; vice-president, T S Carman; secretary-treasurer, J. L. Biggar, auditor, W. D. Chisholm; solicitor, W. H. Biggar.

The company state that it intends to buy or erect works in the city for the manufacture of Wilton and Brussels carpets. They expect to employ at least 200 men for at least ten months in the year and to pay out from \$25,000 to \$40,000 per year in wages. They ask that the city grant them a free site, if they should require one, exemption from taxation and a bonus of \$35,000, \$25,000 payable when the works are completed and 100 hands are employed, another \$5,000 when 150 hands are employed and the balance when 200 hands are employed. The security to the city will be the building and plant and a paid-up insurance policy. A by law granting a bonus upon those terms has been prepared and will be voted upon by the ratepayers on Nov. 22nd. The carpet plant of W G Dresser, Elora, Ont., is to be removed to Belleville and Mr Dresser is to have an interest in the new business. The Elora plant was stated to be worth \$40,000 in the council meeting at which it was decided to ask the ratepayers to vote on the granting of a bonus.

The Granby, Que., Rubber Co., has erected a large and well equipped building in which to manufacture varnish. J Fox will act as manager of this department.

## HOW TO BE IN IT.

An incident of general interest to the manufacturers of, and dealers in, textile fabrics throughout Canada will be the publication of the fourth edition of the Canadian Textile Directory, which is now rapidly going through the press. This work is more than a mere directory of names. It gives facts and figures about the textile trades of Canada which have been attempted in no other work. It contains not only a list of all the general stores, retail dry goods dealers, hat and fur dealers, clothiers and haberdashers, tailors, milliners, etc., but all the wholesalers and commission merchants or manufacturers' agents in similar lines, and all the mills and factories engaged in manufacturing fabrics of all kinds connected with the textile and kindred trades. These will be found specified in the lists detailed below, and by referring to them it will be seen that it gives information of special value relating to the capacity, products, sale agencies, and other facts of interest to those seeking information concerning the mills. The publishers desire completeness above all things, and a great amount of money, time and correspondence have been spent to obtain this completeness. Considering that all this information is of most benefit to the manufacturers and dealers themselves, one would think that not a single dealer or manufacturer in the country would fail to report promptly, seeing that it is of more importance to themselves than to the publishers. Yet there are a few who

have been thus negligent or forgetful. If this touches any reader of this notice will he read over the announcement below and send in his report at once, as the work will soon be issued. As an advertising medium the Canadian Textile Directory is unequalled. The cream of the manufacturers and dealers in every line we represent are the most prominent users of space in this work. Every copy goes to the trade and counts in influence because it is a standard work. The first edition contained 318 pages; this edition will make a book of over 500 pages. It is the only work in Canada which gives a full list of the boards of trade, travelers' associations, and dry goods and kindred associations, while the immense amount of statistical information, such as the details of the imports and exports of dry goods, etc., the tariff of Canada, the United States and Newfoundland, sterling exchange rates, etc., make it indispensable in any office of any pretensions.

The price of the book to non-subscribers is \$3, to subscribers \$2, and the advertising rates are as follows: One page (4½ x 7 in.), \$25; one-half page, \$15; one-third page, \$10; one-quarter page, \$8; one-sixth page, \$6; ten lines in classified list, \$5. Address at once,

BIGGAR, SAMUEL & Co., Publishers,  
Fraser Building, Montreal, or 62 Church st., Toronto

## DO NOT NEGLECT

## TO SEND YOUR REPORT FOR THE NEW "CANADIAN TEXTILE DIRECTORY"

It costs you nothing, and will be to your advantage. If you do not report, do not complain if your name and business are incorrectly given, or, possibly, omitted.

The following is the information required in the various branches of trade —

**Woolen Mills, Cotton Mills, Carpet and other Factories where Weaving is done:** Name and address of Proprietors, and names of the Officers, if a joint stock company; the capacity in sets of cards, looms and spindles (in the case of knitting mills, the number of knitting machines, and whether hand or power machines), when established, whether water, steam or electric power, description of goods manufactured; whether the mill has a dye house; and names of selling agents, if any. When situated in cities, the street address is desired

**Carding or Fulling Mills:** Name; address; capacity (number of carding machines); date established, and whether steam, water or electric power

**Cordage and Twine, Jute and Flax Mills:** Name, address, date established, capacity in spindles, steam, water or electric power; kind of goods made and material used (whether cotton, hemp, flax, etc.); selling agents, if any

**Sail, Tent and Awning Factories; Upholstery, Wall Paper and Window Shade Factories; Rubber, Oil Clothing, Felt, and Miscellaneous Factories in Textile Fabrics:** Name; address; date established; steam, water or electric power; description of goods made, and selling agents, if any.

**Clothing, Glove and Mitt, Collar and Cuff, Suspender and other Factories in Men's Furnishings; Button Factories; Corset and Ladies' Wear Factories:** The same as in preceding list, adding, whether selling through agents, or to the trade direct; or whether manufacturing for custom work only, or for the wholesale or retail trade.

**Hat Factories:** Name; address; date established; steam, water or electric power; whether manufacturing Wood Felt, Fur Felt, Silk, Cloth or Straw Hats; and whether selling to the wholesale or retail trade.

**Fur Manufacturers:** Name; address; kind of goods manufactured, and whether selling to the wholesale or retail trade.

**Bleachers, Dyers and Feather Dressers:** Name; address; whether Job Dyers, etc of garments only, or feathers, etc.

**Laundries:** Name, address, and state whether a machinery or hand laundry.

**Paper and Pulp Mills:** Name; address. Officers, if a stock company; capacity, in tons per 24 hours; date established; steam, water or electric power; number and capacity of engines and cylinders, kind of paper manufactured, selling agents, if any.

**Manufacturers' Agents or Commission Merchants:** Name and address; and in what branch of the Textile trade, whether Woolens, Cottons, Hats, Furs, Carpets, etc.

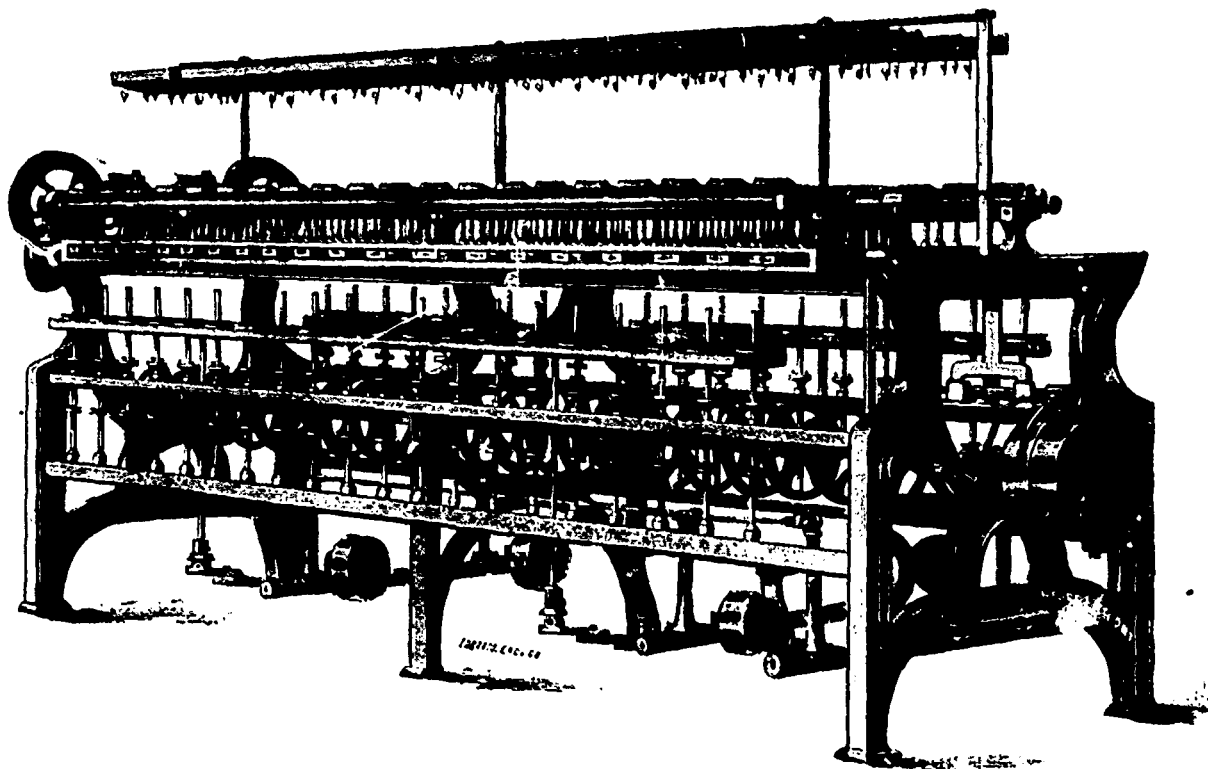
**Wholesale Dealers:** Name, address and line of business; specifying whether dealing in any or all of the following branches: Dry Goods, Clothing, Men's Furnishings, Tailors' Trimmings, Carpets, Upholstery Goods, Hats, Furs, Millinery and Ladies' Wear. In case you manufacture Fabrics also, state in what lines.

