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Canadian Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XVI. TORONTO AND MONTREAL, JANUARY, 1899. No. 1.

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

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

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

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

Agency in Europe Paluce Bros. 5 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.

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Editorial.

THE ADAPTABILITY OF WOOL.

The following is a lecture delivered by J. W. Turner before the Bradford Textile Society. He said that the wool industry was now so subdivided that the manufacturer could buy yarns and go to work upon them guided by the highest technical education, the spinner, on the other hand, had to be guided by what was known as "the rule of thumb." Cotton, silk, and flax could be compelled to take the forms desired by the manufacturer, but wool would only go its own way, and required "humoring." There was no sharp dividing line between the various classes of wool. Many qualities of merino, for example, could be made into either woolen cloth, worsted coatings, worsted stuffs, or flannel. Leicester wool or colonial cross bred, when combed, produced a top which was available for almost any purpose except the production of woolen goods, whilst the noil, or short wool, obtained from the same process could only be used according to its fineness, for the manufacture of fancy woolen goods, flannels, blankets or hosiery. Merino wool, when combed, produced a proportionately long wool or top, suitable for the manufacture of the finer grades of worsted coatings, cashmeres, and Italians, but the noils were only available for making fine woolen-faced cloths, fine flannels, and fine felt hats. It was an old saying that "You cannot make a silk purse out of a sow's ear." It was equally true that a lustre Orleans piece could not be made out of pure merino wool, or worsted coating out of Lincoln hogg. To take pure lustre as an example of the way in which wools could be used, the chief sources were mohair and alpaca, which could be supplemented by the wools of Lincoln, Yorkshire and Nottingham. It must be noted in that connection that white and delicate colors were made out of Mohair and English lustre wools, whilst blacks, browns, and melanges could be made of alpaca, llama, or other goats' hair. Leaving the range of pure lustre, there was a large production of goods known as demi lustre, made of such wools as Irish, North, Kent, etc., and colonial crossbreds, which made serges, cords, reps, poplins, various fancies, and lastings. Amongst those might be mentioned the coarser kinds of demi-lustre, such as Gloucester, Oxford, Warwick, and Northampton, and sometimes Devon and Cornish. These were manufactured into camlets, lastings, braids, and buntings. Next in order came the mixed breeds, which formed a very large proportion of the growth of the United Kingdom, i.e., wools which contained in a greater or less degree a cross of the Scotch black faced or mountain wools. Those could be made into almost anything. The pure black-faced usually found its way into carpets, but the various crossbreds were accounted for by the manufacture of moreens, damasks, and Scotch mixtures. To the same class belonged the Cheviots and the superior classes of Welsh and Irish mountain wools, which were made into goods of a quite unique character. Large quantities of the so-called Cheviot goods, however, were produced from the crossbred wools of Australia and Buenos

Ayres. Some of these were known as Cheviots, tweeds, Scotch fancy suitings, Scotch fingering yarns, etc. In the olden time the finest wool to be obtained in our own country was the English Southdown, excepting, of course, the very fine Saxony wool, which was largely imported into Bradford in the early part of this century. Both English Southdown and Saxony wool had now been supplanted for dress purposes by the enormous imports of colonial nd Buenos Ayres wools. There remained, however, one market for Southdown which it was not likely to lose, viz., hosiery, for it possessed an elasticity and a springiness which were not to be found in any other wool. It was principally grown in Sussex, Wiltshire, Hampshire, Shropshire, and Dorset, but the Southdown blood was to be found, in various proportions of admixture, in almost every county in the United Kingdom. There was no doubt that, during the life of the present generation, merino wool had held the most prominent position. It gained largely in popularity at the time when the public was becoming tired of lustrous and hard-haired fabrics, and for twenty-five years it had had the chief command of the market. It was soft to the touch, would take the most solid and the most delicate colors, and was available for the heaviest woolen cloths, the lightest of ladies' dress goods, and the smoothest of linings. By admixture with the well understood Leicester breed it had produced a vast variety of crossbred colonial wool, which was the principal factor in the wool market to-day. With the exception of the pure lustre wool, almost any wool of European growth could be matched from the supplies of colonial crossbreds.

THE MANUFACTURE OF SAKAI CARPETS.

The carpet-making industry of Japan is of comparatively recent growth, and the chief seat of the industry at the present day is Sakai, a town about eight miles south of Osaka, and a few are made at the neighboring village of Surmyoshi. Mr. Playfair, First Assistant at H.M. Consulate at Hiogo, in a report to the Foreign Office, states that originally two kinds of carpets were made in Sakai, one the ordinary hand woven, and the other on which designs were afterwards dyed. In the former kind the system employed was practically that now in vogue, while in the second kind a double thread was used in the warp, and it would appear that designs were dyed on the carpet after it had been woven, by some sort of stencilling process. As the colors did not thoroughly penetrate the material, these carpets were apt to quickly fade.

The method of weaving is somewhat similar to that for making velvet, the threads on being tied are cut off, and a "nap" left. Skill in cutting the threads off evenly and rapidly is one of the tests of an efficient worker. The inventor of hand woven carpets in Japan was Fujimoto Shozayemon, a thread merchant of Sakai. In 1831 he began to make an article known as Hizen mabeshima carpets—also called Sagara—and carpets copied from those made in China. He employed a skilled weaver named Idzumi Rihei, and gave to his goods the name of Sakai dantzu, and sold them in a small shop of his own. Before the opening of the country to foreign trade the business was a small one, and the quality of the goods very poor. Accordingly the grandson of the original inventor, who is at present one of the leading merchants of Sakai, turned his attention to improving the quality of his wares and seeking a market for them. He did not meet with much success until the Emperor of Japan went to visit the Unebi Mausoleum in February, 1877, on which occasion Fujimoto presented his Imperial Majesty with some of his manufactures. At the first Tokio Exhibition Sakai rugs were shown, they quickly took the public fancy, and since that date have continued to grow in popular estimation. In 1878 Fujimoto exported a few carpets to America and France through foreign merchants. Since then he has been a successful exhibitor at numerous exhibitions at home and abroad. The progress of the trade is shown in the following table:—

Year.	Carpets Exported.	Value (Yen
1880	1,595	2,043
1890	27,593	51,048
1891	60,811	94,731
1892	112,279	177,446
1893	203,050	391,989
1894	546,091	1,134,073
1895	685,536	1,635,902
1896	661,732	1,152,177
1897	555,878	973,871

The weaving is done in houses all over the town of Sakai and its suburbs, the houses containing from two to four looms worked by three or four children, the superintendent being usually a girl of 17 to 18. The workrooms are frequently rather dark, and in winter very cold. One large packing and sorting warehouse was light and airy, and was fitted with electric light for use after dusk, but no means of heating were employed. In this warehouse there is a press for packing bales. It is worked by hand by means of long levers, but it is hoped that ere long hydraulic pressure may be substituted. The presses used by merchants for packing bales are worked by screws, not levers. The reason why no large factories exist is that, as education is compulsory in Japan, it is difficult to get together a large number of children of school-going age in any one place. Weavers, therefore, set up houses in a district where poor children are numerous, and thus get labor in abundance at their very doors. Parents are allowed to plead poverty as an excuse for not sending their children to school, and freely avail themselves of the privilege, although probably the truth is that when the carpet business is flourishing, and children can earn fair wages, it is found to be more profitable to send them to work than to school. As a natural consequence children in Sakai are numerous but ignorant. To remedy this evil night schools are being established by private enterprise to educate the little workers after their hours of labor are over. The materials employed in carpet making are cotton, wool, silk, and yamamai or wild silkworms' thread, waste silk and jute. The cotton used is chiefly obtained from Osaka. The woolen yarn is chiefly made in Tokio from raw wool imported from Australia, mixed with a certain proportion of wool imported from China, which is much cheaper. Yarn imported from England has also

been given a trial, but it is feared that when the higher scale of duties comes into force this will not prove profitable. The silk used is only that which comes from Joshiu, and the dyeing of the thread is all done in Tokio. The supply of yamamai is drawn from the surrounding district. The jute employed consists chiefly of old gunny bags unravelled, but as the supply is insufficient the deficiency is made good by jute yarn imported from Calcutta. Japanese hemp is too expensive.

The materials are supplied by the large dealers to the weavers to be made up in their own houses. Of late, however, it has become the custom for large dealers to advance money free of interest to weavers to enable them to purchase materials. The reason for this is that dishonest weavers were in the habit of buying inferior material and mixing it with that supplied by the dealer, consequently the article returned was poorer in quality than the dealers expected. Now, if the finished article is not up to muster the price paid is reduced accordingly. All looms working for a large dealer are inspected for him daily. The designs are chiefly copied from Persian and Turkish patterns, the old Japanese designs not finding much favor now. Some of the original designs in the cotton rugs are, however, very pretty and in good taste. Any design supplied can be copied to order. A great improvement has taken place lately in the dyes used, but as the large dealers are of opinion that still further improvements are necessary and desirable, a meeting of those interested is being called to try and do away with the practice now in vogue of buying cheap dyes from the native merchants in Osaka, and in lieu thereof to purchase them direct from the foreign importers at Kobe. The imported dyes now in use come principally from England and Germany. These dyes last better than those formerly used, and are now almost invariably employed in the making of wool rugs and jute rugs of the better qualities; while for cotton rugs—except such few as are dyed on what is termed the "old Japanese system"—very inferior dyes are used even now, and the colors quickly fade. Cotton rugs are altogether inferior to those made from jute or wool, and are manufactured principally for consumption in Japan. One of the disadvantages attaching to cotton rugs is their extreme inflammability, rendering them dangerous for use as hearth rugs.

Woolen rugs are more durable and of a better appearance than cotton rugs. The manufacture of this class of goods dates back to the spring of 1896 only. In these rugs the warp is of cotton and the woof of either wool, jute, or cotton yarn, while the "filling" is of wool. They are made chiefly to order, the customer usually supplying his own design and the dyed wool yarn necessary to make the carpet. This is presumably an attempt to compete with Turkish and Persian carpets, by copying them more or less faithfully. The greater part of the output goes to America, but is not yet of great extent. Jute carpets apparently have a future before them, provided that the question of dyeing receives proper attention, and, as already alluded to, the dealers are becoming cognizant of this fact. At present the majority of rugs manufactured are of jute. The warp is cotton yarn, the woof of thick jute, and the filling of thin jute yarn. They are exported principally to America and Great Britain, the latter country taking just over one-half of the output. The sizes most in favor are 3 feet by 6 feet, 9 feet by 12 feet, and 12 feet by 12 feet, though rugs as small as 1 foot by 2 feet 2½ inches and as large as 15 feet by 20 feet are occasionally exported, the sizes being entirely a matter of popular fancy. Silk rugs are made to a small extent only, being too expensive to become an article of common use, a rug of 3 feet by 6 feet costing from $200 to $250. A few are exported to America and France. Two silk rugs, 6 feet square, were first exhibited at Tokio in 1878, and were purchased on the second day shown. Two similar rugs were presented by the chief men of Sakai to the Russian Crown Prince on his visit to Japan. Two of 6 feet by 9 feet were exhibited at Chicago, and Mr. Fujimoto purposes sending some to the coming Paris Exhibition in 1900. At present there are only three looms in which silk carpets are woven. Yamamai carpets are still in the experimental stage, and the supply of raw material being somewhat limited the output is but small. A few years ago a foreign firm retained a number of looms to weave exclusively for them, the firm supplying materials, dyes, and designs, but the arrangement is no longer in force. There were in Sakai at the end of 1897, 6,181 looms in 1,062 houses, giving employment to 18,554 persons, of whom 13,242 are females and 5,312 males. Looms vary in width from 3 feet up to 27 feet, the intermediate sizes being 9 feet, 12 feet, and 18 feet, though up till 1877 the maximum width was only 6 feet. Any length of carpet can be made as required, the largest hitherto turned out being 27 feet by 32 feet and 3 feet by 120 feet. Very small rugs are not so profitable. If all the looms are in full work the possible daily output would be as much as 7,726 square yards; the average prices are, for cotton rugs 80 sen, jute 90 sen, and woo 380 sen per square yard. The system employed is as follows:—

At the top of the loom is a large beam called *tatemakibo*, on which the threads composing the warp are wound. These threads are fastened at the bottom to a beam known as *surebo*. As the work proceeds the threads are wound off by a turn or two of a cog wheel attached to the *surebo* and the threads on the *tatemakibo* are loosened in proportion. The woof threads are rapidly passed in and out by the workers—who squat on a board at the foot of the loom and slide back and forth along their respective portions of the pattern—and tied in position by the "filling" threads forming the pattern, which are then snipped off to the required length with a special kind of scissors.

At intervals a heavy beam called *osa* or *osa-ha*, which is of the nature of a huge comb, is jammed down on the portion of the work already done to render it close and firm.

The threads are all dyed before use, and the pattern is woven according to the design, which is supplied upon a small map or plan. This plan only represents one-

quarter of the whole design, and is repeated four times, being turned upside down for the lower portion of the pattern.

The children, while at work, keep up a song or chorus under the guidance of the forewoman, who changes the words and tune as the pattern alters. Makers say that silent workers are "idlers," and are therefore suspicious of the children when they cease singing.

A peculiarity of Sakai carpets is that, owing to the length of the "nap," they present quite a different appearance when viewed, so to say, against the grain. The quality of carpets depends, to a great extent, upon the number of threads in the warp, woof, and filling.

Thus in a 3 feet by 6 feet rug there may be 100, 135, or 155 pairs of threads in the warp of 3 feet, while in the 6 feet of length the woof threads may be from 300 to 600 in number, and the "filling" from one to six strands of material.

Excessive export of only the cheapest class of goods is greatly to be deprecated, as likely to give the trade a bad name. The better qualities look well and wear satisfactorily, while the cheap kinds do neither.

Provided that strict attention be paid to the quality of the dyes employed and earnest endeavors made to maintain a certain uniformity of standard, there is no reason why the future of the trade should not be assured.

THE PREPARATION OF RHEA FIBER FOR TEXTILE PURPOSES.*

BY PERRY F. NURSEY.

So far the jurors of the Great Exhibition of 1851, whose few years have been lengthened out to nearly fifty, and rhea fiber is not an everyday article of commerce. Going back to 1840, we find that rhea fiber then became, for the second time, the subject of official action on the part of the Indian Government. The first time was in 1803, when Dr. Roxburgh made an effort to utilize the plant. Upon the second occasion Colonel Jenkins took up the matter, but without any practical result so far as the production of the fiber was concerned, the difficulty standing in the way being that of decortication, or removing the bark with its adherent mucilage, containing the fiber, from the woody stem. In 1869 the Indian Government made a third attempt to solve the problem by offering a prize of £5,000 for the best machine for separating the fiber from the stems and bark of the rhea in its green or freshly cut state, which is the most favorable—or rather the proper—condition for the performance of the operation. This offer led to only one machine being submitted for trial, although several competitors had entered their names. This machine is the only one already referred to as having been invented by Mr. Greig, of Edinburgh, but after careful trial by Colonel (afterwards General) Hyde, it was found that it did not fulfil the conditions laid down by the Government, and therefore the full amount of £5,000 was not awarded. In consideration, however, of Mr. Greig having made a *bona fide* and meritorious attempt to solve the question he was presented with £1,500. The reward was still offered, and further attempts were made to obtain it. They, however, proved unsuccessful, and eventually the offer was withdrawn by the Government. But the withdrawal of the prize did not damp invention, for there was a great commercial issue at stake, and the £5,000 was re-offered in 1881. Another competition then took place, at which several machines were tried, but the trials, as before, proved barren of any practical results, no machine being found capable of dealing successfully with rhea stems in the green state. The question of the preparation of the fiber, however, continued to be pursued in many directions. Nor is this to be wondered at when we find that the strength of some rhea fiber from Assam, which was experimented with in 1852 by Dr. Forbes Royle, as compared with St. Petersburg hemp, was in the ratio of 280 to 160, whilst some fibers of the wild rhea of Assam were as high as 343. But above and beyond this, rhea has the widest range of possible applications of any known fiber, as shown by an exhaustive report on the preparation and use of rhea fiber by the late Dr. Forbes Watson, with whom the author has frequently had the pleasure of being associated in his investigations connected with the present subject. The report referred to was published in 1875, at which time Dr. Watson was the reporter to the Indian Office on the products of India. The direction in which practical efforts were being made to solve the rhea fiber problem at the time the author was first consulted, was the very proper one of decortication, that being the initiatory stage of treatment, and its success underlying that of all subsequent proceedings. The rhea and other fiber-producing plants are generally cultivated at long distances from the localities where the fiber is prepared for the market. The stems are cut and transported across the country to the scutching mills. This gives rise to two evils—in the first place, about a ton of raw woody material is transported to produce 1½ cwt. of fiber; and in the second, the gum is liable to become partially, and sometimes wholly, set during transport. This leads to difficulty and waste in the extraction of the fiber, as the author has already shown. In order to remedy these defects, and to cheapen the production of fiber generally, a simple and inexpensive process was devised by M. Favier, and was introduced in this country in 1882 by Messrs Brogden & Co. The principle involved was to steam the fiber producing plants at the place of culture, and to send only the epidermis with the fiber attached across country to the mills. The apparatus employed was simple and inexpensive, consisting merely of a stout deal box or trough, 8 feet long by 2 feet wide and 20 inches deep. This box had a false bottom, under which was a ¾ inch perforated iron steam pipe connected with a boiler. At the bottom of the box at one end was an outlet for the condensed water. In the trial made by the author a number of stems of rhea and other fibrous plants which had been cut several days were placed in the box, and the lid, which fitted tightly, was closed. Low pressure steam was then admitted, and in twenty minutes the specimens were taken out. They were found to be in excellent condition

*From a paper read before the Society of Engineers.

for stripping. The gum was softened and the epidermis, with the fiber attached to it, was readily removed by the fingers in strips or ribbons from the woody stem. Thus the process of decortication was accomplished in a few minutes, instead of requiring, as it sometimes does in the retting process, days and even weeks, and being at the best attended with uncertainty as to results, as is also the case when decortication is effected by machinery. Moreover, the retting process, which is simply steeping the cut stems in water, is a delicate operation, requiring constant watching, to say nothing of its serious inconvenience from a sanitary point of view, on account of the pestilential emanations from the retteries. By the Favier process it was estimated that the cost of producing the fiber ready for the scutching machine was not more than £2 per ton, which was said to be very low, but the author has no means of verifying this statement. The question of fuel for steam-raising does not arise, inasmuch as the woody stems can be used for that purpose after being stripped of the bark, if no other local source of fuel exists.

Thus the initial operation, so far, appeared to have been satisfactorily accomplished by M. Favier. In practice however, it was found that perfection was not reached The process certainly greatly simplified the commercial production of the fiber up to a certain point; for, at a very small cost, it gave the manufacturer the whole of the fiber contained in the stems treated. But still it stopped short of what was required, in that it delivered the fiber in ribbons with its cementitious matter and outer skin attached. To free the fibers from imprisonment various methods of treatment were proposed, and some were tried, but without absolute success, although success was often very closely approached. The gist of the matter was that the fiber could not always be produced of such a uniformly good quality as to constitute a commercially reliable article. Such was the position of the question in 1883, when it was taken up by a distinguished French chemist, the late professor Fremy, member of the Institute of France, who was well known for his researches into the nature of fibrous plants and the question of their preparation for the market. The professor thoroughly investigated the matter from a chemical point of view, and at length brought it to a successful and, apparently, a practical issue. One great bar to previous success appeared to have been the absence of exact knowledge as to the nature of the constituents of that portion of the rhea plant which contains the fiber, that is the casing or bark and its lining, which surrounds the woody stem. As determined by Prof. Fremy, this consists of the cutose, or outer skin, within which is the vasculose containing the fiber and other conjoined matter known as cellulose, between which and the woody stem is the pectose, or gum, which causes the skin or bark as a whole, fiber included, to adhere to the wood. The professor, therefore, proceeded to carefully investigate the nature of these various substances, and, as a result, he found that the vasculose and pectose were soluble in an alkali under certain conditions, and that the cellulose was insoluble. His method of procedure, therefore, was to dissolve out the cutose, vasculose, and pectose by a very simple process, obtaining the fiber clean and free from all extraneous adherent matter ready for the spinner. In order, however, to insure the production of a perfectly uniform and marketable article, the professor employed different chemicals at the several stages of the process. These chemicals, however, were not administered haphazard or by rule-of thumb, as had been previously done in some of the chemical processes bearing on the question, and which consequently failed in the sense that they did not take their places as commercial successes. The professor, therefore, carefully examined samples of the stems to be treated, and, according to the nature and character of the components of the mucilaginous matter, he determined the proportions of the various chemicals which he introduced at the several stages. All chance of failure thus appeared to be eliminated, and the production of a fiber of uniform and reliable quality was assumed to be removed from the region of doubt into that of certainty.

The principles just enunciated were carefully worked out into a system by Professor Fremy, in conjunction with M. Urbain, the professor's chief assistant in the Government Laboratory, Paris, where the author first went through the process experimentally with those gentlemen. Having sufficiently developed their invention, steps were taken to demonstrate its practicability on a fair working scale. The processes of M. Favier and MM. Fremy and Urbain were therefore combined, and a small plant was put up at experimental works in the Route d'Orleans, Grand Montrouge, just outside Paris. The process there carried out consisted in first treating the rhea stems according to M. Favier's invention, which has already been described. Decortication by steam having been effected, the work was taken up by MM. Fremy and Urbain. The ribbons having been produced, the fiber in them had to be freed from the surrounding mucilaginous secretions. To this end, after examination in the laboratory, they were laid on metal trays placed one above the other in a vertical perforated metal cylinder. When charged, this cylinder was placed within an iron cylinder containing a strong alkaline solution. Within the cylinder was a steam coil, and, steam having been turned on, the temperature was raised to a certain point, when the cylinder was closed and made steam tight. The process of boiling was continued under pressure until a high temperature, and consequently steam pressure was reached Upon the completion of this process, which occupied about four hours, the cementitious matter was found to be transformed into a substance which was very easy of solution. The fibrous mass was then removed to a centrifugal machine, in which it was rapidly freed from its surplus of alkaline moisture, after which it was placed in a weak solution of hydrochloric acid for a short time. It was then transferred to a bath of pure cold water, in which it was allowed to remain for about an hour, after which it was placed in a weak acid bath for a short time, and subsequently dried, being then ready for the spinner.

Continued working in the experimental factory at Montrouge, however, developed defects, and the system was found to be a little less than perfect. MM. Fremy

and Urbain set to work to overcome the defects, and in course of time the process was said to be perfect, and the results all that could be desired. A spinning mill, situate at Louviers, near Rouen, was acquired, in which appliances were put down for preparing the fiber according to the process just described. There was already machinery in the building suitable for spinning the fiber into yarns, capable of an output of about 10 tons per week. It is unnecessary to describe the arrangement of the works, beyond stating that there were two main buildings, each of two stories, and each about 130 feet long by 30 feet wide. One contained the carding and spinning machinery, and the other what may be termed the converting plant. On the ground floor of the latter was the steam digester or kier, which was 8 feet high by 6 feet in diameter, and capable of containing about half a ton of dry ribbons. Besides this, there were washing tanks and large circular vats for the treatment of the fiber after it left the digester.

The author visited these works three times during the years 1884-5, and although there were some slight variations in the treatment, the principle followed was in all cases the same. Upon the occasion of the author's last visit, the ribbons containing the fiber were first placed in the digester, and boiled by steam heat under pressure with from 8 to 15 per cent. of caustic soda, according to the nature of the rhea. After being boiled for from three to four, or even five hours, a brown liquor resulted, which was drawn off, and the ribbons were transferred to a tank of cold water, where they underwent a thorough washing. They were then subjected to another boiling with a reduced quantity of caustic soda, after which the resulting fibrous mass was submitted to saponaceous treatment. The fiber, now fully developed and known as filasse, was then washed in pure cold water, and then placed in a slightly acidulated bath. Another washing in cold water completed the process, and the fiber was then ready for the spinner. The most important factor in the success of the Fremy-Urbain process was said to be the saponaceous treatment, which may be regarded as the crowning feature of the whole. Upon the author's second visit to the works, chlorine was used in the preparation of the fiber subsequently to the caustic soda treatment. This agent had to be employed in consequence of the difficulty of getting rid of the chlorophyll or coloring matter of the plants. On the author's third and last visit, Professor Fremy stated that he had long been of opinion that the use of chlorine was prejudicial to the fiber, and that he had endeavored to supersede it by some innocuous agent. Such an agent he had then recently discovered, and saponification was substituted by him for the chlorine process. By this means the professor appeared to have eliminated from the Fremy-Urbain process the last element of uncertainty, and the last chance of possible danger to the fiber.

The author saw several charges of ribbons treated by this process, and some of the resulting filasse put through the mill and worked up into yarns. Upon his last visit of inspection the author sent a small bale of the fiber to the late Sir Joseph Lee, of the firm of Tootal, Broadhurst, Lee & Co., of Manchester, Sir Joseph being an authority upon fibers, and having upon one occasion accompanied the author to Louviers. Sir Joseph took a great interest in the Fremy-Urbain process, and his object was to have the fibers spun into yarn in one of his own mills. Sir Joseph's views and opinions are best given by the following letter which he wrote to the author acknowledging the receipt of the fiber :—

56 Moseley Street,
Manchester, March 18, 1885.

My Dear Sir,—I thank you for your letter of the 16th inst., and also for the samples of ramie in the various stages of development. The change in the Fremy process is undoubtedly a great gain in the cleansing of the fiber. From what I see, the problem of making the ramie a commercial article is solved. The important question of producing yarn from the filasse is yet unsolved—that is to say, the machinery for cotton, flax, or wool cannot be employed on ramie in an economical and consequently a profitable manner. We have to look to the mechanical constructor to provide machinery for its treatment. As I have said elsewhere, vast sums have been squandered in the attempt to produce yarn by machinery quite unsuited for the purpose. An appeal must now be made to inventors to take the thing in hand. M. Favier's opener*—from the small sample sent me—will not fill the requirement. The whole process of spinning must be studied so that the waste at present made is minimized. Any further information I obtain I will let you have from time to time.

I am, yours most truly, J. C. Lee.

P. F. Nursey, Esq.

(*To be continued.*)

BETTER GOODS.

There is a marked tendency towards an increased demand for better goods, the result no doubt of the increasing prosperity of the last year and a half. This demand is not only for goods of finer finish and appearance as might have been expected from the cry for cheapness, but is also for quality, durability and fastness of color. We often hear shoppers in retail stores complain that they cannot secure goods which have the wear or appearance of twenty years ago. Such complaints are having an effect on the market, and sooner or later we will have a revolt against the low-grade goods which some firms are producing. It is stated that the departmental stores of New York are now falling behind the single-line houses because the public has got cheapness inseparably associated in its mind with the departmental store, and when prepared to pay a good price for an article goes to a house which it has been accustomed to look upon as dear, perhaps, but reliable as regards quality. The same tendency is at work in Toronto, and many instances might be given.