ADDRESS **BIGGAR, SAMUEL & CO., PUBLISHERS**

62 CHURCH ST., TORONTO, or FRASER BUILDING, MONTREAL, CANADA

**RING TWISTER.**

This cut represents the ring twister, which is manufactured by H. W. Karch, Hespeler, Ont. Its dimensions are forty spindles, twenty on each side; size of rings,  $3\frac{1}{2}$  inches; will take on a spool three inches in diameter, by six inches long between heads. The manufacturers can supply this machine with



any number of spindles. They are in use by G. A. Cook, Norwich; J. S. Brunton, Allandale; R. McCulloch, Hawkesville; McCulloch & Co., Rapid City, Manitoba; Jacob Messenger, Hanover; W. J. Wallace, Fallbrook; Dufton & Son, Mitchell; Central Prison, Toronto; S. Taylor & Sons, Columbus; N. W. Gingerich, St. Jacobs; D. L. Weaver, Chicopee; James Butler, Strathroy; Duncan Fisher, Paisley; John Scott, Clifford; S. Beaumont, Glen Williams; Harris & Co., Rockwood; S. Martin, Speedsville; David Mann, Lakefield; Warren Doane, Barrington, N.S.; Galbraith, Guelph; Morden Woolen Mill Co., Morden, Man.; Wm. Harrison, Owen Sound, Ont.; E. Cantin, Warwick, Que. Mr. Karch also makes the following woolen machinery—Fulling mills, cloth washers, wool and waste dusters, drum spool winders, reels, spooling and doubling machines, ring twisters, card creels, rag dusters, dead spindle spooler (for warp or dresser spools), pat. double-acting gigs, etc.

**LITERARY NOTES.**

The Century begins its new year with a brilliant cover in color by the well-known Parisian poster-artist, Grasset, who made the Napoleon poster for The Century. This time he pictures Alexander the Great on the famous Bucephalus. This is in connection with the magazine's new historical serial on Alexander, written by Prof. Benjamin Ide Wheeler, which will be one of the leading features for the coming year. The lessons from the career of the Macedonian conqueror are of particular interest in these days of empire-making projects. Aside from the archeological material that is pictured, the life is strikingly illustrated by Castaigne and Loeb. Captain Charles D.

Sigsbee begins his "Personal Narrative of the Maine." This is the contribution of the commander of the battle-ship to The Century's new war series, which will include articles by most of the leading officers in the land and naval operations in the recent war. Captain Sigsbee, in this paper, gives for the first time, and in a full and authoritative manner, the story of the ordering of the "Maine" to Havana, her arrival in the harbor, her

reception by the Spanish officials, and the precautions that were taken to guard her safety. The article is fully illustrated from photographs that have not appeared elsewhere. Paul Leicester Ford, author of "The True George Washington," begins a series of profusely illustrated papers on "The Many-Sided Franklin," the opening article dealing with Franklin's Family Relations. A new romance by Marion Crawford, his most im-

**SITUATION WANTED** as earlier by a man of sixteen years' experience as overseer; could also take charge of jack spinning. Temperate habits, well recommended. Address, DONALD MACK, P.O. Box 333, Peru, Ind.

**POSITION WANTED**—Young man of good education, at present employed as superintendent in a large woolen mill in the south of Scotland, would like similar position in Canada. Can assist in destenning. Address "SUPERINTENDENT," care of Canadian Journal of Fabrics, Montreal, Que.

**WILL** shortly open Manufacturers' Agency in Montreal. Have you any specialty you want me to handle? Thirteen years' experience in a general store in Canada, fourteen in the general dry goods trade in the U. S. Speak English and French. Am a pusher. **EXPERIENCE, ENERGY,** care Canadian Journal of Fabrics.

**SITUATION WANTED**

Wanted situation as manager or superintendent of woolen mill by a man who has had a large and most successful experience on shoddy goods. Married, 39 yrs. of age. Address J. E. C. L., care Canadian Journal of Fabrics.

**SITUATION WANTED**

Experienced long chain dyer and yarn printer desires situation. Fast colors. Economical. Nine years with leading gingham, shirting, and fancy cotton, woolen and silk dress goods mill in New England. Age 39. Married. Address "M," care of Canadian Journal of Fabrics.

**Wanted**

By experienced Cotton Bleacher and Finisher, situation in Canadian mill. Best of references covering a long period of years. Age forty. Married.

Apply "WEST POINT,"  
Care Canadian Journal of Fabrics.



portant historical novel, is begun. It is the story of a young English knight in the Second Crusade, and is entitled "Via Crucis." A characteristic story by Mark Twain is called "From The London Times of 1904," and is founded upon a recent invention, in which the author is deeply interested. It contains an incidental reference to the Dreyfus trial. A two-part story by Frank Stockton, "The Vizier of the Two-Horned Alexander," one of his most curious conceits, is begun. The prize in fiction in The Century's first competition for college graduates has been awarded to Miss Grace M. Gallaher, and her story, "A Question of Happiness," is given. Lowell's "Impressions of Spain" are contained in some of his hitherto unprinted official despatches, written while Minister at Madrid, with a prefatory note on Spanish politics by Hon. A. A. Adee. Baron Coubertin writes on "Building Up a World's Fair in Paris," and there are illustrations by Castaigne. A frontispiece portrait, in colors, of Dr. Weir Mitchell, is drawn by the distinguished portrait painter, Cecelia Beaux, especially for the magazine; and a romantic poem by Dr. Mitchell, "Guidarello Guidarelli," is strikingly illustrated by Louis Loeb. Timothy Cole's wood-engraving this month, in the series of "Old English Masters," is from Raeburn.

The November number of The Canadian Magazine perhaps more than usual deserves its title of Canadian. It contains the first chapter of what promises to be an interesting story, "A Daughter of Witches," by Joanna E. Wood, who has already written two Canadian novels, which have been read because they were interesting, a quality somewhat lacking in many of our Canadian literary efforts. J. G. Mowat writes on the advantages of the Canadian climate under the catchy heading, "Where Summers are Long," and J. Jones Bell gives an account of the Red River expedition: "M. C. Cameron, as I Knew Him," is the title of a biographical sketch of the late lieutenant-governor of the Northwest Territories, by Dan. McGillicuddy.

#### THE WOOL MARKET.

MONTREAL.—The wool market has shown considerable activity recently, most of which was in sales of Greasy Cape wool, which changed hands at full prices, namely 14c to 16c. Some B.A. scoured was also sold at 34c to 35c; the prices for B.A.'s show an advance of 3c to 4c per pound during the last few weeks. Further supplies of B.A. scoured are due to arrive, some of which have already been placed at the above figures. There is very little being done in Northwest wools, which are quoted at 12½c to 13c. There is also very little doing in Canadian wools at 16c to 17c.

TORONTO.—There is almost no business doing in Canadian fleece. Prices are now from 3 to 4 cents below prices at which some large holders bought their holdings, but they do not seem anxious to sell. There is no enquiry from the United States for wool owing to the duties. Most Canadian mills are fully employed.

The Penman Mfg. Co., Paris, Ont., is building a new mill to accommodate the business of the Watson mill at Merriton, Ont., which is being removed to Paris and for which a new plant is to be installed.

#### A REMINDER.

During the past month the subscribers to The Canadian Journal of Fabrics have received a post card bearing the following as the annual reminder of the more prosaic side of the relations between the publisher and readers of a newspaper:

"Mercerizing is a new process which is attracting a great deal of attention at present in the textile trades. By it cotton is made to so resemble silk that a careful examination is necessary to determine the nature of the fiber. No means has yet been discovered to make the publishing business 'smooth as silk,' but cash subscriptions would do much towards this end. Kindly send us \$\_\_\_\_\_ and we will credit amount on our books. Biggar, Samuel & Co., publishers, Canadian Journal of Fabrics, Fraser Building, Montreal, Que. Please remit by P.O. order, express order or postal note."

### Among the Mills

Co-operation is one of the guiding principles of industry to-day. It applies to newspapers as to everything else. Take a share in "The Canadian Journal of Fabrics" by contributing occasionally such items as may come to your knowledge, and receive as dividend an improved paper.

J. G. Reiner is now running his woolen mill at Wellesley, Ont., overtime.

The Waterloo Chronicle says A. Burrows is building an addition to his carpet factory at Breslau, Ont.

The Farmers' Binder Twine Co., Brantford, Ont., started running again after a three weeks' close down.

J. Dingwell, spinner in J. G. Reiner's woolen mill, Wellesley, Ont., died very suddenly, Oct. 13th, from a paralytic stroke.

T. Hope, manager of the Perth, Ont., woolen mills, was married at Cornwall, Ont., Oct. 20th, to Miss Binnie, daughter of Rev. Binnie.

The Robb Engineering Co., Amherst, N.S., is supplying a 600 h.p. cross compound engine for the Maritime Sulphite Fibre Co., Chatham, N.B.

Arthur Tattersall, of Samuel Law & Sons, Cleckheaton, England, has recently completed a three weeks' tour among the Canadian manufacturers.

The employees of the Canadian Colored Cotton Mills Co., at Merriton, Ont., subscribed \$130, and the company \$250 to the relief fund for those injured in the cyclone.

George Dick, Montreal, designer in the Excelsior Woolen Mills, has been appointed superintendent and designer in the Gillies Woolen Mills, Carleton Place, Ont.

Miss Marie Louise Roy, daughter of Rouer Roy, Q.C., consulting-attorney to the city of Montreal, was married a short time ago to Gerald A. Dillon, of Bellhouse, Dillon & Co.

The old corset factory building, Sherbrooke, Que., has been leased by E. A. Lothron, who will fit up the building with machinery for the carrying on of a modern steam laundry.

Considerable damage was done to the premises and stock of A. H. Sims & Co., shirt and collar manufacturers, Latour street, Montreal, through a fire recently. The principal damage was caused by water from the automatic sprinkling apparatus.

# Wool Washers

## Dryers and Carbonizers

# KITSON . . .

## MACHINE CO.

LOWELL, MASS.

Arthur Devitt has removed his family from Peterboro to Appleton, Ont., where he is now superintendent of the Mississippi woolen mill.

At a meeting of the creditors of the P. & A. Corset Company, of Farnham, Que., Nov. 2nd, Kent & Turcotte, Montreal, were appointed curators.

When in Toronto recently, Wm. Thoburn, woolen manufacturer, Almonte, Ont., was elected president of the Silver Bell Mining Company, Limited.

The marriage of Miss Edna Sanford, elder daughter of the Hon. W. E. Sanford, clothing manufacturer, Hamilton, Ont., with Captain Ernest Tudor Tudor, Royal Engineers, took place at St. George's church, Hanover square, London, Eng., on October 26th.

Wylie & Shaw, Almonte, Ont., have received an order from a prominent wholesale firm for frieze—one that will keep their factory humming for six months at least, and perhaps for a year. The Almonte Gazette says that Wylie & Shaw are now arranging to waterproof all the frieze they manufacture.

There was a fire at the Dominion Cotton Mills Co.'s mill, Brantford, Ont., Nov. 1st, which, had it not been for the prompt action of the employees' brigade, might have been serious. The fire started from the heating of a box in the mule room. Considerable damage was done by water.

Thomas Allan, who has been cutter for E. Van Allen & Co., shirt manufacturers, Hamilton, for ten years, has gone to Montreal, where he will be manager of Tooke Bros' shirt manufactory. He was presented with a handsome gold-handled umbrella by the employees of E. Van Allen & Co. previous to his departure.

The Ontario Department of Agriculture has begun some experiments in growing hemp on the waste lands of Muskoka. Through William Brodie, Toronto, a number of places have been selected, pieces of land that are at present producing no economical crops and patches of old beaver meadows overrun with weeds.

W. H. Beatty, T. G. Blackstock, W. H. Cawthra, C. W. Beatty, W. G. Gooderham, H. W. Beatty and J. W. Beatty, Toronto, have received an Ontario charter to manufacture men's, women's and children's clothing and apparel of all kinds, and to do laundry work, as the Beatty Manufacturing Company, Limited, Toronto; capital, \$300,000.

The Patent Cloth Board Co., of Parry Sound, Ont., is rapidly turning out cloth-boards for the English market. Recently a carload of boards has been shipped to Manchester, England. Besides this branch of manufacture, the company have now orders for carloads to Paisley and Glasgow. They also make veneers for organ-builders, at such points as Guelph and Bowmanville.

J. B. Shantz, of Berlin, will, it is said, build a branch of his button factory in La Salle, N.Y.

Another order for dye machines has been placed with the Lancaster Machine Works by the Canadian Colored Cotton Mills Co., Ltd.

The new mill built by Dick, Ridout & Co., at Cobourg, Ont., for their bag factory, is of brick and is 13x35 feet, and two stories in height.

The Guelph Mercury states that the Galt town council has decided not to give \$500 towards removing the Elora Carpet Factory to that town.

Joseph Johnston, employed in the Courtenay Bay cotton mill of Wm. Parks & Son, St. John, N.B., had his arm broken recently by having it caught in the machinery.

The Lancaster Machine Works, of Lancaster, Ont., have lighted their works with an acetylene gas plant of the Hamilton pattern, and for which they are Eastern Ontario agents; business in this branch of their business is very promising.

William Boyington, an employee of the R. Simpson knitting factory, Toronto, met with serious injuries Nov. 11th. He was working on the roof of an outbuilding, shovelling off the snow. A shaft by which power is transmitted passed along the roof. Boyington's apron caught in this and he was whirled round and round the shaft, finally being thrown to the ground. No bones were broken, but his injuries were so serious that he could not be removed to his home for some hours.

The Merriton, Ont., mills of the Canada Colored Cotton Company are having installed 20 new carding machines equipped with card clothing, by the well-known firm of Samuel Law & Sons, for whom Geo. Reid & Co. Toronto, are Canadian agents. These cards are provided with a new patent clip for fastening the cards, the only contrivance yet invented which can be adjusted at the mill. Six cards similarly equipped have been put into the Ontario Cotton Mill at Hamilton, Ont.

The Toronto Rubber Company has offered to settle the law suit pending against the company on behalf of the city of Hull, Que., for the sum of \$500, the costs involved in the passing of the by-law granting a bonus of \$30,000 to the company. The council will likely refuse the offer and maintain its claim of \$30,000 damages. The Mayor says that the corporation really sustained heavy damages by the fact that another company was refused the same bonus at that time in order to grant it to the Toronto Rubber Company.

There is a boom at Valleyfield, Que., where the new cotton mill is nearing completion. The main building is 450 feet square, five stories in height, while there is a wing 180 by 80 feet of the same height. A warehouse 220 by 80 feet and four stories in height, capable of storing 10,000 bales of raw cotton, is also being built. This new mill will be ready by February to

# The Royal Electric Co. MONTREAL TORONTO

CANADIAN MANUFACTURERS OF THE

## S. K. C. TWO-PHASE APPARATUS

Alternating Current Generators

Alternating Current Motors

Alternating Current Arc Lamps

Served from the same circuit

## S. K. C. TRANSFORMERS

Correspondence solicited for all kinds of Electric Installations.

manufacture fine cloths, hitherto not made in Canada. One thousand hands will be employed in the new mill, bringing the total number of operatives in Valleyfield up to 2,500. The Northrop Loom Co. is also building a factory 260 by 80 feet, and by December, it is expected, will employ 100 men.

The town of St. Stephen, N.B., has voted a bonus of \$3,000 a year for ten years to a proposed factory, and exemption from taxation. But it has made conditions. For instance, the concern must employ 50 persons the first year it is established, 100 the second year, 150 the third year. And further—here is where the paternal legislation comes in—at least 75 per cent. of these employees must be residents of St. Stephen.

The well-known bag manufacturing firm, Dick, Ridout & Co., Bay street, Toronto, have completed the removal of their bag works to the mills at Cobourg, Ont., bought from the Cobourg Woolen Co., as reported in a former issue of The Journal of Fabrics. Although a large quantity of machinery had to be transferred the removal was effected without any accident and without occasioning a day's delay in the execution of orders. This firm has since then established a branch factory in Winnipeg in the building until recently occupied by Geo. T. Wood & Co., off Main street. The new mill is operated by electric power and will be devoted exclusively to the manufacture of jute and cotton bags. G. Ernest Johnston will be manager, and W. G. McMahon, selling agent of this new branch. Mr. Johnston has had many years' practical experience in the jute business in Dundee and Toronto.

**THE FIBER OF THE COMMON MILK WEED.**

Editor CANADIAN JOURNAL OF FABRICS.

I enclose you specimen of some fiber. I don't know what it is. Some who pretend to know say it has a value; will it be too much for you to give it a name, and let me know if it be worth collecting. To me it seems good enough for mixing with silk. D.

Eganville, Oct. 14th., 1898.

Ed—The sample you send is from the seed of the common milkweed (*Asclepias Cernui*). The material has been shown to have a definite commercial value for either paper or cloth, but the most important question is the possibility of producing the fiber at a remunerative price. No experiments in this direction have been tried, so that we are without reliable data.

—Treasury Bureau of Statistics estimates that 85 per cent. of the silk goods now used in the United States is the product of American factories. American silks are likewise competing with the fabrics of the French looms in the world's markets.

Chas. E. D'Autemil, doing business as dry goods merchant in St. Rochs, Que., as P. C. D'Autemil & Co., has assigned his estate. The principal Montreal and western creditors are N. Saxe & Son, J. W. Bondreau & Son, J. Eveleigh & Co., and John Cohen & Co., of Montreal; Bailey, Watson & Co., E. Boisseau & Co., and A. Bradshaw and Co., Toronto. The Green Manufacturing Co., London, Ont.; John Calder, Hamilton. The largest creditors are Gaspard Rochette, Quebec, \$8,000; Mrs. P. C. D'Autemil, Quebec, \$6,500; Mr. V. E. Paradis was provisional guardian.

ESTABLISHED 1859  
**THE C. TURNBULL CO.,**  
OF GALT, Limited.

MANUFACTURERS OF  
Full Fashioned Lamb's Wool Underclothing, Hosiery and  
Knitting Yarns, Perfect Fitting Ladies' Ribbed Vests,  
Sweaters, Jerseys, Knickers.

**CHEMICALS AND DYESTUFFS.**

Market is firm without much change. Orders are coming in freely and enquiries are good Sulphate of copper is higher. The following are current quotations in Montreal:—

|                                    |         |            |
|------------------------------------|---------|------------|
| Bleaching powder .....             | \$ 1 95 | to \$ 2 00 |
| Bicarb. soda .....                 | 2 00    | " 2 05     |
| Sal soda .....                     | 0 70    | " 0 75     |
| Carbolic acid, 1 lb. bottles ..... | 0 35    | " 0 37     |
| Caustic soda, 60° .....            | 1 75    | " 1 80     |
| Caustic soda, 70° .....            | 2 00    | " 2 10     |
| Chlorate of potash .....           | 0 13    | " 0 15     |
| Alum .....                         | 1 35    | " 1 50     |
| Copperas .....                     | 0 70    | " 0 75     |
| Sulphur flour .....                | 2 00    | " 2 50     |
| Sulphur roll .....                 | 3 00    | " 3 50     |
| Sulphate of copper .....           | 4 50    | " 5 00     |
| White sugar of lead .....          | 0 07    | " 0 08     |
| Bich. potash .....                 | 0 09    | " 0 10     |
| Sumac, Sicily, per ton .....       | 55 00   | " 60 00    |
| Soda ash, 48° to 58° .....         | 1 15    | " 1 25     |
| Chip logwood .....                 | 1 90    | " 2 00     |
| Castor oil .....                   | 0 09    | " 0 09½    |
| Cocoon oil .....                   | 0 06½   | " 0 07     |

**A. KLIPSTEIN & CO.**

122 PEARL STREET, NEW YORK.

*Chemicals & Dyestuffs*

Fast Color for Wool—Dry Allzarine, Phenocyanine, Gallocyanine.

Direct Cotton Colors—Auramine, Congo Red.

Azo Colors—Naphthol Yellow, Orange, Scarlet, Fast Red.

**HEADQUARTERS FOR**

|                    |                      |
|--------------------|----------------------|
| Caustic Potash 90% | Carbonate of Potash  |
| Chlorate of Potash | Bleaching Powder     |
| Phosphate of Soda  | Refined Cutch A.K.C. |

**WRIGHT & DALLYN, Agents, Hamilton, Ont.**

**FOR SALE**

**A FELT MANUFACTURING PLANT**

Picker, Cards, Felter, Fulling Mill, Cloth Press.