There are at least a dozen woolen mills in Canada which we could name which we have every reason to believe have yet to work their first pound of shoddy. Per-

*This refers to an improved detail in spinning machinery invented by M. Favier, not the M. Favier who invented the decorticating system formerly described.

haps they are not all the biggest mills in the country, but they make money and will make more.

If some economical method could be found by which mills running on absolutely pure stock could unite to have a general trade-mark that would stand for quality as does the word "Canadian" on a cheese box in the English market, we might export woolen goods to a large extent. A staff of designers might be employed by such an "all-wool" combination, which would produce designs equal to any in the world, and by assigning different lines to the mills best adapted to produce them, thus save a great deal on changing over.

Canadian woolens are sold now in the United States. But it is as British goods they are sold, not as Canadian. If we had a system of trade-marks and maintained the purity of our goods we could get good prices and have a steady demand.

TEXTILE IMPORTS FROM GREAT BRITAIN.

The following are the sterling values of the textile imports into Canada from Great Britain for November and the 11 months ending November, 1897-1898:

	Month of November.		Eleven months ending November.	
	1897.	1898.	1897.	1898.
Wool	£ 9,285	£ 3,321	£40,261	£35,978
Cotton piece-goods	26,699	24,176	342,578	427,044
Jute piece-goods	9,513	14,856	117,550	125,035
Linen piece-goods	7,787	9,743	107,320	136,298
Silk, lace	441	491	5,088	6,681
" articles partly of	1,902	2,374	19,269	29,414
Woolen fabrics	6,109	8,806	208,354	270,695
Worsted fabrics	27,646	23,804	519,294	531,558
Carpets	9,097	5,454	129,890	165,906
Apparel and slops	17,538	15,115	283,117	309,519
Haberdashery	5,127	4,670	132,314	136,031

The following are the sterling values of the textile imports from Great Britain to Canada in December 1897 and 1898 --

	December.	
	1897.	1898.
Wool	£7,757	£3,339
Cotton piece-goods	57,309	60,946
Jute piece-goods	8,369	8,859
Linen piece-goods	13,448	12,561
Silk, lace	374	922
" articles partly of	1,286	2,805
Woolen fabrics	11,430	18,116
Worsted fabrics	59,954	51,253
Carpets	9,463	12,549
Apparel and slops	17,415	12,843
Haberdashery	5,787	5,636

COCOA, COIR AND STRAW MATTING.

Cocoa and Coir.—Cocoa or coir matting is made from the fibrous rind or husk of the cocoanut. The cocoanut palm tree, which produces these nuts, is cultivated in Ceylon, the Malabar coast, the Straits Settlements, the islands of the Eastern Archipelago, the West Indies, Central America, Brazil, and Zanzibar, Africa. The husk, which contains the fibers, is removed from the nut by pressing it upon a sharp spike of iron or hard wood fixed in the ground. The husks are then placed in soaking tanks, which are filled with fresh water. If the trees are on or near the seashore, the nuts are simply buried in holes dug in the sand, so that the salt water may reach and macerate them. The soaking renders the fibers more pliable and facilitates their separation from the cellular tissue of the husk. This is accomplished by beating the macerated husks with hard wooden clubs or mallets. The fiber, or coir, as it is called, is then arranged in loose rovings or sheaves, which are twisted into yarn by being rolled in a peculiar manner between the palms of the hand. All these operations are performed by the natives in countries where the cocoanut palm tree grows. The separation of the fiber from the nut and the twisting of the yarn, occupy them through the rainy season, when no other work can be done. The cost of native labor is so low and the yarn spun by machinery is so much inferior to the hand-made product that all attempts to introduce machines in this work have proved impracticable, says a writer in the Carpet Trade Review.

The first process to which the yarn is subjected in the matting factory is bleaching, and, as all the skeins are not of equal texture and do not have the same color after bleaching, they are assorted according to shade or tint and texture. The yarn intended for the warp is reeled upon bobbins about a foot in length, and these are placed on a frame at the back of the matting loom. Each thread passes separately through a reed, which keeps it in place, and then between a pair of iron rollers with roughened surfaces, which hold it tightly. The woven fabric also passes between a similar pair of rollers, whose purpose is to give the tension desired. The shuttle used is quite large, and the yarn for the filling is wound on a cob large enough to fit tightly in the shuttle. No spindle is used and the yarn unwinds from the end. The matting loom is operated by power, and, unlike most other kinds of power-looms, it requires constant and arduous labor to make it weave properly. This is owing to the difficulty in giving the necessary tension to the weft threads. The yarn is so coarse and harsh that every contrivance for tightening the weft sufficiently for a perfect selvedge tends to interfere seriously with the working of the shuttle. The workman is therefore obliged to catch the thread behind the shuttle every time it passes through and draw it tight, an operation which considerably retards the speed of the loom.

Ordinary cocoanut matting is woven with a certain kind of twill in a three-leaved harness, two extra threads running in special loops, alternating up and down for selvedge. In Calcutta-made matting this twill is reversed every five or six inches, so as to give the fabric a striped appearance. But all goods having this appearance do not come from Calcutta, for European and American manufacturers produce the same effect by reversing the order in which the warp threads are drawn into the harness. The looms on which cocoa mats are made are like an old-fashioned hand-loom of the most primitive style; but they are very strong and substantial, as great tension is needed and heavy blows must be dealt with the lathe to beat the weft up tightly. The warp is wound upon the beam in the ordinary manner and passes through a plain two-leaved harness.

In making fiber mats the workman uses the loose cocoanut fiber, having first run it through a picker. He springs the harness, and twisting a bunch of the fiber into a wisp or loose strand, passes the end of it under each alternate warp thread as it is brought uppermost by the harness cutting off each time a length sufficient to form the pile of the mat. The loose ends, which are too short to be fastened in, are pulled out. After a tuft of fiber is thus placed under each warp thread across the loom, the harness is sprung about and a weft thread run through as a binder. In the better grades of mats, Zanzibar yarn is used for the weft. In cheaper goods remnants or short ends are employed. The harness is then sprung again and the process of inserting fiber is repeated. When the mat is woven to the size desired, the warp is set forward some

inches, leaving a number of bare threads The mats are finally cut apart, finished on the edges with braid, and sheared on the surface by a machine resembling a cloth shearer. Coir mats are made in a similar manner, but, instead of loose fiber, the weaver has a large ball of yarn from which he forms the tufts. The weaving requires less time than it does for a fiber mat. The weaver, after spreading the harness, passes the end of the yarn through from one side, while from the other, on the top of the warp, he pushes forward a flat iron rod, grooved on the edge, upon which he winds the yarn, bringing up the loops between successive warp threads, while pushing the rod along. When the yarn is thus wound across the warp, a straight thread is run through for a binder, the rod is turned, with the groove uppermost, and the threads are cut by running a knife along the groove The harness is then changed, the filling well beaten up with the lathe and the operation of winding the yarn on the rod repeated as before.

Straw.—The straw matting, which comes from China, is manufactured from a species of reed or grass having culms which grow as high as 6 feet. When it has acquired the proper height, the grass is cut, spread out in the open air to dry, then roughly sorted, packed in bales, and delivered to the matting manufacturer, who sorts it again according to its fineness, uniformity, and color. The freshest, greenest looking straw is taken for white matting, and the rest is put aside to be dyed. In the familiar red and white check matting the red color is given by sapanwood For all other colors coal tar dyes are used. In Japan the matting manufacturers use a straw, like the Chinese, from which they make what is called the Bungo weave, but a large proportion of the matting which comes from China is made of straw which is smaller than the Chinese, and this makes what is called the Bingo matting This kind of straw is easier to manipulate, and can be woven in designs much more elaborate and handsome than is possible with the Chinese reed: but it is not so durable.

In both China and Japan the loom on which the matting is woven is of the same pattern, consisting merely of an upright bamboo framework, with cylindrical crosspieces above and below, over which the warp runs, the weft being woven in without a shuttle The movement of the warp is governed by the weaving beam or bar, a piece of wood 2 in. square and about a foot longer than the width of the matting which is to be woven The bar is pierced with thirty-nine small holes to receive the warp threads, the front row of holes being about three-sixteenths of an inch to the right or left of those on the opposite face, through which the other row of warp is threaded. The warp threads are made of hemp, and are oiled to make them smooth When the warp becomes loose, it is tightened by driving wedges between the upright and crosspieces of the loom The weaver handles this bar by means of a peg inserted midway in it. With this peg held at a right angle to the weave the warps are in normal position. When the peg is turned up the front row of warp threads moves back, and when the movement of the peg is reversed, the back row of thread moves forward. Between each upward and downward turn of the bar, the weaver's assistant, who kneels at his right with bundles of straw for the weft on the ground before him, draws from a bundle a straw of the color called for by the pattern, catches it in a notch cut in the end of a slender piece of bamboo, about 4 feet in length and holding the straw in this way places it horizontally between the two rows of warp threads. The weaver seizes the end of the straw, which passes beyond the left-hand selvedge and twists it round the selvedge cord, while the assistant twists the right hand end in the same way. Then the beam is brought down with sufficient force to press the warp straws closely together When the loom has woven a piece of matting 2, 4, or 5 yards in length the selvedge is cut down clean with a knife, and the matting or mat is taken off the loom, which is then provided with another warp As the straw is always wet before the weaving, the woven pieces are dried in the sun or over slow-burning wood fires To make the ordinary roll of matting a number of these pieces sufficient to measure altogether 40 yards are joined, this being done by running the warp ends of each two pieces in opposite directions under the weft, a smooth, flat bamboo needle being used for this purpose The roll is then ready for packing

Jointless matting is made on a loom which differs but slightly from that which is used in making the joined goods, the only change consisting in arrangements for loosening the warp and pulling it over wherever about two yards of matting have been woven, the finished part being passed back under the loom. As the beam cannot beat up the weft so closely with this arrangement, the texture of the jointless goods is quite loose. To remedy this the roll is made somewhat longer than 40 yards, and is then stretched tightly over a tall box-like structure, open at the top, and containing in its centre a charcoal fire Two coolies, one standing at one selvedge of the roll, the other at the opposite selvedge, then apply their hands to both sides of the matting, loosening and then forcing down the straw to the firmness desired While this raking, as it is called, is going on the heat from the charcoal fire is removing the moisture from the matting

FIRE SERVICE IN FACTORIES. WORKS, ETC.*

BY HAROLD SUMNER

(Concluded from September Issue).

Smaller appliances, such as buckets, hand pumps or chemical "extincteurs," can be judiciously distributed about the works. The buckets should be painted red, or some distinctive color, and should always be kept three-quarters full of water. A few drops of glycerine spread over the surface of the water in a thin film, will materially prevent evaporation. Workpeople should be distinctly forbidden to use these buckets for any other purpose than extinguishing of fire. A hand pump in conjunction with the buckets will be found of more utility than the small chemical "extincteurs." The "extincteurs" have the advantage that they can be called into instant use, but, even then, present in this respect no real advantage over a hand pump and two or three buckets full of water. On the other hand, "extincteurs" require a certain amount of special knowledge as to their use, and necessitate frequent examination. Moreover, as the charges are comparatively expensive, frequent trials or use for instruction purposes are seldom thought of, and, further, they present the great disadvantage of being quickly exhausted and requiring considerable time for recharging. "Hand grenades," it should be added, are generally useless unless in the hands of specially-trained men fully conversant with grenade throwing. In chemical laboratories, a box of slightly moist sand should be kept handy for dealing with outbreaks of fire where water cannot be successfully employed.

The other accessories, such as branch pipes, stand pipes, and so forth, should be of the best type and sufficient in number. The couplings should be preferably the same as those of the nearest fire brigade, and all accessories should be of the same size and type throughout the place. A certain number of ladders should be stored at a given place, and be of such a size that access to the roofs can easily be obtained. In addition to the stationary fire pump and system of fire mains, or in place of them, it may be found desirable to have either a manual or a steam fire engine or both. Either of these appliances will be found useful in case of a breakdown of the fire pump, or

*Reprinted from the transactions of the British Fire Prevention Committee.

steam and water main, and especially in those establishments where steam is not always kept up day and night throughout the year. The initial expense of these appliances will probably be found less costly than a thoroughly efficient system of mains and a fire pump, though the latter have many advantages, the most obvious of which is the fact that the water can be supplied by hydrants at any convenient point required—irrespective of the distance from the main water supply, and under a better head than could be obtained by pumping through long lines of hose from either a manual or steamer. Provided that a fairly good public water main supply is obtainable, a steamer or manual, in conjunction with a reservoir or river, is a useful addition to a fire protective plant.

These engines should be placed in a well-ventilated room or station of their own, conveniently situated for quick "turning-out," and for easy access to the different parts of the buildings. They should be kept scrupulously clean, in thorough working order, and provided with the necessary gear. They should be so arranged that they can be taken by hand or horse draught to any desired spot. A steam fire engine is to be preferred to a manual, owing to its greater power and ease of working. A supply of boiling water should be constantly kept for the boiler of the steamer either by means of a gas jet or heater. With some instruction it will be found that any intelligent mechanic can efficiently take charge of the steam fire engine. In order, however, to work the fire appliances efficiently—no matter if they take the form of mains and hydrants, fire engines, or both—it is advisable to form a body of trained men who have a thorough acquaintance with the fire protective measures and appliances at the disposal of the works or factory in question. This body of men should be known as the Works Fire Brigade, and its members should be picked men residing in the near vicinity of the works.