All in good order—will be sold en bloc or singly.

Lancaster Machine Works, 113 Oak Street, Lancaster, Ont.

**MILLS FOR SALE**

Excellent Water Powers.

**CAMPBELLFORD WOOLEN MILL**—4 story stone building—never failing water power for sale or rent. **GLEN TAY MILLS**—with 4 set of machinery, stone buildings and a never failing water power. **CANNING WOOLEN MILL**—a two set mill, brick and stone building, excellent water power. **BLYTH WOOLEN MILL**—Peterboro, Ont. entire plant for sale. Send for catalogue. Also a one set Woolen Mill with a splendid custom trade.

For full particulars, &c., apply to

**GEO. REID & CO.**  
118 Duke Street, Toronto.

**FIBRE AND FABRIC** A Weekly Textile Journal  
Subscription \$2.00 per year  
\$1.20 for 6 months.

Advertising Rates furnished on application.

**Wade's Overseers' Bureau** Canadian Manufacturers should notify us when in need of employees. Overseers out of work should enter our bureau. Textile books and directories furnished at publishers' prices.  
**JOS. M. WADE & CO, Boston, Mass.**

See that all your  
**LINEN THREAD**  
 and . . .  
**SHOE THREAD**  
 carries  
 this Trade Mark:



IT IS  
 ALWAYS  
 RELIABLE

**THOS. SAMUEL & SON, SOLE AGENTS**

8 St. Helen Street, Montreal  
 22 Wellington Street West, Toronto  
 473 St. Valler Street, Quebec

FULL STOCK CARRIED AT EACH ADDRESS

' WE HOLD THEE SAFE. '

**The Dominion Burglary  
 Guarantee Co.**

LIMITED.

Head Office, Montreal, Can.

CAPITAL, \$200,000.

Insurance against burglary and housebreaking. Policies clear  
 and free from vexatious or restrictive clauses.

CHAS. W. HIGGILL, General Manager

**DICK, RIDOUT & CO'Y**

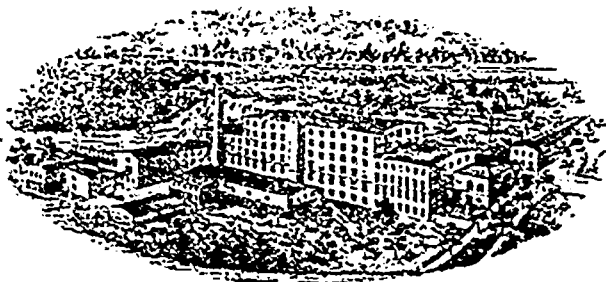
TORONTO, ONT.

Manufacturers of

Jute and Cotton Bags  
 Horse Blankets, Hessians, Buckrams  
 Tailors' Canvas  
 Hop-Sacking, Binder Twine, Yarns, Etc.

Agents for LOUIS BEHRENS & SONS, Manchester, England,  
 Velveteens, Velvettas, Furniture Coverings.

**ROSAMOND WOOLEN CO., ALMONTE, Ont.**



Fine **TWEEDS, CASSIMERES, and Fancy WORSTED  
 SUITINGS AND TROUSERINGS**

Colors warranted as fast as the best British or Foreign goods

**Richard Schofield, Toronto**

Manufacturer of all kinds of

**Power Knitting Machines**

Cylinder Dials  
 Cams  
 Yarn Guides  
 Cut Pressors  
 Mill Supplies  
 14 COURT ST.

Fluted Rollers  
 Gear Wheels  
 Worm Wheels  
 Ratchet Wheels  
 Special Screws  
 &c. &c.  
 14 COURT ST.

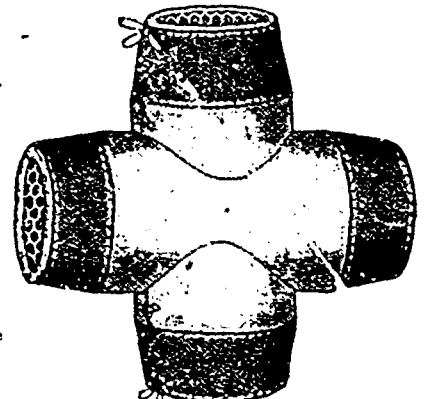


Ontario agent for the well-known Union Special Sewing Machine for  
 plain and ornamental stitching, as used in the manufacture of shoes, gloves,  
 underwear, etc. 14 Court Street.

**... MICA ...**

**Boiler Coverings!**

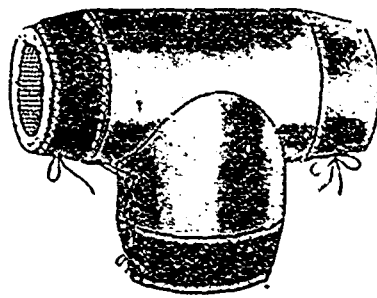
All Steam  
 Users should  
 See the  
 New Mica  
 Boiler and  
 Pipe  
 Covering



It is Flexible, Durable  
 and a Magnificent  
 Non-Conductor  
 ... of Heat ...

CROSS CLOSED.

Tested by Mechanical Experts of the Canadian  
 Pacific Railway Co., Grand Trunk Railway Co., Michigan  
 Central Railway Co., Boiler Inspection Insurance Co., and  
 proved to be the Best of all Non-Conductors.



TEE

Mica Boiler  
 Covering Co.

LIMITED.

9 Jordan Street  
 TORONTO

Full particulars, reports  
 of trials, prices, testimonials,  
 &c., &c., from

**G. ROOT & COMPANY,**

Wool and Noil Merchants  
Combers  
and Top Makers

Cable Address—  
Roots,  
Bradford.

**BRADFORD, ENG.**

**Australian, Cape and  
B. A. Wools  
Tops, Noils, Wastes**

**AGENT:**

**R. S. FRASER**

17 LEMOINE ST., MONTREAL

YOUR ENGINEER OUGHT TO HAVE A COPY!!

**The Manual of Lubrication,**

Or, How to Choose and How to Use Lubricants for  
any description of Machinery

With Methods of Determining the Purity and other Properties of Oils, etc.  
By Louis SIMPSON.

Price \$1.00  
Post paid

Address **BIGGAR, SAMUEL & CO.,**  
Fraser Bldg., MONTREAL, Can.

**FABRIC ITEMS.**

Jas. Ball, St. Mary's, Ont., has bought the tailoring business of K. Sandiman, Souris, Man.

Bartlet & Macdonald, Windsor, Ont., have been awarded the contract to make uniforms for the L.E. & D.R.R., including the Erie & Huron and London and Port Stanley divisions.

J. F. Sheridan, late foreman cutter for W. R. Johnston, wholesale clothier, Toronto, and E. Hachborn, for thirteen years bookkeeper for the same firm, have begun business for themselves in the same line as Sheridan & Hachborn at 19 Front street west, Toronto.

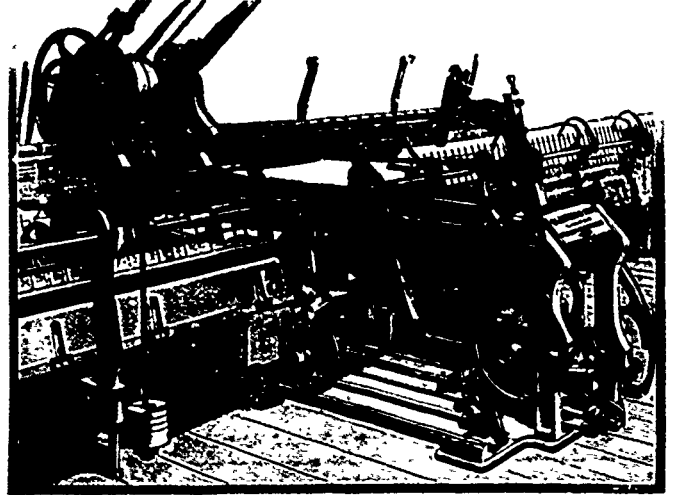
A compromise at 25 cents in the dollar is asked for by Paschal Gagnon, a Montreal dry goods retailer. He separated from the firm of Gagnon Freres, in 1895, starting alone on limited capital. In February, 1897, he failed, offering 40 per cent., but the estate was wound up, and he resumed under his wife's name.

The name of Davidson & Horan one of the oldest in the Quebec retail dry goods trade, is likely to disappear from trade lists very shortly. Mr. Davidson died in 1885, but the business has been continued by Mr. Horan alone. The premises have recently been sold to others in the trade, and the announcement is made that the firm will retire from business.

The estate of Cheyne & Co., clothing merchants, Toronto, which has been before the courts, pending a decision regarding the transfer of the stock has been placed in the hands of Assignee Tew, Miss Cheyne having assigned recently. The assets are estimated at about \$7,000. The principal creditors of the estate are Hamilton and London, Ont., houses.

**WILLIAM WHITELY & SONS, Limited**

**LOCKWOOD, HUDDERSFIELD, ENGLAND.**



Winding Machinery, Improved Self-Acting Mule, Suspended Steam Driven Centrifugal Hydro-Extractor, Tenting and Drying Machines, Patent Wool and Cotton Dryer, Patent Wool Scouring Machine, Cross Raising Machine, Patent Crabbing and Winding-on Machine, Warp Sliding, Cool Air Drying and Beaming Machine, and other Woollen Machinery.

CATALOGUE ON APPLICATION

**SHAW BROTHERS, - Agents**

164 McGill Street, - Montreal.

A New Brunswick charter has been granted incorporating H. D. Mott, T. H. Somerville, W. H. Horn, J. B. LeBlanc, F. Skinner, G. A. Noble, jr., St. John, N.B., as the London House, Wholesale, Ltd., to buy the wholesale dry goods business at present carried on by the firm of A. Miller & Co. in St. John, and the wholesale millinery business carried on by the firm of Skinner, LeBlanc & Co., St. John; capital, \$75,000

F. W. Radford, a well-known accountant and curator for several insolvent estates, has been missing for some weeks from his place of business in Montreal, and his absence gives rise to much anxiety. Mr. Radford was a member of the firm, Radford Bros., wholesale men's furnishings, Montreal, whose failure some years ago is still memorable in the trade. Since the failure Mr. Radford has been doing business as an accountant, etc.

The prosecution of a merchant for advertising dress goods as "all-wool" when they were partly composed of cotton, which was taken up by the Bradford Chamber of Commerce, has again been before the Leeds stipendiary, but is not yet concluded. Without entering into the merits of the case, says The Drapers' Record, it is a matter of congratulation that Chambers of Commerce are taking an interest in the correctness or other wise of trade descriptions.

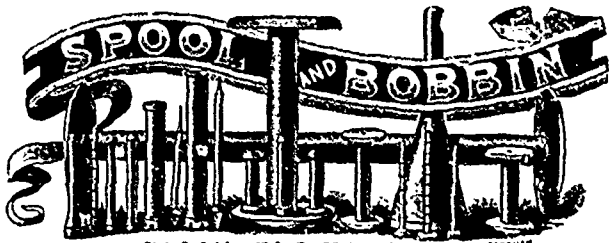
Suits of clothes with an extra pair of bicycle breeches are being offered for spring trade by some of the clothing houses, and will no doubt meet with the approval of the trade, so wide has the ramifications of the bicycle become. The ordinary full tweed suit is offered, with the option of a pair of bicycle breeches added, making four garments to the suit instead of three. As a coat and vest will usually wear out several pairs of trousers, the idea of an extra pair trousers is not a bad one, aside from the demand for bicycle breeches.

THOMAS KER

J. HARCOURT

**KER & HARCOURT,**

ESTABLISHED 1857



MANUFACTURERS, SARONAN

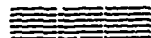
Orders by Mail  
will receive prompt  
attention.

**Parry Sound, Ont.**

**Canadian Colored  
..... Cotton Mills  
Company.**

- |               |                  |
|---------------|------------------|
| Cottonades,   | Zephyrs,         |
| Tickings,     | Skirtings,       |
| Denims,       | Dress Goods,     |
| Awnings,      | Lawns,           |
| Shirtings,    | Crinkles,        |
| Flannelettes, | Cotton Blankets, |
| Ginghams,     | Anglas,          |
|               | Yarns, etc.      |

WHOLESALE TRADE ONLY SUPPLIED.



**D. Morrice, Sons & Co.**

Agents,  
Montreal and Toronto.

**CANADA GARNETT CO.**



MANUFACTURERS OF  
Garnetted Wastes  
and Shoddies  
Waste Openers  
and Pullers

Office 17 Lemoine Street  
Works, Canal Bank, near  
Saguenay St., Montreal

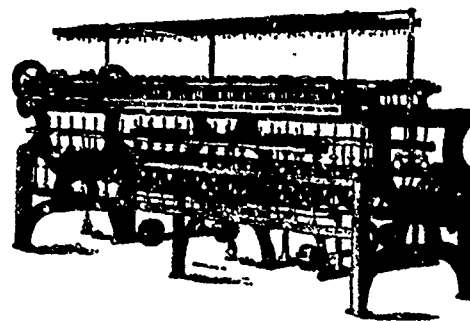
**LONDON SHEEPSKIN SALE.**

A sale of sheepskins was held in London, Eng., Oct. 27th. The offerings amounted to 4,400 bales in good condition. There was a fair attendance, but the buying was irregular, about 1,100 bales being left over. The Continent bought sparingly. The home trade took the bulk of the offerings, after it was seen that buyers were indisposed to pay the prices asked. The unsettled wool market has a depressing effect. Merinos were a farthing to three-eighths lower and cross-breds a farthing to 1/2d. lower than last sale.

—There has been a good deal of correspondence in the Belfast papers regarding the alarming decline in the growth of flax in Ireland. Unless measures are taken immediately to prevent it, the culture of flax in that country will soon have disappeared. In 1868 the area under flax in Ireland was 240,000 acres; in 1888 it had fallen to 113,586 acres, in 1898 the area had dwindled to 31,489 acres, of which 31,215 acres are in Ulster. Last year the area was 45,537 acres, so that there is a decrease this year of nearly 25 per cent. upon the acreage of 1897.

**H. W. KARCH,**

**HESPELER, ONT.**



Manufacturer of  
Woolen Machinery,  
Rotary Fulling  
Mills, Kicker Full-  
ing Mills, Soaping  
Machines, Cloth  
Washers,  
Wool & Waste  
Dusters, Rag Dus-  
ters, Drum Spool  
Winders, Reels,  
Spooling & Doubling  
Machines, Ring  
Twisters, Card  
Creels,

Dead Spindle Spooler for Warp or Dresser Spools,  
Pat. Double Acting Gigs, Dyeing Machines.

**Loom Picker Co.**

**BIDDEFORD, ME.**

H. P. GARLAND, Treas.

MANUFACTURERS OF

- Rawhide and Leather Loom Pickers,  
Loom Harnesses and Reeds,  
Duck and Ticking Lug Straps,  
Tape Picker Loops, Leather Strapping,  
Black Oak-Tanned English Picker Leather,  
North Carolina Hickory Picker Sticks.

Illustrated Catalogue sent on application.

**TEXTILE MACHINERY (New and Second Hand) CARD CLOTHING TETLOW'S**



English Sales Attended.

**Condenser Aprons**

Stock in Canada  
Buffed Surfaces  
Plain & Grooved  
Oak-Tanned and White Belting  
Cotton Banding, Rim Spindle and Braided  
Shuttles, Pickers, Heddles, Harness  
Patent Frames, GENERAL FURNISHINGS

**ROBT. S. FRASER**

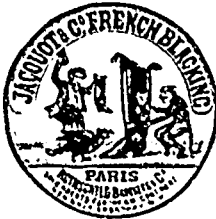
17 LEMOINE ST., MONTREAL

**ROTHSCHILD BROS. & CO.**

Manufacturers, Manufacturers' Agents and Importers

**BUTTONS.**

Sole Agents for the American Continent



Sole Agents for the American Continent

OFFICES—466 & 468 Broadway, N.Y.  
28 Rue de la Victoire, Paris, France.  
11 & 13 Front St. East, Toronto.

Established 1848.

**A. EICKHOFF**

Manufacturer and Dealer in

Hatters', Furriers', Tailors',  
Glovers' and Shirt Cutters'

**KNIVES AND SCISSORS.**

Knives for all kinds of business always on hand and warranted. All kinds of Cutlery ground and repaired.

No. 381 BROOME STREET,  
Between Broadway and Bowery,

**NEW YORK CITY**

**The R. Forbes Co.**

(Limited)

Manufacturers of

**WOOLEN AND WORSTED YARNS**

For Hosiery and other work

**HESPELER, ONT.**

**Just Out**

**THE CANADIAN CUSTOMS & EXCISE TARIFF**

Corrected to June 23rd, 1898.

**Containing**

Excise Duties. Ports of Entry.  
Extracts from the Customs and  
Tariff Acts.

Reciprocal and British Preferen-  
tial Tariffs.

Tables showing Sterling, Francs  
and Rixmarks reduced to \$ & c.  
and other valuable information.

Cloth Limp for the Pocket,  
by Mail, 50 Cents.

**MORTON, PHILLIPS & CO.**

Stationers, Blank Book Makers  
and Printers

1755 & 1757 Notre Dame St., Montreal

**G. B. FRASER,**

**3 Wellington Street East  
TORONTO**

REPRESENTING

Miller Bros. & Co., Montreal; Paper and Celluloid  
Collars, Cuffs and Shirt Bosoms.

W. D. Van Egmond, Seaforth Woolen Mill, Etouffes,  
Friezes and Tweeds.

I. A. Teskey, Appleton, Ont., Fine Tweeds and  
Cassimeres.

D. Fisher, Paisley, Ont., Etouffes and Tweeds.

John J. Ashley & Co., Bradford, Eng., Dress Goods  
and Worsteds.

Horner, Determann & Co., Barinen, Germany,  
Buttons, etc.

S. W. Whitham, Leeds, Eng., Woolens.

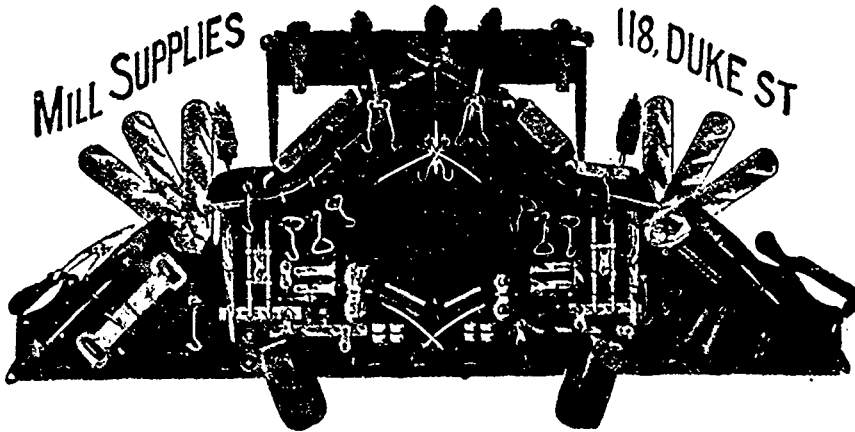
Merrimack Print Mfg. Co., Lowell, Mass.

Burton Eros. & Co., New York; Linings, &c.

H. T. Lamkin & Co., Cotton Brokers, Vicksburg  
Mississippi Long Staple Cotton a specialty.

**GEORGE REID & COMPANY**

SUCCESSORS TO  
PAUL FRIND WOOLEN MACHINERY CO., Limited



**WOOLEN MACHINERY**

Cards, Mules, Looms, Pickers, etc. All  
kinds for sale.