It is advisable that the brigade be a relatively large one, so that the services of a certain number of them can be relied upon during the stoppages of the works. The officers should be chosen from amongst those having authority in the works, and the whole placed under the direction of one of the superior officials or heads of the firm. The men should have the proper clothing and helmets supplied to them, and every effort made to make the members feel that the brigade is one of the valued institutions of the establishment. It is perhaps more satisfactory that the men be remunerated for drills than that their services be voluntary. The remuneration is a useful lever for the maintenance of proper discipline, and is in many ways a more efficient system than a voluntary one combined with some special benefit such as an annual dinner or excursion. The paid system, further, need not, and should not, exclude any such special benefit as a dinner or outing for the men of the brigade The brigade can be divided into companies or sections, each in charge of a foreman. Each company should have its special duties in case of an outbreak of fire, one company having charge of the stationary fire pumps and the maintenance of the steam and water supply, whilst another has charge of a steam fire engine. The whole organization should, however, be under the command of one chief officer, who would be responsible to his employers. The brigade should be drilled regularly, and every member should be made acquainted with the working of all the different appliances, hydrants, water sources, and so forth, no matter what special section he may be attached to. The drills should have special reference to the buildings they are primarily expected to protect. A certain number or all the men may also be conveniently instructed in ambulance work. An ambulance corps is of great utility in any works for dealing with the accidents which unfortunately take place from time to time, but for fire brigade work the possibility of obtaining "first aid" on the spot is essential. The fire appliances throughout the works should be inspected weekly by some responsible officer of the brigade and a report made to the chief, who would have to verify these reports from time to time. This weekly inspection should not be of a perfunctory nature, but a thorough examination of all pumps, hydrants, valves, etc., about the place, and any defect should be promptly repaired. A special report book with the necessary headings should be kept and signed by the officer charged with this inspection. In this report book a record of all tests should also be kept and it should show when the appliances were last thoroughly overhauled. All appliances should be cleaned and every hydrant flushed out once every week under the supervision of the inspecting officer. To avoid friction with the heads of departments, etc., the internal appliances can be put under the charge of the respective foremen of rooms or shops, but these foremen should be made responsible for their being kept clean and in good order, and the appliances should, nevertheless, be regularly inspected. The engines and appliances at the fire station should be in the charge of one or more firemen especially told off for this duty, and would also be subject to regular inspection. The fire alarm can be given by means of a steam whistle when steam is always kept up, or by means of a bell. The whistle should be of a distinctive sound, and not the same one which calls or dismisses the work-people. The fire whistle should occasionally—once or twice a week—be blown at pre-arranged times, preferably at the middle of the day and simultaneously with the works whistle, in order to keep it in thorough working order. It can be placed either on the watchman's room, the central office, the fire station, boiler house, or other recognized building. In large establishments it is, however, better to have a supplementary system of electrical fire-calls communicating from the different buildings to wherever the whistle may be placed. Where an establishment covers a very large area, there can be more than one whistle.

The watching service or patrolling of the works as a precautionary measure against outbreaks of fire, is a most important feature of any system of fire protection. This precaution of watching is now practically always undertaken at every factory of any size, and it often constitutes the sole fire preventative measure. The system can be elaborated according to the size and the risk of the premises in which it is employed. In other than very large establishments, it is generally performed by the night watchman, who must be a trustworthy, active, and resourceful man, and have a thorough knowledge of every part of the premises under his care, of the position of the fire appliances, their nature, and the resources generally at his command. It is of paramount importance that the patrolling is systematically carried out, and that every part of the works or factory, however insignificant, receives a regular visit from those appointed to this duty. It is therefore necessary that some means be adopted to ensure that this duty is satisfactorily carried out. Surprise visits are of value, but some mechanical or electrical system of recording the visits of the watchman to the various points of his rounds, are very desirable. The use of peg clocks or control watches will be found to meet this desideratum. The control watch is carried by the watchman, and its distinctive feature consists of a strip of paper round the inside of the watch, the strip is graduated or subdivided into hours, half hours and quarter hours. Each room or determined point is provided with a case affixed to the wall containing a special key attached to the case by a chain. Each key makes a separate and distinctive mark on the strip of paper, showing the time the watchman inserted the same into the watch. The strip on its removal in the morning gives a faithful record of the various points visited, the route taken and the time of each visit to the different parts of the works. By a judicious distribution of the keys and a determination of the

route to be taken so that every part of the works must be patrolled by the watchman, satisfactory results are obtainable.

Where more than one watchman is employed on night service, one should make his rounds while the other remains in the watchman's office ready to attend to any emergency. The system of electric fire calls from various points of the works or factory, and communicating to the watchman's office or fire station, can be usefully adopted in this case. The watchman not on patrol can receive the call and immediately give the alarm.

The number of men employed, and the system adopted for night watching, must of course depend on the size of the establishment. In very large works it may be found desirable to have one or two members of the fire brigade sleeping at the fire station, and in addition it may be necessary in day time to have one or more men ready for any emergency, and solely employed as watchmen or firemen. The close proximity or otherwise of the members of the Works Fire Brigade should be taken into consideration when determining the question of night or day watching service. Part of the fire brigade can keep their uniforms at the station, and part at home, so that no time is lost either by day or night in securing a number of properly equipped men The day men and night men should be changed every month

In a factory the risk of fire is always present to a certain degree, quite apart from any special risk in the process of manufacture, on account of the carelessness of those employed on the premises. It is, therefore, essential that this factor be taken into due consideration. Smoking is generally severely prohibited, but the necessary attention to the use of matches, where gas is used as an illuminant, is mostly overlooked The lighting of the gas jets should be solely in the hands of those especially appointed to this duty Electric gas igniters, or special gas lighting lamps, should be employed, and both the ignition and the extinction of all gas lights should be performed by the same men. Wire guards should be adapted to all unenclosed gas jets, and the supply pipes made of galvanized iron Similar precautions apply to electric light fittings, only those who are duly authorized should be allowed to switch the light off or on at the main switchboard or distributing boards Any tampering with the fittings should be strictly prohibited The accumulation of oily rags or waste must be guarded against A special receptacle should be supplied for these, which should be emptied periodically. Proper oil catching tins should be provided on all engines, shafting, and the like, and the reprehensible practice of putting down sawdust to catch the oil drippings absolutely forbidden. Not only is the oil-soaked sawdust highly dangerous, but this method of catching oil dripping is wasteful in the extreme. By the use of suitable tins, the waste oil can be collected, filtered, and used again. Accumulations of dust or lint on the steam pipes or boilers is to be avoided.

Where a steam pipe passes through a wooden partition, the hole through which it runs should be of considerably larger diameter than really necessary, so as to permit a current of air passing between the pipe and the woodwork Should this not be admissible, asbestos packing should be placed between the pipe and the timber On no account should steam pipes be placed on, or in close proximity to woodwork without some special precaution being taken to prevent any ignition of the latter. The covering of steam pipes to prevent condensation, as universally carried out, greatly minimizes the risk of fire. Wooden partitions should be avoided as far as possible. Stacks of wood or timber yards should be placed at a safe distance from any building Special precautions must be taken in the storing of easily inflammable substances such as oils, paints, etc Fire-resisting doors should be placed at all openings in party walls or other dangerous positions Iron doors are not to be recommended, they are heavy and unreliable, owing to their tendency to warp or buckle when exposed to great heat. Doors made of two or three thicknesses of timber, covered with lap-jointed sheets of tinned steel, are in every way preferable to the solid iron door. "Fire-proof" shutters can be usefully employed in certain cases, but care must be taken that the entire window framing is fire-resisting.

The sprinkler system, though of comparatively recent growth, is now extensively employed in factories, and particularly in cotton spinning and weaving mills. The sprinkler consists of a valve with a half-inch opening, which is kept closed by means of a strut or other mechanism. A fusible solder is employed in one or more parts of the sprinkler. This solder melts at a given degree of heat, and opens the valve, which allows the water to fall on a serrated plate, thereby distributing a fine spray or rain over a comparatively large area. The sprinkler is thus automatic, the heat resulting from an outbreak of fire bringing it into immediate action. The pipes to which the sprinkler are attached, and from whence they obtain their water supply, are fed either by an overhead cistern, which must be at least 15 feet higher than the roof of the buildings the sprinklers protect, or by an automatic self-starting pump. Two distinct water supplies are required for a sprinkler installation, viz., a combination of tank and pump, or a public supply main and pump or tank Sprinklers, however, have now been brought to a state of great perfection, and are generally considered reliable fire extinguishers. A modification of the ordinary sprinkler is the "drencher" sprinkler. This is an open sprinkler or valve placed on an empty pipe, the water supply being controlled by a valve which is opened on an outbreak of fire. The object of this type of sprinkler is to form a sheet or wall of water to prevent the flames passing from one building to another either through a door or windows, and can be used to protect the whole frontage of any building in danger from a fire raging in its neighborhood

The Factory Acts require that special provision be made for the escape of work people in case of fire, and further reasonable provision has to be made for the escape of all persons on stories above the ground floor In every factory or workshop erected after January 1st, 1896, the doors of each room in which more than ten persons are employed must, except in the case of sliding doors, be made to open outwards When the question of extending or altering existing premises arises, it is advisable that considerable attention be given to any constructional features that may be dangerous from a fire preventative point of view, and above all that separation of hazards should not be forgotten. The employer should never forget to consult the officer in charge of his fire service before starting any constructional work, and his opinions should have due consideration.

In conclusion, it may be considered that the protective measures mentioned in this paper may entail too considerable pecuniary outlay. The question of expense should not serve as an excuse for negligence. It must, of course, not be overlooked that the case here taken is that of a factory thrown on its own resources It is, however, advisable, no matter how good or efficient the external help in case of fire may be, that every factory or works should take into consideration the necessity of being prepared for emergencies, whether the necessary installation adopted be a small or a large one. And where an installation is once provided, there should be every effort made to ensure proper attention being bestowed to the maintenance of a high standard of efficiency An effective, well-planned, and carefully inspected fire-protective plant will immediately repay any expense when the moment of urgency arises. Those firms (and there are many) which have already given this matter their serious consideration, keeping efficient fire brigades and installing the necessary fire-extinguishing plant, have had no reason to regret their outlay on such precautionary measures

WHAT PHYSICAL AND CHEMICAL INFLUENCES PRODUCE THE EFFECT OF MERCERIZING COTTON.

In The Revue Generale des Matieres Colorantes Messrs. Fraenkel and Friedlander describe experiments to determine what physical and chemical influences produce the effect obtained by treating cotton by the Thomas and Prevost mercerizing process.

Caustic alkalies in cold solution and at a certain degree of concentration exercise a remarkable influence on cellulose. Solutions of caustic soda exceeding 10 per cent. strength at the ordinary temperature modify the structure of cotton fiber in such a manner that the original flat filaments are transformed into a thick cylindrical shape with a sunken central cavity. This effect is manifested in woven fabrics by a shrinkage in the length and width, and by a corresponding increase in thickness, the fabric at the same time becoming transparent. These changes are attributable to a decisive reaction between the cellulose of the fiber and the alkali, a reaction occurring in the molecular proportion $C_6H_{10}O_{5=2}NaHO$, and accompanied by combination with water. The compound thus formed is decomposed on washing with water, which removes the alkali and leaves the cellulose behind in a modified form—namely, the hydrate $C_6H_{10}O_5H^2O$. If the alkali cellulose compound be treated with alcohol, one-half of the alkali passes into solution, leaving the remainder combined in the form $C_6H_{10}O_5NaHO$. This constitutes the reaction to which the name of "mercerization" has been applied in honor of its inventor, John Mercer. It is probable that the modifications which the cotton undergoes during the foregoing treatment are partly physical and partly chemical. To the latter belongs the action of the caustic soda, resulting in the formation of a readily decomposable cellulose sodium salt, which when washed decomposes and leaves a hydrated cellulose, with increased capacity for fixing dyes and mordants. The physical change effected in the fiber is undoubtedly due to the alteration in volume which is connected with the transformation of the cellulose into its sodium compound.

This explanation, however, although sufficient in respect of the phenomena of mercerization in general, falls short when applied to the observations made by Thomas and Prevost, who showed that the fiber when mercerized while under tension, assumes a different aspect. An explanation of this difference may be found by microscopical examination of the mercerized fiber. The fiber in cotton, as is well known, is covered by a thin skin of cuticle, which varies in thickness according to the kind of cotton, and has a surface more or less roughened in appearance. This skin can be isolated by dissolving out the cellulose by the aid of ammoniacal copper oxide, which causes the distention of the fiber, finally resulting in the rupture of the insoluble skin. Now the microscopic examination of mercerized cotton shows that the fiber, which has then a light silky lustre, and is strongly attacked by bleaching and washing, is entirely destitute of cuticle. The fiber appears quite cylindrical and perfectly transparent, owing to the absence of the rough cuticle, and the conditions necessary to impart a silk lustre are thus entirely fulfilled. The threads, laid as closely together as possible, side by side, form a surface capable of reflecting light. This physical effect is due particularly to the absence of the cuticle, and it is therefore evident that the classes of cotton best suited for the mercerization are those in which the cuticle is least developed, and therefore the most readily eliminated. The nature of the cuticle of cotton fiber is not yet thoroughly understood. Witt considers it as an oxycellulose, but this appears very improbable—for then cotton would possess dyeing properties which it has not. Kulger and Gilsen have made some valuable observations on cork, and the former detected a considerable quantity of fat in suberine. He isolated a crystallizable phellenic acid from cork, while Gilsen isolated cerine, glycerine, and a new acid, phloionic acid, as well as suberic acid. This observer having indicated a characteristic reaction of phellenic acid, the test was applied to cotton, but investigations tend to show that Gilsen's alleged color reaction is based on some error. On the other hand, from the properties of the products extracted from cotton by treating it with 3½ per cent of alcoholic potash, subsequent to extraction with alcohol, ether and sodium carbonate, it is quite probable that the cuticle of the fiber is really a suberous substance. The definite proof must be postponed until a characteristic reagent for phellenic acid shall have been discovered.