**WOOLEN MILL SUPPLIES**

Every description kept in stock.

**WOOL**

Sole Agents for FRANCIS WILLEY & CO.,  
Bradford, Eng. A large stock always on  
hand.

**BEAM WARPS**

Sole Agents for HAMILTON COTTON CO.

**MILLS FOR SALE**

**CARD CLOTHING**

Our MR. REID is Sole Agent for Messrs.  
Samuel Law & Sons, Cleckheaton, Eng.,  
and has always a large stock on hand.

**E. W. MUDGE & CO.**

5 St. Peter St. - Montreal.

**TRIMMINGS**

—FOR—

Knitting Mills and Woolen Mills

TYING-UP RIBBONS.

Pink & White Cotton Tapes

**COP TUBES**

Cones and Shells.  
WORSTED TUBES.  
Conical Tubes.  
MAILING TUBES.  
Haworth & Watson. LOWELL, MASS.

**CHAS. F. TAYLOR**

Successor to Burgess Cop Tube Co.

Manufacturer of  
PATENT MACHINE

**PAPER**

**COP TUBES**

48 Custom House St.

**PROVIDENCE, R. I.**

**U. S. A.**

**WOOL WM. GRAHAM**

54 and 56 Wellington  
St. East, TORONTO  
Dealer in

Foreign and Domestic  
Wools

My manufacturing experience assists me in import-  
ing wool for any desired goods.

**The Montreal Blanket Co.**

Manufacturers of

Shoddies, Wool Extracts

and Upholstering Flocks

Office and Works: COTE ST. PAUL  
P.O. Address: MONTREAL

**JOHN HALLAM,**

83 & 85 Front St. East, - - - Toronto  
and  
88 Princess Street, - - - - Winnipeg  
Wholesale Dealer in

**DOMESTIC AND FOREIGN WOOLS**  
Sumac, Japonica, &c.

**LONG & BISBY**

DEALERS IN  
Foreign and Domestic

**WOOL AND COTTON**

GENERAL COMMISSION MERCHANTS  
HAMILTON, ONT.

**W O O L .**

**A. T. PATERSON & CO.**

MERCHANTS,

85 Francois Xavier St., Montreal.  
REPRESENTED BY MR DAVID GUTHRIE.

**THE SMITH WOOLSTOCK CO.**

Manufacturers and Dealers in all Lines of  
Wool Stock, Shoddies, &c., Graded Woolen  
Rags, Carbonizing and Neutralizing.  
Best prices paid for Wool Pickings, Woolen  
and Cotton Rags, Metals, &c. Hard Waste, &c.,  
purchased or worked up and returned.  
210 Front St. E., Toronto | Foot of Ontario St.

**B. Spedding & Co.**

72 St. Henry St., Montreal

Wholesale Dealers in all kinds of Foreign  
and Domestic Woolen & Cotton Rags.  
Paper Stock and Metals. Graded  
new Woolen Clips a speciality.

Agent for

George Hirst & Sons, Exporter of Woolen  
Rags, Bristol, England  
Telephone 2882.  
Cable—"SPEDDING," Montreal.

**ROBT. S. FRASER**

**Wools, Cottons, Noils, Yarns**

Specialties:

English Pick Lambs and Downs  
Foreign Wools and Noils  
Egyptian and Peruvian Cottons  
Fancy Yarns

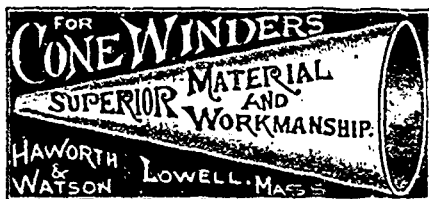
17 Lemolne St., MONTREAL

**WM. D. CAMERON,**

Woolen & Cotton Manufacturers'  
Agent,

HALIFAX, N.S., & ST. JOHN, N.B.

Address P.O. Box 401. - HALIFAX, N.S.



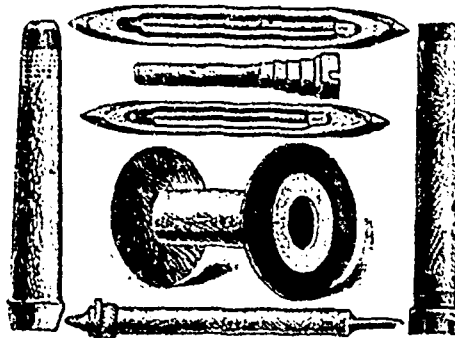
**WILSON & COMPANY**

DEALERS  
IN ALL KINDS .....  
OF

**W O O L**

CORNER FRONT AND CHURCH STREETS,  
TORONTO, ONT.

**Lachute Shuttle and Bobbin Works**



We are the largest Shuttle  
Manufacturers in Canada.

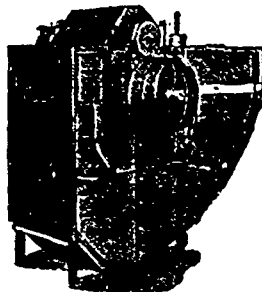
Slubbing, Roving and all kinds  
of Bobbins and Spools for  
Cotton and Woolen Mills

We have always on hand  
a large stock of  
Thoroughly Seasoned  
Lumber.

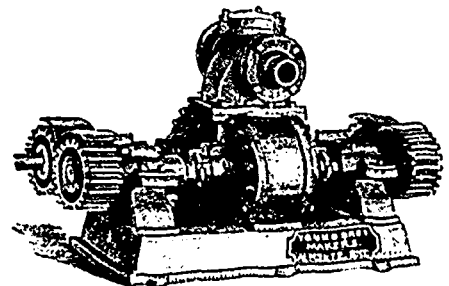
Orders solicited and all work guar-  
anteed to give satisfaction.

**John Hope & Co.**  
LACHUTE, P.Q.

**MISSISSIPPI IRON WORKS**



ESTABLISHED  
1875

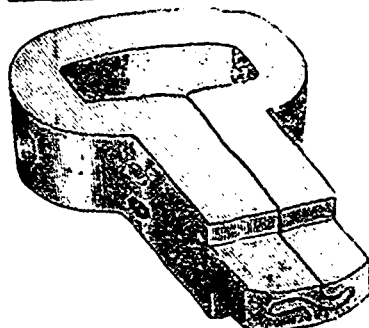


Manufacturers of English or American Fulling Mills and Washers, Wool Pickers, Ex-  
haust Fan Drilers, Dusters, Rotary Force Pumps for Fire Duty, Boiler Feed Pumps  
Shafting, Hangers, Castings, Pulleys, Gearing, Forgings.  
Full equipment of mills of every kind. YOUNG BROS., Almonte, Ont.

**WILLIAM CRABB & CO.**

Manufacturers of all kinds of  
Hackle, Gill, Comb and Card Pins, Picker Teeth, Needle  
Pointed Card Clothing in Wood and Leather for  
Flax, Jute, Tow, etc.

Hackles, Gills and Wool Combs made and repaired; also Rope Makers' Pins, Picker Pins, Special  
Springs, Loom and Shuttle Springs, English Cast-Steel Wire, Cotton Banding and General Mill Furnishings  
Bloomfield Avenue and Morris Canal, NEWARK, N. J.



**JOHN W. BARLOW**

Manufacturer of

**LOOM PICKERS,**

LAWRENCE, MASS.

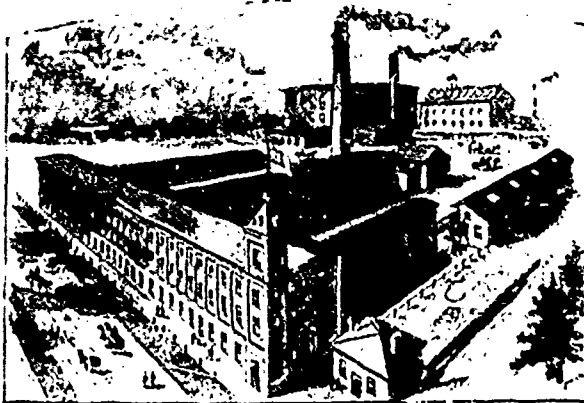
This cut represents Barlow's Pat. Bow Picker  
with solid interlocking foot. Pat. Feb. 20, 1880



## Hamilton Cotton Co., Hamilton

MANUFACTURERS OF

White and Colored Yarns, Single or Double, Hosiery Yarns of all descriptions, Warps, Twines, white or colored. Webblings & Bindings in great variety, Lampwicks, etc.



SELLING AGENTS:

WM. B. STEWART, 18 Front St. East, Toronto.  
Agent for Warps. GEO. REID, 118 Duke Street, TORONTO

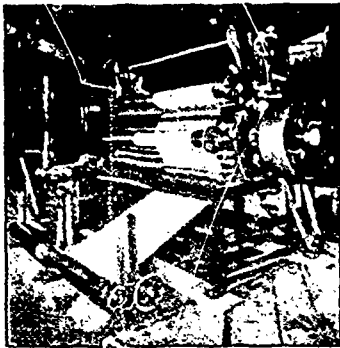
## DEROCHIE BROTHERS, Cornwall, Ont.

We build

### NAPPING MACHINES

up to 80 inches wide, to nap one or two pieces in width. The machine naps cotton or woolen goods; can either furnish folders or winding attachments; this machine is so geared that the changing of small gears changes the nap on cloth that is needed. The main shaft is 3 1/2 in. in diameter. All roller bearings are bronze and self-oiling. All Rolls are made of hydraulic piping—and every part of the machine is first-class in every respect.

Some of the machines are running at Canada Mills, Cornwall; Montreal Cotton Co.'s Mills, Valleyfield; Van Parks & Sons, St. Johns; Dominion Cotton Mills, Halifax.