The practical significance of this observation is that in all cases the cuticle is dissolved in part by the caustic soda, but that the greater portion is separated by the distension of the fiber, which, in conjunction with the tension exerted during or after the operation in the Thomas and Prevost process, results in its entire removal. Other reagents have been tried to ascertain if the same results could be obtained as with soda, and in particular the action of alcoholic soda was investigated.

When cotton is immersed in a 10 per cent. solution of caustic soda in 96 per cent. alcohol, no effect of mercerization is noticeable, even after prolonged exposure to the reagent. When removed from the liquid the fiber at first preserves its original length and appearance, but after being left in the air a short time while damp the fiber contracts in length and then elongates anew, but it is permanently shortened and appears to be mercerized. If subjected to tension after removal from the alcoholic lye, and washed while still extended, it furthermore assumes a silky lustre. The effects thus obtainable leave nothing to be desired, in comparison with those produced with aqueous solutions. In this case the mercerization is effected by the moisture of the air to which the cotton fiber, moistened with the alcoholic solution, is exposed, and, in fact, if the operation be carried out in the absence of water and atmospheric moisture, with a solution prepared with metallic sodium in alcohol, and then washing with absolute alcohol, no mercerization takes place. The water attracted by the fiber moistened with the alcoholic solution is that necessary for the formation of the sodium compound of cellulose, which is transformed into hydro-cellulose by a larger proportion of water. When the fiber is boiled in alcoholic lye and exposed to air, mercerization also occurs, the sodium compound being formed on withdrawing the fiber from the liquid, but apparently boiling increases the amount of cuticle dissolved.

THE COTTON SITUATION.

Alfred B. Shepperson, the eminent cotton expert, of New York, in a recent contribution to a New York journal gives his views of the present cotton situation and epitomizes salient features as follows: First.—The large receipts of the American crop since September 1 (the beginning of the season) and the large visible supply at this time. Second.—The unusually large quantity of cotton still in the fields and the uncertainty as to how much of it will be saved, and in what condition. Third.—The large proportion of stained and low grade cotton, with the correspondingly small proportion of high grades in the crop. Fourth.—The improved condition of the cotton-goods trade in this country.

He states the quantity of our crop which has come into sight as about four hundred thousand bales greater than to the end of December last season, 1,300,000 bales more than the previous season, and 700,000 bales more than the season of 1894-95, in which the largest crop was ever marketed, except the crop of last season.

"It is to be noted," said Mr. Shepperson, "that the increase in our exports this season over last season is several thousand bales greater than the increase in cotton brought into sight, thus offsetting to a certain extent that depressing item. As the crop has been marketed with great rapidity it may well be questioned if the present increase in receipts over previous seasons will be maintained to the end. Should this gain be held, however, a comparison with last season would indicate a crop of 11,000,000 bales, while only 10,000,000 bales would be indicated by comparing with the season of 1896-7 and about 10,600,000 bales by comparing with the large crop of 1894-95. The weather conditions in the cotton belt since October 1 have been in striking contrast with the remarkably favorable weather of last season for maturing and gathering the crop. Killing frosts were unusually early, being quite general from October 27 to 30, and I think that these frosts and the subsequent frosts curtailed the yield materially. The crop was a late one and therefore more than usually subject to damage in quality and less in quantity by early frosts. Whatever others may think about it, there is no doubt that those who sold good grades of white cotton (middling and above) for December and January shipment have now a very lively realization of the effect of frost and rain on the quality of cotton, for they are finding much difficulty in filling their engagements. My advices leave no room for doubt that high grades are relatively, and at some points positively, scarce, while 'stained' and low grades are plentiful. The frosts which stained so much cotton undoubtedly destroyed an immense number of immature bolls, and thus reduced the earlier promise of the crop. Spinners prefer good grades of cotton much more than formerly, and when prices are low the undesirable growths and grades are almost unsalable. A few weeks ago not a bale of India cotton was reported in the Liverpool sales for the entire week, and the same conditions existed during the great depression in prices in the fall of 1894. The large proportion of low grades in the crop will undoubtedly serve to enhance the value of the good grades and to minimize the depressing effect which large stocks usually have upon prices.

"Latest advices from Egypt are that the Egyptian crop will probably be less than last season by the equivalent of 100,000 to 150,000 bales of our cotton, with an unusually small proportion of good grades. In consequence of the comparatively small quantity of good grades there has been an advance in 'good fair' Egyptian cotton in Liverpool and in Alexandria, between October 21 and December 16, equal to 1½ cents per pound, while the advance in American middling upland cotton in Liverpool during the same period was equal to only 3-16 cent. Some of my friends who deal in Egyptian cotton are confident of a further advance of 1 cent per pound in a few weeks. Is not this suggestive of what might possibly happen for American cotton when the inferior character of our crop is generally known? Estimates differ as to the probably quantity of unopened and opened but unpicked, cotton in the fields when the October frosts occurred It is probable that the equivalent of about two and a quarter million (2,250,000) bales would be a fair estimate. The most of this cotton has been more or less damaged, as frosts and rains have been frequent in November and December, and a great deal of it is still unpicked I doubt if very much will be utterly destroyed, and still less will be abandoned The most of it will doubtless be gathered, but will be of low grade, and some of it will probably serve no other purpose for a long time but to be counted in 'stock,' or to be delivered and redelivered on contracts for 'futures' I doubt if the crop will be over 11,200,000 bales, and the spinning quality will be lower than any crop of recent years The visible supply is now the largest on record, being about 800,000 bales more than at corresponding time last year, but only about 200,000 bales more than in 1894. The consumption of the mills of Europe and America is also larger than ever before, being fully 220,000 bales (of 500 pounds net) per week, and in addition to this we will probably ship an average of 3,000 bales per week to Japan, etc Europe and America alone are consuming this season fully a million and a half bales more cotton than in the season of 1894-95, and the increased consumption requires larger visible and invisible stocks to be carried. Cotton is to-day relatively the lowest in price of our staple products. I think it is also the cheapest. It is an article of such large and increasing consumption that the volume of business in it will not permit the price to remain stationary. It must fluctuate, and while there does not seem much room for a downward turn there are great possibilities in the other direction.

Stoddard, Haserick, Richards & Co.'s Egyptian cotton market report of January 11 says that during the week the market has shown considerable firmness and advanced ¼c. Their latest estimate of the crop is 5,500,000 cantars, and this estimate is practically confirmed from all sources. The total shipments from Alexandria for the first four months show a falling off of about 50,000 bales.

Foreign Textile Centres

MANCHESTER.—"As usual at this season—the end of the year—business matters have to a large degree been laid down, and social pleasures accorded their place. The prosperity of the past six months has developed a disposition to do this more freely than has been seen for some years past, and has also justified it," says The Textile Mercury, Manchester. "We close the year 1898 under cheerful auspices and with a fairly strong assurance that its successor will open auspiciously; if not on its merits, it will on the engagements handed over by its predecessor. What 1899 may have in store for us, of which no shadow has been cast before nor beam of light projected in advance, it would be idle to predict. If good things, they will bring their own pleasures at the time, and if otherwise the knowledge of trouble will come early enough. The new year commences with a fair margin of satisfactory orders in hand, and prospects are satisfactory and clear, only one small cloud showing on the horizon. This is the revival in the East Lancashire districts of a movement for an advance of wages. At present no one regards it seriously, but there is always the contingency that there may be a change of aspect and character in that respect. We wish all our readers pleasant and prosperous times during the year upon the doorstep of which we are now standing." The Drapers' Record, London, records improvement in the Manchester distributing trade during the past few months. There has been a better feeling as far as heavies are concerned, but the stocks on hand are in many cases larger than is consistent with profitable departmental working. Occasionally happy selections have been made in regard to styles, and this has enabled buyers to regard with equanimity the magnitude of their holdings. In only a few cases, however, is this remark applicable.

LEEDS.—The best worsteds are firm, but the melton trade is dull and slow, being largely dependent upon shipping orders, which are now very scarce. For more than a week there has not been any United States business worth reporting. Makers of army cloths, however, are too busy to stop their mills for more than two or three days.

BRADFORD—It is quite evident, however, that the prices of all kinds of fine colonial wools, such as merinos and fine crossbreds, are quite firm, with a tendency in the seller's favor, says The Drapers' Record, and as there have been no cheap lots

offering for some time past, the position of holders of these merino wools is quite strong. Lower classes of crossbred colonial wools have been in poor demand for the last twelve months, and prices have gradually fallen away until the combed tops made from these wools could be purchased at a price fully 10 per cent. lower than anything previously known. This state of the market has been the result of a strong combination of causes, such as the discontinuance to a large extent of the use of braids made from these wools, the reimposition of the wool and weight duties on American imports, and the substitution of smooth-faced cloths for serges in both men's and women's wear. Following a well-known rule of commercial economy, however, this unusually low level of prices has at last begun to attract increased attention to fabrics made from low crossbred wools, and already the prices of 40's tops have been advanced fully a ¼d. per lb., *and there is every indication that an upward move* ment of considerable importance has already set in. Bradford has laid itself out more especially to deal with combing crossbred wools of both the finer and coarser kinds, and is to-day practically without a competitor in the preparation of the yarns made from them, as is proved by the fact that both France and Germany import practically the whole of their supply from this district. No doubt serges for dress goods are made largely on the Continent from yarns spun there, but these yarns do not possess either the strength or the wearing properties of the Bradford made serges, and on account of being filled are liable to retain creases and damage quickly from rain or damp. Filled serges are also unsuitable for the application of showerproof or unshrinkable finish processes There is not much change in the demand for the ordinary run of non-lustrous English wools, but the best bright wools are more enquired for. Raw mohair and alpaca are *quite firm at the recent advance, and as only a* very small portion of the present year's clip now remains outside the control of the consumer, we may look for the present level of prices to be at least maintained for some months to come. The dress goods trade is quiet, affected no doubt by the attention just now being given to fancy goods and the imminence of stock-taking; there have, however, been one or two important London buyers in the market recently, who have displayed considerable interest in bright goods for the coming spring, and also in clearing lines of winter fancies. The prospects of Bradford dress goods for the coming spring season are distinctly improving, especially in regard to both plain and jacquard mohairs, and the high-class mohair crepons, which had been to some extent neglected lately, also seem to be returning to favor in the home market, following no doubt the lead of America, where they have all along been good property Every recent season seems to have emphasized the distinction between dress materials for indoor wear and those for walking purposes, and there is every appearance of light-weight fabrics, cut very full, being worn for house dresses, whilst heavy clothing tailor-made cloths will be required for costumes. Bradford is laying herself out to fill the bill in both respects. The production of fancy silk goods for blouse purposes is a department of the trade which has shown very considerable expansion lately, and all the makers who have devoted their special attention to this branch of the trade are full of orders, and have produced some most effective styles.

KIDDERMINSTER.—Manufacturers, while they do not speak exuberantly with regard to the year, will no doubt find the stock-taking, which is now in progress, come out as well as for several years past, says The Kidderminster Shuttle in the review of the year. The year has been free from any exciting incidents. The price-lists which were in force at the commencement are still the basis of business transactions at the close of the year. The volume of trade has been from 2 to 3 per cent. better than in the previous year—certainly a movement in the right direction, while the travelers who are now at home are full of expectancy with regard to the spring season. At the commencement of the year there were distinct indications of a revival in the demand for the best qualities of Brussels and Wilton carpets, and many a 6-frame cut-pile loom which had been idle was set in motion. This has been the feature of the year's trade, and the assurance is given that the demand will be more than maintained in the immediate future. No doubt the vast development of the Royal Axminster trade has led to this revival, so while that special industry has had its drawbacks so far as male labor is concerned, it has been attended with satisfactory results in other respects. Some of the best retail houses have broken away from the bad habit which had grown up of late of giving their orders from hand to mouth, so to speak, and have learnt *to anticipate their wants, but many dealers still need to be educated* in this respect. It is the number of small urgent orders —inevitable of course to a certain extent—which have such a disturbing influence with the manufacturer in calculating the cost of production, and sometimes leads to rather strained relations with the carpet weavers.

NOTTINGHAM.—Business generally has been at a standstill all the week until yesterday, when the factories and warehouses once more resumed the even tenor of their way. Prior to the holidays there was a great effort made to clear off as many orders as possible, and consequently in many cases stock-taking was able to be proceeded with almost without interruption. It is to be feared, from the general trend of business during the year, both in the lace and hosiery departments, that the results, when the balance sheets are made up, will not be so satisfactory as could have been wished. Both departments have had many adverse influences to contend against during 1898. It is to be hoped that the coming year will make amends for past bad seasons, and that an era of prosperous times will dawn for Nottingham. In the fancy millinery lace departments few advance orders have been booked. America and the colonies have sent a few, but the demand for the Continent has fallen extremely low. The pattern-rooms have been kept busy, and although no startling novelties have been introduced, it is expected that the newest assortments in Torchons and Valenciennes will find much favor in the new year. Oriental laces are not so much enquired for as formerly, and other millinery laces are somewhat erratic in their movements. Silk laces are all in a stagnant condition. The plain branches show very little falling off; in fact, these goods have sold phenomenally well for a long period. The hosiery trade has been affected by the mildness of the weather and the paucity of orders for America. Cotton goods have shown no improvement in either demand or price. Foreign competition has had a great deal to do with the falling off in these goods. A few specialties in cashmere hose and larger underclothing have been moving; but, taken all round, prospects in the hosiery trade are far from bright.

LEICESTER.—The hosiery trade is now fairly active for choice fabrics and specialties, but heavy goods are depressed and repeat orders are extremely small, although stocks are low The export trade with South African, Australian, Indian and Canadian markets is of fair extent. In the yarn market there are more enquiries for covering all prospective needs, while spinners are in a stronger position, and decline to book orders unless at prices which show a fair margin of profit. Cashmere yarns of the finest quality are firm, lambswool and fancy yarns are steady, but there is a poor consumption for cotton yarns

KIRKCALDY.—*The Dunfermline and Kirkcaldy linen manu* facturers have had a fairly satisfactory year The linoleum industry during 1898 was exceptionally active, and that, too, at remunerative prices.

DUNDEE.—The year closed with a much better hope for the future than it was possible to cherish two months ago. The stocks of jute goods have been—chiefly by an unexpected demand from the Plate—entirely cleared out. Manufacturers have their order books full till the end of January and the price of hessian has risen. It is true that no great profits have been made, but the balances generally will this year show on the right side. Work has been abundant, wages have been good, and multitudes of the working people have saved money. The one unpleasant feature at the moment is the short crop of jute, which is arriving in small shipments and in bad condition. This is bound to tell on those who have small stocks and who are forced to buy.

BELFAST.—There is little if any change to report in the linen market, business being on the whole of a fairly satisfactory character considering the stock-taking and holiday season. It is anticipated that trade will brighten up at the beginning of 1899. Business has been at a standstill, owing to the holidays. The curtailed production, particularly in the spinning branch, where there are signs of an early improvement, will help the market. Prospects for the immediate future are considered hopeful. The American trade exhibits gradual recovery, and from Cuba a substantial improvement is confidently expected. Continental buying is fair, but might be much better. Nothing much is looked for on home account till the middle of January. Orders for execution in January and February keep dropping in to a very promising extent, and prices show a stiffening tendency.

LYONS.—The market has been very quiet during the week under review. No buyers were on hand during the holiday season, and sales from stock were therefore very small. Neither was there any demand from the Paris houses for delivery of their orders, and a late season seems therefore to be expected. The mills, however, are well employed, but on hand looms more weavers could be utilized if they could be procured, as the production of the most fashionable fabrics, the different styles in taffetas, make but slow progress. Wages have therefore been materially increased, and weavers are now in just as good a position as they were twelve months ago. The mills hold good orders on plain taffetas in colors and glaces, but low-priced fancies seem to predominate, for which the number of hand looms appears to be insufficient for the moment. Aside from taffetas, there are good orders for black and colored damask, and the usual number of looms are busy on the light-weight fabrics. In general the outlook for broad silks is very promising, and, although the season may be a little late, a satisfactory spring business is expected. The demand for velvets continues good, especially in schappe grades. All silk goods are less sought, the demand for these being confined to some special colors. Emerald and violet were most in demand during the week. Fancy and pekin velvets on taffeta grounds with warp print effects are growing in favor. Orders for these are increasing, while plands are becoming more and more neglected. The ribbon trade has not changed since our last report. Some checks and stripes in wide widths are sought but on the whole the ribbon trade is unusually quiet.

CREFELD.—The market has been very quiet, writes the special correspondent of The Dry Goods Economist, New York. Retailers did not buy during the holiday season, and the close of the old year had its influence on the wholesale houses. Despite the apparent lull however the outlook is very promising. The spring orders have been placed earlier than usual, and in fair numbers, so that the mills are well provided with work. The strike in the broad silk mills having been settled the looms are all running again and deliveries of goods will soon be made. The manufacturers hold few stocks having been able to run their looms almost exclusively on orders. As the supplies in the hands of wholesalers are also generally light, good repeat orders are expected soon. Some difficulty, however, is anticipated with regard to prices. All wages have been increased in consequence of the strike, and as there is besides a renewed advance in the cost of raw materials it will be impossible to accept repeats at the old figures. Some of the manufacturers are therefore less sanguine, and fear that the changed conditions of our industry will have to stand a severe test. It is considered very fortunate under these circumstances that fashion remains so decidedly in favor of silks. There is no change with regard to the velvet trade. The demand for goods from stock is slack and few new orders are being received. The majority of the mills are therefore working only short hours in order to avoid the accumulation of stocks.

MILAN.—The market has been recently marked by increased reserve on the part of both sellers and buyers. The demand was good for various grades, but deals were less numerous on account of the high prices, on which holders appear unwilling to make any concessions. Transactions were rendered difficult also by the scarcity in certain grades. Medium and lower grades of greges were sought by spinners whose orders could not be filled on that account. The better greges, however, were bought for America and some sales were also made to Lyons and to Russia. There was a better demand for the best grades of organzines in which several transactions of importance were concluded. The demand for Asiatic grades was slack, but the advance obtained during the preceding weeks was fully maintained. Taking into consideration that the holiday season is little adapted for the development of an active market and the very firm prices which rule at present, the outlook for the coming season appears as favorable as could be wished.

ZURICH.—The demand for raw silk was more active during the week under review. The high price for Italian grades, however, and the disposition of the holders to rather increase their pretensions than to make any concessions rendered deals difficult, and only a limited number of transactions could be concluded. In Chinas some important purchases were made at slowly advancing prices. The demand for Japans was only moderate. In manufactured goods little was done, as is usual during the holiday season. The mills, however, are busy on their spring orders, which are now being prepared for shipment. A fair demand appeared for wide widths of marcelines, in which stocks are small in consequence of the low prices which had lately been paid for these goods. Prices have improved under the present demand, and these fabrics are now being put into the looms again.

CHEMNITZ.—Hosiery is selling, but in no very big bunches. A few stock lots in odds and ends of last year's fancies, left over because of the "busted boom," were sold yesterday at very low prices. The Knitter's Circular wonders sometimes that people are able to push the screaming greens and yelling "yallers" at any price. Staples are going well at fairly good prices. As the year nears its end, everyone is asking, in eager tones, what the prospects are for '99. Ninety-eight will not go into the red letter list. To stand still is to go back, but to actually fall off, as indicated by the big falling off referred to above, is to give cause for alarm. Cotton spinners and machine makers are marking broad margins of profit in their books when balancing. As high as 28 per cent has been recorded by the Muttweida Joint Stock Spinning Company. From centre to suburbs the city is being transformed, new buildings are taking place of the old. Many of these are magnificent. English buyers are numerous. Direct orders from America are no longer numerous. A few fancies were sold, simple ones, soft in color. Jacquard patterns are being put forth and taken as fast as offered. "Extracted" goods are going as fast as

found. Polka dots are most in demand in this line. Printed hose, that no one wanted or would look at some weeks ago, is now in demand. Embroidered goods have gone well all year, and are going now. Open work, lace-like in appearance, is much favored. Richelieus, Rembrandts and ribbed goods have gone well too. In some lines supply is not nearly up to demand Staples of all kinds went fairly well at fair prices. Of course, you cannot have forgotten the reductions recorded in prices in the last two or three years, they are astonishingly low The process of peeling off profits resembles very much that of being skinned alive. Manufacturers must writhe A meaner system than that so successfully employed by some parties for forcing down prices was never employed Commendable efforts are being made by the biggest and best manufacturers to find a way to wipe out this evil.

THE TRANSMISSION OF POWER FOR WOOLEN MILLS BY ELECTRICITY.*

BY C. J. H. WOODBURY, BOSTON, MASS.

A conservative manufacturer naturally looks to precedents, for experimentation in machinery is an expensive process, uncertain in results, which if successful are apt to make him a philanthropist in spite of himself, and this raises the general average only to leave conditions of competition relatively as before. In calling your attention to electric transmission of power for woolen mills there are but few precedents in this line of manufacture; yet this method of distribution has been so widely installed in other textile industries, and throughout such a miscellaneous range, that the mechanical portions of the problem are now well established, and a purchaser can as definitely contract, from any one of numerous manufacturers, as to price, time of delivery, and guarantees for an electric transmission, as for the steam engines, boilers or water wheels which operate them. It is but natural that the woolen industry as a whole should not have given as much attention to questions of mill organization, outside of the design of productive machinery, as some other textile industries, on account of the relative insignificance of these elements to the whole value of the product. The machinery tributary to the fabrication of the goods lies midway between an expensive and variable raw material and a finished product in which design forms an essential factor An appreciated pattern covers a multitude of sins of manufacture

The problem of power generation and distribution is an essential factor in determining the design and operation of manufacturing property. Passing by earlier mills operated by horse power, which were not extensive enough to be considered organizations, the first mills were driven by undershot wheels, and this required the placing of the mill at the side of the stream, with the water wheel at the end of the mill. Further development of the breast wheel, which was placed at the face of the dam, in turn required the building to span the water course, and with the overshot wheel of later date, there was an opportunity for the farther separation of the water wheel from juxtaposition with the dam, and mill designs became more free in consequence. But these early utilizations of water power were necessarily made on rapid streams, which generally flowed through close valleys, in which the mill building, on the narrow space between the canal and the river below the dam, was necessarily narrow, and the floor area obtained by a building of many stories, which was most firmly trussed at the top, thus originating what was known as the factory roof, with its unavailable spaces of no use in manufacturing, and which proved such a costly experience to underwriters, for when a fire reached those spaces the mill was generally "well sold." The turbine water wheel was necessary to permit the development of the modern mill, as the trunk supplying the water as a part of this system could increase the distance from the turbine wheel to the dam, and mill organization reached an important stage in its development. The introduction of the steam engine for driving textile mills rendered the design of the building still more free, as the mill could be increased beyond the natural capacity of the water power, and was not bound to a water power, but could be placed where freights, abundant labor, or other conditions were more advantageous. Yet the conditions of the transmission of power through the mill were exacting, although continued improvements were feasible, many of them being introduced as the result of experience with fires in power transmission, and it was this cause which developed the closed belt tower from which the power was communicated to the several stories along the shafting, rather than by means of belts.

The subject of this paper prevents further allusion to the other improvements in mill construction made possible by the progress in power transmission. Mills have been made broader, better lighted, more fully adapted to economical organization of machinery, with reduction in cost of supervision, but the whole has been an inorganic evolution of that complex organization which constitutes a textile establishment. The latest step in this development is the electrical transmission of power, which requires only space for the wires, and leaves the mill engineers perfectly free to design the mill for its manufacturing organization as a producer of goods, without reference to provision for the communication of power to the machine, knowing that he is equally free to have a single motor in each room or to divide the machines into groups, or even attaching motors to each of the individual machines; in the latter case not merely driving by belt, but motors may be attached in such a way as to form an integral part of the tool. The uniformity of speed, without the losses due to the creeping of belts, by change of length in their passage around pulleys, in their alteration from a tense to a relaxed condition. In its independence of position a new mill may be placed away from the source of power, but for existing establishments the present power may be increased by using distant water powers. There is a well-known water power in the United States which has been on sale for many years. The dam and canal were built, and time and again enterprising men attempted the exploitation of the privilege, but when the site was critically examined by engineers it was found that the banks of the river were of such nature that it would be expensive, and perhaps, from the imminency of land slides, impracticable to place mills below the canal. Within a few years this water power has been developed, the banks being ample to suport a light building for the water wheels, and generators which furnish electricity to operate mills in a neighboring city.

The purpose of this paper is to present to your consideration the proper place of electric apparatus in the transmission of power from the steam engine or water wheel to other parts of the establishment, in comparison with belts or ropes, in the same spirit as considering the usefulness between belt and rope driving, or one engine as a unit of power, or many similar engines, notwithstanding elements of mutual advantage, yet the problem of power distribution in each plant is, within certain limits, a study to be worked out by itself, yet I wish to call your attention to some of the principles involved in the electric transmission of power without going into technicalities, which are live issues only to those identified in the business Sometimes the questions are presented in a manner comparable to the remark of the Oxford Oriental scholar who declared that everybody knew a little Arabic. The motor in its first inception, or I might say accident, was a reversed dynamo, that is, a

*From a paper read at the thirty fourth annual meeting of the National Association of Wool Manufacturers, at Boston, January 11, 1899.

dynamo will generate electricity if power is applied to the driving pulley. If electricity is applied at the binding posts, power will be given off at the driving pulley; but the reason that electricity causes the armature and shaft to revolve is because a conductor conveying electricity is subject to the attractions and repulsions of magnetism. This is best illustrated by an incandescent lamp whose filament is absolutely inert to magnetic attraction when the lamp is not illuminated; but if a current of electricity is passed through a filament, raising it to incandescence, it can be easily bent to and fro by a magnet. A single suspended wire of copper conveying an electric current, in like manner responds to magnetic attractions, although inert when there is no electricity in the wire. The armature of a direct-current motor consists of insulated copper wires coiled lengthwise and radially in grouns parallel to the line of the armature shaft; and when one of these loops conveying electricity comes within the range of the magnets it is pulled by magnetic attraction to a closer positive. But on reaching there it would stop if the electricity was not removed from that coil, which becomes for the time being as useless as a squeezed lemon. And at the same time the electricity is passed into the next coil, and in this manner, step by step, the magnet always reaching after the unattainable, like a shadow chasing a phantom, the armature is caused to revolve, the magnetism attracting the several electrified coils on the armature, step by step, as in a treadmill. In short, by these magnetic attractions cars move, factories are driven and the whole great application of electric power, which now exceeds 200,000 h.p. in the United States, is moved by magnetic attraction as truly as when a small magnet moves a nail or other piece of iron.