### WOOL SCOURING.

First of all, it is of the utmost importance that the water used for preparing or cleaning textile fabrics should have special consideration, and unless water for wool scouring is either soft or to be softened, considerable damage may be done in the preparation of the cloth; besides, needless expense will be incurred, observes a writer in a foreign contemporary. When an excess of carbonic acid is present in water, it takes up from the earth lime with which it comes in contact and forms carbonate of lime in solution, that is to say, two parts of carbonic acid gas combine with one part of lime, and this produces what is called temporary hardness. There are two ways of softening water, either in a separate vessel, or in the tank from which the supply is drawn. Caustic soda softens water by precipitating both the carbonate and sulphate of lime, rendering them insoluble. To water of medium hardness add two pounds of caustic soda to each 1,000 gallons of water. To very hard water add three or four pounds of caustic soda to each 1,000 gallons of water. The caustic soda simply requires to be thrown into the water tank when full in the quantities I have given. It dissolves instantly, and the water only requires to be stirred once or twice to mix the caustic soda "through" and throw down the lime. If the tank be left for three or four hours undisturbed the lime falls and settles to the bottom of the tank, and the clear softened water can be drawn off by placing the

## Second-Hand Machinery

Leonard-Ball Engine, 8 1/2 x 10 cylinder, 42 h.p. indicated, nickel plated fittings.

Boiler 42 in. diameter by 12 ft. long, 35 h.p., 60 ft. smoke stack and fittings.

Set English Wool Cards.

Fulling Machine.

Hand Cloth Press.

Felting Machine.

All of above in first-class order and may be had cheap.

## Lancaster Machine Works,

113 OAK STREET,

LANCASTER - - ONTARIO



## The Underwood

Visible writing start to finish—tabulating attachments for invoicing, billing, etc. No extra cost, easy touch, rapid action, handsome designs—  
fully guaranteed.

All other makes, new and second-hand, at reduced prices.

## CREELMAN BROS. TYPEWRITER CO.

15 ADELAIDE ST. EAST, TORONTO

exit-tap rather above the bottom of the tank, thus leaving the sediment behind.

The next important thing in wool scouring is the soap, and I give two, viz., potash pearl ashes and potash soap. First, pearl ashes is the purest form of potash, and it is safer and better than ordinary carbonate of potash. Too often the latter is palmed off on consumers as pearl ashes; carbonate of potash, if held in the hand and a drop or two of water added will give off heat; pearl ashes will not give off any heat; this is a sufficient guide to distinguish between pearl ashes and carbonate of potash, but in cases of doubt recourse should be had to analysis. Second, potash soap is made from caustic potash and water combined with fatty matter, or, speaking more correctly, in soap you have to deal with an alkali and a fatty matter. The alkali and this substance enter into combination, and when this is complete you have a new product, viz., soap. Wool washers find it to their advantage to make their own soap.

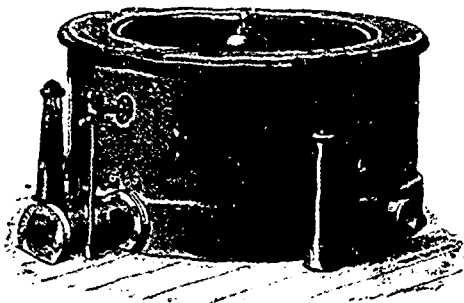
Next we come to the wool scouring, which operation consists in removing the oily substance in the wool, which is called "yolk," and nearly one half the weight of this yolk is potash. This yolk is capable of forming a soap with an alkali in the bowl, consisting largely of potash, no soda being present. Before, however, the wool can be used for spinning, this grease must be removed in such a way that the fiber of the wool be not injured, or its natural bright color destroyed. This is best accomplished by the use of pure potash soap. The action of such a soap, which contains neither an excess of free or un-

combined alkali, nor an excess of tallow, only removes the superfluous greasy matter adhering to the outside of the fiber, and leaves the fiber itself unimpaired. If, however, any chemical be used in conjunction with soap, the best results will be obtained with pearl ashes. The quantity of potash soap necessary for washing wool must depend on the quality and condition of the wool itself. Potash soap should be dissolved in the proportion of 1 pound to the gallon of water, and a portion added to the washing bowls as required. Refined pearl ashes should be dissolved in the proportion of 1 pound to the gallon of water and a small quantity of this solution added from time to time in the first and second bowls. I will take a scouring machine with three bowls; the bowls being primed thus: First bowl—6 gallons of liquid potash soap and pearl ashes combined. Second bowl—3 gallons of liquid potash soap and pearl ashes combined. Third bowl—Hot water. After working for some time the first bowl is let off and receives the suds from the second bowl with three gallons of liquid potash soap and pearl ashes; the second receives the hot water from the third bowl with three gallons of potash soap and pearl ashes, and the third bowl is again filled with clean hot water. The real cleansing, it must be borne in mind, is after all performed in the first bowl and strictest attention must be paid to this fact. If, however, the wool be very dirty the proportions mentioned above may be increased all through the process of scouring. On no account should soda ash or soda crystals be used with potash soap, as this simply destroys the whole advantage claimed for potash soap. Another important point is the temperature of the water. It should not be too hot. Hot water certainly washes more quickly, but it causes a greater loss in weight of the wool.

Any temperature that the hand cannot bear is too great, but dirty and very greasy wools require a greater heat than cleaner qualities. Hot water also takes out the natural curl of the wool and thus destroys its spinning properties. Many a bad spin is due to nothing but washing in too hot water. And now in conclusion, the object in scouring is not simply to remove the greasy product from the material, but also the dirt and other matter with which the wool may be covered. A wool thoroughly cleansed should be of a pure color, should handle soft and elastic, and produce a true thread. On the other hand, wool which is not properly scoured takes a streaky color; the dyes do not penetrate the fibers, but remain on the surface.

—Fred. S. Lyke, Western representative of the United Shirt and Collar Company, of Troy, N.Y., is responsible for the statement that a gigantic trust is about to be formed of the different collar and shirt industries of the United States. This trust, which is to be controlled by English capitalists, will be organized within a short time, with a capital of \$100,000,000. The corporation will control the output of the leading industries of this kind in this country, and will also own and operate its own cotton mills. According to the information given out, the plants will be consolidated where advisable, and the business conducted on a more economical basis. The goods manufactured will be sold through agencies, and as far as convenient, the services of traveling agents will be dispensed with. The trust, according to report, will embrace the principal concerns of Troy, Rochester, and other centres of manufacture. Agents of the combination are visiting the principal manufacturers of shirts and collars in the West, and the obvious purpose of the syndicate is to buy outright the larger concerns. Practically the entire output of the United States will be controlled.

# BROADBENT'S HYDRO EXTRACTORS



Direct Steam Driven. No Shafts or Bolting required.  
Suspended on Links and requiring no Foundation.

Adapted for **Manufactories, Dyehouses, Laundries, Chemical Works, Sugar Refineries, etc., etc.**

—SEND FOR CATALOGUE—

**Thomas Broadbent & Sons, Limited**

CENTRAL IRON WORKS

HUDDERSFIELD, - - - ENGLAND

Telegrams: "BROADBENT, HUDDERSFIELD."

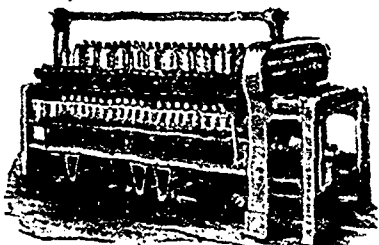
Agents for Canada: - - SHAW BROTHERS, 164 McGill Street, Montreal.

# Brooks and Doxey

— Manchester, England

Telegrams: Union, Manchester, Athlons, Boston

Makers of **Cotton, Cotton Waste and Woolen Machinery**



WE have a complete set of our latest Cotton Machinery at work in our Show Rooms at 161 Pearl Street, Boston, and our agents, MESSRS W L HAINES & COMPANY, will always be glad to see buyers and to explain the various valuable improvements embodied in the machines. Our machinery is made of best materials only, particular care being paid to the finish of the various parts, and is constructed very substantially so as to withstand the highest speeds, and give the greatest production combined with best quality of work.

**PAPER FROM BARLEY STRAW.**

The first paper mill in Montana, U.S., will soon be erected at Manhattan, in that State. The material to be used in the manufacture is the white barley straw grown in the Gallatin Valley, thus utilizing a product of the State which heretofore has gone to waste. The plant will be the only one of its kind in the United States, as at the present time there are no paper mills in this country converting straw into pulp and paper. In Russia there are a few mills of this sort, while Germany has more than one hundred mills which manufacture pulp and paper from the German barley straw.—Ex.

—From Bradford it is announced that coating costume cloths in mixture shades, which had a good reception last season on account of the unalterable and unspotted finish, have been

bought more than ever for the next spring season, and that although the wool from which these goods are made has greatly advanced in price, only a very fractional advance is being, up to the present, demanded by the manufacturers.

—From Ireland it is announced that the total exports of piece goods in September have decreased 6 per cent as compared with the same month last year. The principal decreases are—to the Foreign West Indies, 63.12 per cent., Republic of Colombia, 39.8 per cent., Brazil, 31.6 per cent., and Australasia, 19.5 per cent. On the other hand, the following places show increases—United States, 2.2 per cent., British North America, 19.6 per cent.; France, 48.7 per cent.; Germany, 7.2 per cent.; and British East Indies, 7 per cent. It is pleasing to note that Canada is among the list of those countries which have made larger purchases than a year ago.