The characteristics of electric currents in their applications to the transmission of power can be very widely changed to conform to any purpose which may be desired. As in the case of belting and pulleys by which speed can be increased or diminished with the inverse effect upon the power, so the electrical pressure can be raised or lowered in inverse ratio to the amount of the current transmitted. It may be sent at a continual pressure, or in waves following and superimposing on each other, and the various methods of application of these complicated electrical problems has, however, fortunately resulted in relatively simple machinery, whose management can be readily undertaken after a very short instruction, and is certainly as simple as that of electric lighting. In the general type of motors operated by wavelike currents, the operation is quite different from that of the direct current motor, to which reference was just made, and for the present purpose it may be referred to as an arrangement by which the magnetism resulting from waves of electricity in the wires upon the magnets causes the magnetism to travel around a large circular magnet, comparable to a hat rim, and by the same stretch of the imagination let the hat band represent the electric wire causing the magnetism. The electrical conditions which caused this magnetic motion in the iron, also produce by their inductive effect, currents in the armature, which during operation has no electrical connection with the outer wires; and this may be compared to a ball of twine held within the center of the hat rim.

Whenever the magnetism revolves through this iron, the attraction draws the electrified wires in the armature, which are rendered susceptible to attraction by the electricity produced in them by induction; and therefore, the armature revolves, following the magnetic field, and this rotary motion in a synchronous motor gives a speed as uniform as that of the generator from which it obtains the current, the armature turning in unison with the rotation of the magnetism which attracts it. There are other motors which operate in a reverse manner, by the current from the generator upon the armature circuit, and thence causing currents by induction in the wires upon the magnets; and there are still further modifications of the two extreme types. But this is no place to follow the details of these types of motors. But it should be said that these organizations of plants installed during the last few years are well constructed, more simple in management than steam motive plants; are economical in operation, and, in short, are practical tools in the service of man.

The relative cost of electric and mechanical transmission is practically a question of distance, because with the increase of distance the additional expense is merely that due to increased cost of carrying the copper wires to a greater distance. The question of attendance, however, is such that it is doubtful whether great advantages are gained for power plants of under 100 h.p. The elasticity of the system is such that it can be extended for other power uses, of which comparatively little application is made in mills, among which may be considered the use of elevators, traveling cranes in storehouses, and also electric railways for transportation around the mill yard into the building and off to the railway station or wharf. There is a great distinction to be made in the advantage of electric transmission to new or to old plants. In a mill newly constructed and designed with the purpose that the power shall be transmitted by electricity, this forms one of the many advantages that such a plant might possess; but in an existing mill the mere substitution of an electric transmission for belts in a single building may or may not furnish advantageous conditions of manufacturing, but if the method enabled the introduction of a cheaper power the advantage would be apparent to those who pay the bills. The methods by which electric transmission is to be applied to existing mills need careful study in each case to determine the point of greatest economy in the abandonment of existing shafting, and the rental value of added floor space furnished in many instances by the removal of belt porches. The value of a method of transmitting power is not to be measured entirely by its first cost or expense of maintenance, but rather by its relation to the production of the mill. For example, electric lighting costs more than gas and gas more than kerosene oil for mill lighting; yet the value of electric illumination has made its use general, largely on account of the reduced percentage of seconds manufactured under artificial light. It is a well-known fact that a few years ago summer-made goods of standard lines of textiles were preferred to winter-made goods because on account of the larger proportion of artificial light there were more imperfections in the winter-made goods.

The question of skilled attendance is one which is natural, but the concensus of opinion appears to be that the grade of skill is no higher, and certainly less elaborate, than in the case of electric railways, where the motorman is trained for his duties in a very short time, the greater part of which is devoted to learning the signals and rules of the road. A power transmission requires less attendance than an equivalent electric lighting plant. The hazard of a breakdown appears to be less than that of steam motive plants. Some types of motors cannot burn their armatures, all of them have protective devices against overload; which is the cause of such accidents. The fact that motors perform their work beneath street cars, indicates under what extremes of jar and exposure they will operate.

In summary of the advantages of electric transmission of power worthy of your consideration as woolen manufacturers, it may be said in partial repetition of what has been already submitted: The organization of a new mill plant may be designed independently and without reference to the transmission of power to each room, except to provide for the conducting wires. In any mill property a steam power plant may be concentrated. The speed may be uniform and positive, and the creeping and

slipping of belts avoided. The power to any circuit may be applied or withdrawn by means of a switch. The power may be measured at any instant as readily as steam pressure is ascertained by a steam gauge. The weight of shafting is reduced from 10 per cent. upward, and among other matters, it tends to cleanliness and better lighting. Lighting and power may be obtained from the same plant, although it is generally preferable to have different circuits. Its flexibility is beyond comparison with present methods, unless there may be some comparison between miles of wire and the short spans of belts or rope driving. Mechanical driving is generally cheaper in a single building with a single source of power. While it is capable of sub-division to small units, yet it is not to be generally recommended in this instance for less than 5-h.p. motors where larger units may be provided. The same power can be used for tributary purposes of a mill as elevators, especially those in storehouses, and power railways for transportation of raw material, supplies and product, around the mill yard into the building, or to the shipping point. It is especially applicable to portable power in repairs. It reduces the fire risk in the abolition of belt porches. It is not probable that a fire ever gained headway in an open belt porch, which did not extend to destructive results in a mill, except when automatic sprinklers stopped such fires in their infancy. The ethereal attraction of the magnet has solved problems of sociology in transporting people to homes outside of crowded cities where they earn their livelihood; it is giving value to water powers; it is a step in advance in concentrated methods of manufacturing, vouchsafing with its colleague, the electric light, the blessing of enlightened civilization.

E. A. SMALL & CO'S. CREDITORS MEET.

A meeting of the creditors of E. A. Small & Co. was held in the Council Chamber of the Board of Trade, Montreal, Jan. 20th. W. C Kains occupied the chair, and A W. Stevenson acted as secretary. After Mr. Stevenson had presented a statement of the creditors of the firm and a tabulation of the assets and liabilities, the following resolution was adopted: "That a committee of creditors, consisting of R. R. Stevenson, D. Morrice, A. C. Karns, John W. Shaw, W. J. Stephen, George H. Bishop and John Turnbull, be and are hereby appointed to take into consideration any offer of composition that may be made by the firm, and report on same at as early a date as possible." The statement of liabilities and assets is as follows: Assets—Stock, $84,909.30; furniture and fixtures $5,670.90; book debts, $10,226.09; lot in Winnipeg, $2,500; interest in Amherst Park, $1,000; stocks, $30,300; total, $146,626.29.

Liabilities—Privileged, $3,305.15; ordinary, $263,794.71; W. Pitfield & Co., St. John, N.B., $14,212.61; Canadian Bank of Commerce, $56,631.94; total, $337,944.41. Nominal deficiency $191,318.12. The principal creditors are as follows:

CANADIAN AND UNITED STATES CREDITORS.

Rosamond Woolen Co., Almonte, Ont.	$10,774 69
Dominion Woolen Mnfg Co., Ltd., Montreal.	10,691 63
Auburn Woolen Co., Peterboro, Ont.	10,502 98
M. Fisher, Sons & Co., Montreal.	6,106 78
The R. Forbes Co., Hespeler, Ont.	5,195 93
Montreal Cotton Co., Valleyfield, Que.	5,124 67
Dominion Cotton Mills Co., Montreal.	4,227 83
Montreal Woolen Mills Co., Montreal.	4,028 22
Cornwall Manufacturing Co., Cornwall, Ont.	3,617 80
A. W. Brodie, Hespeler, Ont.	3,092 48
Lambton Woolen Mills, Lambton, Ont.	2,952 00
Trent Valley Woolen Co., Campbellford, Ont.	2,747 31
Estate John Gillies Co., Carleton Place, Ont.	2,435 48
The Gault Bros. Co., Ltd., Montreal.	2,189 52
Waterloo Woolen Co., Waterloo, Ont.	1,973 19
George Pattinson & Co., Preston, Ont.	1,767 52
Bank of Nova Scotia, St. John, N.B.	1,587 90
W. J. Stethem & Co., Montreal.	1,560 24
Munderloh & Co., Montreal.	1,511 56
Deckerhoc, Raffloer & Co., New York.	1,068 99
Boyd Caldwell & Co., Lanark, Ont.	1,053 40
Excelsior Woolen Mills, Montreal	1,029 74
Boas Manufacturing Co., St. Hyacinthe, Que.	935 27
Canadian Colored Cotton Mills Co., Montreal.	921 19
Belding, Paul & Co., Montreal.	877 40
Desbarats & Co., Montreal.	684 15
A. A. McDougall & Co., Montreal.	665 01
A. McKim & Co., Montreal.	654 16
Merchants Cotton Co., Montreal.	637 66
J. C. Wilson & Co., Montreal.	630 35
Adam Lomas & Son, Sherbrooke, Que.	582 80
Corticelli Silk Co., St. Johns, Que.	540 83
Watchorn & Co., Merrickville, Ont.	504 28
Hawthorn Woolen Co., Carleton Place, Ont.	495 26
J. Y. Shantz & Son, Berlin, Ont.	484 40
S. T. Willett, Chambly, Que.	478 81
Lamb, Finley & Co., New York.	448 53
McIntyre, Son & Co., Montreal.	419 99
George D. Ross & Co, Montreal.	406 37
R. Roschman & Bro., Waterloo, Ont.	403 25
Foster, Martin & Girouard, Montreal.	400 00
Central Agency, Montreal	371 80
Royal Electric Co., Montreal.	311 56
London Free Press, London, Ont.	348 87
J. S. Thompson, Montreal	311 00
Oxford Manufacturing Co., Oxford, N.S.	282 30
F B. Mathys, Montreal	235 00
Montreal Waterproof Co., Montreal	210 60
Newlands & Co., Galt, Ont.	205 65
S. Greenshields, Son & Co., Montreal.	180 46
Barker, Miller & Gardener, McLeod, N.W.T.	155 40
S. Myers & Sons, St. Mary's, Ont.	152 03
Walker Bros., Montreal	147 64
Standard Shirt Co., Montreal.	133 00
Wm. Skinner Mnfg. Co., New York.	124 48
Millichamp, Coyle & Co., Toronto, Ont.	127 80
German Artistic Weaving Co., New York.	103 11
J. A. Teskey, Appleton, Ont.	102 29
Mrs. E. A. Small, Montreal	127,810 75
The aggregate of claims under $100 is	1,293 10
	$229,016 52

ENGLISH AND FOREIGN CREDITORS.

Joseph Brooke & Co., Bradford, Eng.	$ 6,703 45
Hudson, Sykes & Bousfield, Leeds, Eng.	2,268 54
Brooke, Wilford & Co., Batley, Eng.	1,995 90
John Crowther & Sons, Milnsbridge, Eng.	1,889 15
Robert Noble & Co., Howick, Scotland.	1,853 65
A. & S. Henry & Co., Bradford, Eng.	1,753 45
Jaffe Bros. & Co., Dundee, Scotland.	1,688 98
Schneider & Co., Glauchan, Germany.	1,665 73
R. Pullar & Sons, Bridge of Allan, Scotland.	1,555 46
Chas. Semon & Co., Bradford, Eng.	1,200 03
Edelstein, Moser & Co., Bradford, Eng.	1,029 06
G. R. Portway & Co., Leeds, Eng.	897 11
Hill & Sons, Dublin, Ireland.	858 18
Marsden Mill Co., Marsden, Eng.	834 51
Jas. Drummond & Sons, Bradford, Eng.	791 01
M. Sheard & Son, Batley, Eng.	711 30
Kessler & Co., Bradford, Eng.	605 12

Sir Titus Salt, Sons & Co., Saltaire, Eng.	613 28
Landgraft & Holman, Nachf, Hof., Germany	577 18
Wm Firth, Sons & Co., Bradford, Eng.	572 54
Smith & Hutton, Leeds, Eng.	506 63
Joseph Walker & Son, Huddersfield, Eng	466 82
Nelson & Woolger, Huddersfield, Eng.	361 16
Stephenson & Son, Dungannon, Ireland.	340 46
Athlone Woolen Co., Athlone, Ireland.	323 53
L. N Hardy & Co., Bradford, Eng.	311 47
Joseph Kitchen, Armley, Leeds, Eng.	264 03
Thos. Cresswell & Co., Huddersfield, Eng.	250 98
John Taylor, Ltd., Huddersfield, Eng.	241 65
Halbot & Lens, Bradford, Eng.	233 29
Fox Bros & Co., Wellington, Eng.	169 51
Block & Mellor, Huddersfield, Eng	151 01
Hargrave & Nussey, Leeds, Eng.	144 54
John Gunning & Sons, Belfast, Ireland	140 69
Ashton & Co., Manchester, Eng.	131 19
Borthwick & Ingram, Howick, Scotland	115 60
Jas Nimms & Co., Huddersfield, Eng	114 89
Jas. Clay & Sons, Lowerby Bridge, Eng	98 43
Niemann & Gundert, Barmen, Germany	98 30
Hirsch, Penner & Co., Bradford, Eng	61 14
Park, Hudson & Co., Bradford, Eng	87 96
David Midgley & Son, Bradford, Eng.	54 87
Ferdinand Heilborn & Co., Bradford, Eng	43 41
	$34.778 19

Mrs Small was a daughter of the late H. Shorey, and inherited from her father, $130.000. There was some difference of opinion expressed as to the legality of the claim.

LEVEL DYEING.