ISSUED MONTHLY IN THE INTERESTS OF THE

**CIVIL, MECHANICAL, ELECTRICAL, LOCOMOTIVE, STATIONARY, MARINE MINING, AND SANITARY ENGINEER; THE MACHINIST AND FOUNDER, THE MANUFACTURER AND CONTRACTOR. SUBSCRIPTION, \$1 - - A YEAR - -**

The increase in its circulation is remarkable, as is shown by the following detailed statement confirmed by the affidavit of A W Law, Secretary of The Monetary Times Printing Co., our printing contractors. THE CANADIAN ENGINEER stands to-day unrivalled among Canadian trade papers for the wide distribution and character of its circulation

| VOLUME III.   |       | Copies Printed and Mailed. |       |
|---------------|-------|----------------------------|-------|
| Date of Issue | No    | Date of Issue              | No    |
| 1 May, 1895   | 2,000 | 4 Aug, 1896                | 3,450 |
| 2 June, "     | 2,000 | 5 Sept, "                  | 3,975 |
| 3 July, "     | 2,100 | 6 Oct., "                  | 3,745 |
| 4 Aug., "     | 2,200 | 7 Nov., "                  | 3,800 |
| 5 Sept., "    | 2,400 | 8 Dec., "                  | 4,050 |
| 6 Oct., "     | 2,400 | 9 Jan., 1897               | 4,100 |
| 7 Nov., "     | 2,500 | 10 Feb., "                 | 4,350 |
| 8 Dec., "     | 2,600 | 11 March, "                | 4,350 |
| 9 Jan, 1896   | 3,500 | 12 April, "                | 4,350 |
| 10 Feb., "    | 3,000 |                            |       |
| 11 March, "   | 3,100 | <b>VOLUME V.</b>           |       |
| 12 April, "   | 4,150 | No 1, May, 1897            | 4,350 |
|               |       | " 2, June, "               | 4,000 |
|               |       | " 3, July, "               | 4,350 |
|               |       | " 4, Aug., "               | 4,400 |
|               |       | " 5, Sept., "              | 4,500 |
|               |       | " 6, Oct., "               | 4,400 |
|               |       | " 7, Nov., "               | 4,600 |

Departments devoted to Civil Engineering, Surveying and Mining, to Mechanical, Electrical, Locomotive Stationary, Marine and Sanitary Engineering. Sample copies sent free to intending subscribers. Advertising rates on application.


**BIGGAR, SAMUEL & CO., Publishers**  
**FRASER BUILDING, MONTREAL,**  
 Or 62 Church Street, - - - - - **TORONTO**

**ROBERT & COMPANY**

Manufacturers' Agent,

**Woolen & Cotton Mill Supplies**

14 St. Michael's, - MONTREAL, Que



**THE Curtis Pressure Regulator**

for Steam, Water, and Air, is a regulator which is unequalled for simplicity, efficiency, and reliability.

These regulators have now been in use for twelve years, and have established a reputation second to none.

The use of this regulator means decreased expenses.

Manufactured by the  
**D'ESTE & SEELEY CO.**  
 29 to 33 Haverhill St., Boston.  
 New York: 109 Liberty St.  
 Chicago: 218 Lake St.



# HAWTHORNE

WOOLEN CO., Limited

CARLETON PLACE,  
Ont.

MANUFACTURERS OF

Fine Tweeds,  
Cassimeres, etc.

JAS. LOCKHART, SON & CO.,  
Selling Agents, Toronto.

The best results in  
**Card Grinding**  
are obtained by using 

**DRONSFIELDS PATENT**  
**GROOVED EMERY FILLETING**  
SPECIALITIES: MACHINES FOR GRINDING CARDS  
MACHINES FOR COVERING ROLLERS WITH LEATHER

**DRONSFIELD BROS. LIMITED**  
Atlas Works, OLDHAM, England.

## THE McCORMICK TURBINE ...

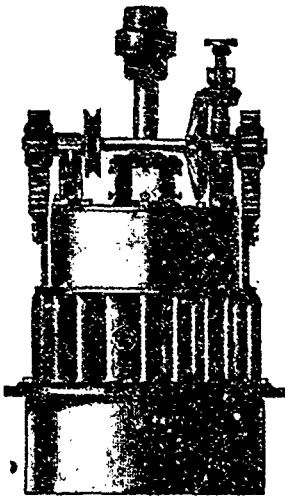
FEATURES WORTH CONSIDERATION:

Great Capacity, High Speed, Unequaled Efficiency, Steady Motion,  
Easy Working Gate, Greatest Power from a Limited Quantity of  
Water, at Smallest Cost.

Undoubtedly the Most Popular Turbine Manufactured.

Write for Catalogue.

S. MORGAN SMITH CO., York, Pa.  
U. S. A.



## CO-OP. KNIT MACHINE CO.

MILLSTONE LANE, LEICESTER, ENG.

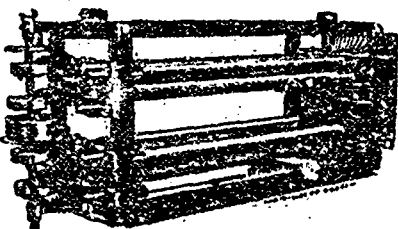
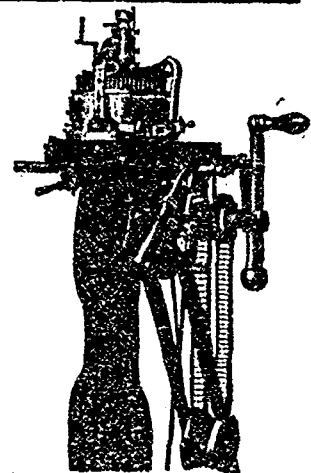
### Sturgess Designer Machine

For making Hand Knit Hosiery (Seamless), Golf and Cycling Hose, Gents' Fine Socks,  
Ladies' Fancy Hose and Gloves in hundreds of fancy designs. The chief features are:—  
Simplicity of Construction. Enormous Production. Variety of Design.

AUTOMATIC MACHINE COMPLETE, £47 13s. 6d.

Designers Separately for attachment at \$50.50 each. Transfer Needles 10c. each.

Made and sold for Canada under Patents 52,124 and 52,125, 1896, by Biggar, Samuel & Co., of 62 Church  
Street, Toronto, who will be glad to receive offers for the purchase of these Patents outright or on royalty.



The manufacturer Barker's  
Patent Noiseless Fast-  
Running Double Apron

### Barker's Patent Double Apron Rubbing Motions for Condenser Cards

Are in successful operation on all grades of stock, being generally  
adopted because they change carding and spinning  
rooms for the better.

**James Barker,** Cotton and Woolen Machinery  
Second and Somerset Streets, PHILADELPHIA, Pa

# ENGLISH OAK-TANNED BELTING

*The J. C. McLaren Belting Company*

69 Bay St., Toronto.

292-294 St. James St., Montreal

**SAMUEL LAWSON & SONS, LEEDS, England**

—MAKERS OF—

**Machinery for Preparing and Spinning  
Flax, Tow, Hemp and Jute**

**Special Machinery for the Manufacture of Binder and Ordinary Twines**

**Good's Patent Combined Hackling  
and Spreading Machine**

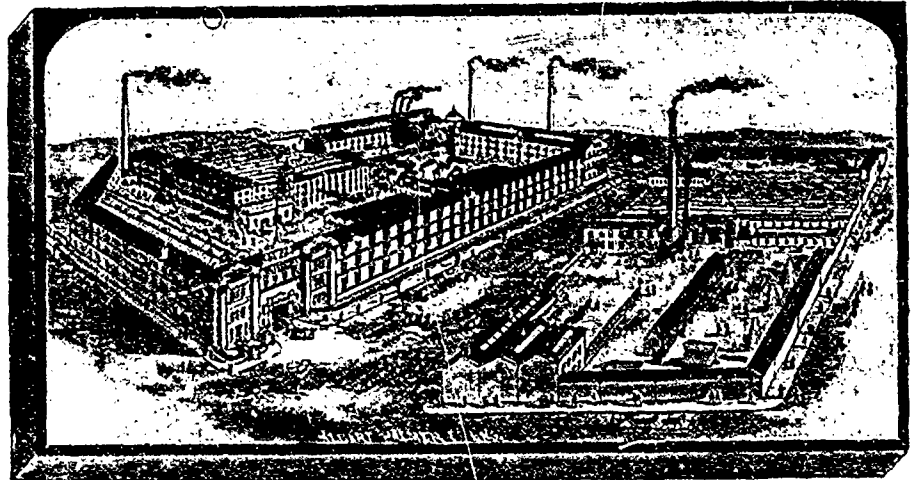
**Patent Automatic Spinning Frames  
Improved Laying Machines**

and other special machinery for the  
manufacture of Rope Yarns

—  
ALSO OF

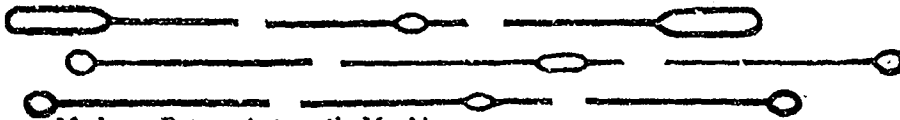
**Brownell's Patent Twisting and Laying  
Machines for Twines**

Council Medal London 1851, Grand Medal  
Paris, 1867, Prize Medal, Moscow 1872, Diploma  
of Honor Vienna 1874, Highest Award Phila-  
delphia, 1876, Gold Medal, Paris, 1878, Highest  
Award (Medal), Melbourne, 1880.



*Fellen & Guilleaume, Carlswerk, Mulheim-on-Rhine, Germany.*

*Manufacturers of Tinned Cast Steel Wire Heddles Patent "Favorite" Shafts  
for Weaving.*



*Made on Patent Automatic Machines.  
The Lightest, Most Exact and Uniform Wire Heddles Ever Made.*

*They give the easiest working, most reliable  
and durable harness; made with one or two  
carrying wires inside the wooden frame heddles,  
can be set as closely as any worsted heddles up to  
60 to an inch, and last 12 to 15 times as long.*

*For Prices Apply to JACK & ROBERTSON, 7 St. Helen Street, MONTREAL.*

**L. S. WATSON MANUFACTURING CO.  
LEICESTER, MASS.**



**Manufacturers of WATSON'S PATENT MACHINE WIRE HEDDLES**  
Guaranteed to be perfectly adapted to weaving all kinds of Woolen, Cotton and Worsted Fabrics, Fancy Cotton, etc., etc.  
Superior Harness Frames furnished promptly. Also Hand Cards of every description.