The first condition for successful dyeing, says a foreign contemporary, is that the fibers to be treated should be absolutely clean, and especially free from every trace of fat. A careful washing with water is not enough for this purpose; that is doubtless the necessary condition for making the dye to hold on and not to come off, thereby causing a loss of dyestuff, soiling the whites, and giving rise to trouble between the dyer and finisher; it is also the condition for making the color uniform. The washing must be done at a boil, so that the fiber is well wetted out and all the little air bubbles driven out which adhere to it But this is not enough. It must be accompanied by a scouring, not only in the case of fabrics of which the dyer does not know whether they have already been scoured, but also when they have been scoured and bleached elsewhere. The kind of scouring which the fibers have to receive in this case may be of a comparatively light character; but it should never be omitted, even for dark dyes, for the traces of grease which the fibers bring along to the dyeing operations are the causes of many irremediable stains Even in dyeing wool black, it is of the greatest usefulness to have the fiber suitably scoured. The fatty matters which the fibers contain may belong to the components of the fiber itself and be natural matters; but in the case of wool they are mostly dressing oils, of which the dyer cannot be too anxious to free the fabric before dyeing Some practical ways for the preparatory treatment of the fibers prior to dyeing may therefore be described with advantage.

Cotton is boiled off at actual boiling heat, for 2 hours with 3 to 4 of its weight of carbonate of soda and a little soft soap This treatment is sufficient for dark colors; for light colors it is necessary that the cotton be also bleached.

Wool is scoured with soda and soap at 50° C., in the proportion 4 pounds soda and 2 pounds soap for 100 pounds wool

Silk is ungummed for 1¼ hours in a boiling bath with 25 per cent. of its weight of soap. For light colors, a second ungumming is given with 15 per cent.

The careful cleaning of wool previous to dyeing is of exceptional importance. We shall review the process for raw wool, woolen yarn and woolen piece goods. Raw wool is cleaned with carbonate of soda and ammonia. For 50 pounds wool to be cleaned, 3 pounds carbonate of soda and 1½ pounds ammonia are added to a bath of 150 gallons water. The wool is laid down in it for 20 minutes at 35° C., taken up, squeezed, treated for 15 minutes upon another bath with 2 pounds carbonate of soda, and then rinsed. In the case of woolen yarn 50 pounds of goods require two tubs of 40 gallons capacity. The first tub is to contain 35 gallons water and 2 pounds ammonia. After working the skeins for 3 minutes in it, they are left to stand for 15 minutes; they are then wrung, and the operation upon the second tub repeated; finally, the yarn is rinsed several times in soft water Woolen piece goods are placed in a large wooden tub at 40° C., and treated with 4 pounds carbonate of soda and 2 pounds of ammonia for 100 pounds material. The pieces are moved about for 20 minutes, laid down in the bath over night, again turned for 10 minutes and extracted. They may also be handled for 40 minutes upon a bath of ¾ pound ammonia for 100 pounds wool at 60° and then for 30 minutes in clear water at 60° C.

After the wetting or preparatory treatment, it will be best to immediately proceed to dyeing. If the fibers are left in a heap for too long a time, there is danger that they may become heated, or at least that the moisture will become irregularly distributed by the difference of pressure or partial drying, thus causing an uneven fixation of the color in the first stages of dyeing. The two first conditions of successful dyeing are, therefore, a suitable wetting out and scouring. The dyer, however, must be not less careful to see that the dyebath be what it ought to be. Whenever possible, the dyestuff must be dissolved separately, or at least the bath not entered before the dyestuff is well dissolved. Artificial dyestuffs require particular exactness in this regard, because the presence of undissolved particles is the cause of irregularities—of streaks, or, at least, of specks. The solution is mostly made hot, as follows: After pouring water of 80° C upon the dyestuff, stir gently, strain through flannel or through a very fine sieve and pour more water upon the residue until nothing more is dissolved. As is known, the artificial dyestuffs often contain insoluble matter—resin, etc.

The solutions of artificial dyestuffs are ordinarily made at the rate of 1 to 5 pounds for 100 gallons water, 2 pounds being the proportion most frequently taken. This depends more or less upon the solubility of the dyestuff When old solutions are to be used, it is indispensable to first heat them again, in order to redissolve any portion which may have crystallized out. The best way, however, is to prepare only just so much solution as is required for immediate use When pastes are employed, to avoid their drying, care must be taken to keep them in well closed cases, in a cool place, out of the reach of frost as well as of any rise of temperature Before employing the paste, it is indispensable to stir it with a wooden spatula until it is perfectly homogeneous Finally, the surface must always be covered with a piece of linen (muslin) and the lid fastened down upon it.

The dyestuff solution being prepared it must be added to the dyebath in several portions, always taking out the fabric; then the liquid in the tub is stirred so that the dyestuff is uniformly distributed in it, and then the fabric is re-entered Another very important condition to obtain a level dye is to proceed very slowly. We begin, therefore with a feebly-colored bath, enter in the cold and raise gradually to the required tem-

perature. If necessary to retard the dyeing up from the start, an auxiliary mordant is added, such as soda crystals or phosphate of soda for benzidine dyestuffs upon cotton; bisulphate of soda for dyeing azo dyestuffs upon cotton; bisulphate of soda for dyeing azo dyestuffs upon wool; or tartar in nearly all dyes. Tartar gives, besides, a soft touch. Finally, it is indispensable to give the fabric a very frequent motion—to turn it. In the case of wool this motion must be so managed as to avoid felting.

When dyeing upon a mordant, the dyer must with not less attention see to the proper preparation of the mordanting bath —that all the mordant be well dissolved and that the dyeing follows it in proper time. After mordanting wool, which is done with bichromate, it must be dyed without delay, because the chromed wool has become sensitive to the action of light; it becomes gradually yellow and then green, as the chromic acid is being reduced under the influence of the solar light, and is transformed into chromium oxide, which is deposited upon the wool. The portions which are not exposed to this action would take the dye more rapidly, and thus we would have unevenness.

Another cause of irregularity is the peculiar behavior which the fibers (wool especially) present—that they continue dyeing after being lifted from the tub, as long as the hot liquid remains in them. Wool in this case continues to fix the dyestuff, and the dye becomes a little deeper. If the fiber is not washed with the desirable attention after being lifted from the dyebath, but is thrown upon the floor or hung upon sticks, this residuary dyeing proceeds irregulaly and therefore causes irregularities. To avoid this, the fiber may be washed soon after dyeing; but this method does not give such rich colors as when the treatment is continued in the tub, after the shutting off of the source of heat until the bath has completely cooled down. Then it is time to wash, and this method must be recommended.

In all cases we must not stop dyeing until done. The conditions of temperature and time play here a very considerable part. Thick tissues particularly require long dyeing; for, if the middle portion of the tissue more or less escapes the dye it will soon become gray and show the usage. Finally, the last cause of irregularities is the presence of fibers of different kinds in the material to be dyed. In the case of cotton for instance, the dead cotton, or cotton that has been picked before complete maturity, is not fit to take the dye. As regards wool, the finer it is the greater is the quantity of dyestuff which it can fix and the richer the obtained dye, but the coarser a woolen thread is, the less dyestuff will it fix. When the wools are not well sorted and picked irregularities in dyeing can be caused by the difference in the qualities of the stock.

PRINCIPAL MOTIONS OF A LOOM.

One of the first things a student is told on entering a weaving class is that "the principal motions of a loom are shedding, picking and beating up." This phrase is called "Cartwright's theory of weaving," as it is claimed that it was the principle that the reverend inventor of the power loom worked upon when bringing out his masterpiece. Of course it will be evident to the merest novice in weaving, says a writer in a contemporary, that the above motions in a loom must be made in the order as given in order for the loom to be a success, though as regards the correct timing, etc., of the various motions with regard to each other, that is a matter which experience shows slightly alters according to the quality or description of the fabric to be woven and the machinery used.

The shedding or separating of the ends of yarn takes place sooner in some looms than in others, according to the weight of the cloth. Speaking generally, it may be said that medium weight fabrics are woven with all the yarn as level as possible when the cranks are in an upright position, or, as it is called, on the top center. Light goods allow of the shedding to be a *little later*, that is, *the ends are level with the cranks a little* nearer the front. Very heavily-picked goods often require the shedding to be set very soon so that the crossing of the ends will lock the pick, and to prevent it from flying back after being beaten up. This is more especially the case with heavy twills than with heavy plains, as the picks are not so securely interwoven with the yarn. In jacquards it is customary for the ends to be as level as possible when the cranks are on the top centers, though of course in the ordinary double lift it is not possible for all the ends to be perfectly level in the ordinary way of weaving.

As regards shedding, in calico weaving the best results are achieved when the bottom shed is very tight and the top shed comparatively slack, as this allows the top ends to spread out, and so prevents the cloth from being reed marked and thin or bare. Dobby shedding allows the yarn to be of equal tension in both sheds, while in jacquards the top shed is generally more tight than the bottom, as this tends to keep the harness steady, this tending to the appearance of the cloth and the durability of the harness. The picking of the shuttle across the yarn is also a very important motion, as by faulty picking a considerable amount of unnecessary expense is sometimes incurred. In most kinds of looms the correct time for shedding is a little before the cranks reach the bottom center. By this means a very steady pick is obtained; later than this, a harsh though a very strong pick is given. The picking should be as free from jerks as possible, and no more strain should be put upon the picking mechanism of the loom than is sufficient to carry the shuttle across safely. When the shuttle is propelled with too much force, not only is there unnecessary strain put upon the picking points and other parts of the loom, but any small defect in the correct guidance of the shuttle there may be is increased and damage is caused to the yarn, the weft and the shuttle.

There are three different classes of picking motions in ordinary power looms, viz.: The over-pick the under pick and the side-lever pick. A great many other methods of picking have been invented and patented, which have attempted to perform this very simple operation by curious and novel methods One required a magnet underneath the yarn which drew the shuttle backward and forward. The majority of ordinary power looms have the overpick motion, sometimes called the cone pick. There are two picking tappets, one at each side of the loom on the bottom or second motion shaft. These tappets being each provided with a projecting picking point, are set exactly opposite each other, and each of these points come in contact with a conical anti-friction roller upon a stud attached to the lower end of an upright shaft, the upper end of which is connected to the picking peg. The nearer the tappet is placed to the upright shaft the stronger is the pick, and the power of the tappet is increased by affixing a longer picking point. When picking, the shuttle should commence to move slowly at first and gradually increase in speed till it leaves the picker. The beating up of the weft takes place when the succeeding shed is about half open, the sooner the shedding takes place the more firmly is the pick secured The beating up should be quick, the lower the crank shaft in relation to the sley sword pin the stronger and quicker is the blow. Long ears to the sley swords and short crank arms will also increase the force of the sley when beating up Of course, in light and medium weaving a very strong beat up is not necessary, and would probably be objectionable

On account of the great amount of vibration which the shedding, picking, and beating up motions entail upon the loom,

it is necessary that all the various parts of the loom be strongly made and well fitted together, and that all the working parts be of as simple construction and as direct in their operations as possible, considering the character of the cloth required. The plainest fabrics require the least complicated machinery, and every stage in the manufacture of a more intricate weave of cloth requires more varied working parts in the loom.

Even under most favorable conditions there must be considerable amount of vibration in the running of a loom, and when this strain and vibration is considered, it will soon become obvious that they are evidence of a considerable waste of power, and therefore the more direct the force is applied the less friction, strain and vibration there will be, and less power required for the different motions of the loom. The shedding of the plain loom being the most direct and least complicated, there will therefore be least loss of power and least vibration in plain weaving. In order to reduce this loss of waste power to a minimum and to produce a smoothly running shedding motion for the weaving of light goods, such as light twills, sateens, etc., barrel motions are very extensively used in some districts. In each case the barrel tappet with the necessary framework is attached to the top rail of the loom, with the barrel shaft at right angles to the healds, and on the barrel shaft is the large tappet wheel set with bevel teeth and facing the back of the loom. There are two short shedding levers or treadles connected with each heald, one end of each treadle being set with teeth, and thus gear into each other. These treadles are placed over the barrel, and one set of treadles being provided each with an anti-friction roller, each roller rests upon, and is controlled by one of the plates of the tappet. The leaves or plates of the tappet may be either each cast in one piece or composed of sections. An upright shaft with a bevel wheel at each end drives the tappet the lower bevel wheel being geared with a bevel wheel upon the lower or second motion shaft. These barrel motions are of the negative or non-positive order, as springs are used to bring the healds down after shedding. This barrel motion does not allow of very quick speed, though it is of a durable type, and when properly set is little trouble. The tappet can be used for patterns up to ten picks to the round

THE CANADA HAIR CLOTH CO.

The Niagara Falls (N.Y.), Gazette of recent date, contains the following reference to the new building, which McSloy Bros of St Catharines, Ont., are about to occupy with their branch factory in that city. The building is of brick, 180 feet long and 45 feet wide, and is three stories in height, and cost about $15,000. It is nearly fire proof as possible. It has an addition to be used as a boiler room and dye house, which is 30 by 22 feet in dimensions and two stories high. The addition is entirely separate from the main building, which gives increased fire protection. The building is equipped in the latest modern style with fire escapes and elevators to the upper stories. The interior is coated with alabastine, and each floor is supplied with a fire hose and rack—in addition to the chemical fire extinguishers. It is heated by steam, the steam plant being guaranteed to raise the temperature to 70 degrees Fahrenheit when the outside temperature registers 10 degrees below zero. The heat of each floor is regulated independently of the others. The building will be lighted by electricity. The Cataract Hair Cloth Company will occupy only the lower floor, the two upper stories being let to other industries. The advantage of cheap power induced the company to establish a branch of the concern in Niagara Falls, N.Y., which was done a year ago last July. Up to the present time only ten men have been employed by the local branch, but in the new building the force will be doubled. Ten electrical horse-power has been the extent used heretofore, but as soon as the new factory is in operation a contract for 20 horse-power goes into effect. A handsome new residence for Manager Dolan and his family is now in the course of erection close to the factory building.

LITERARY NOTES

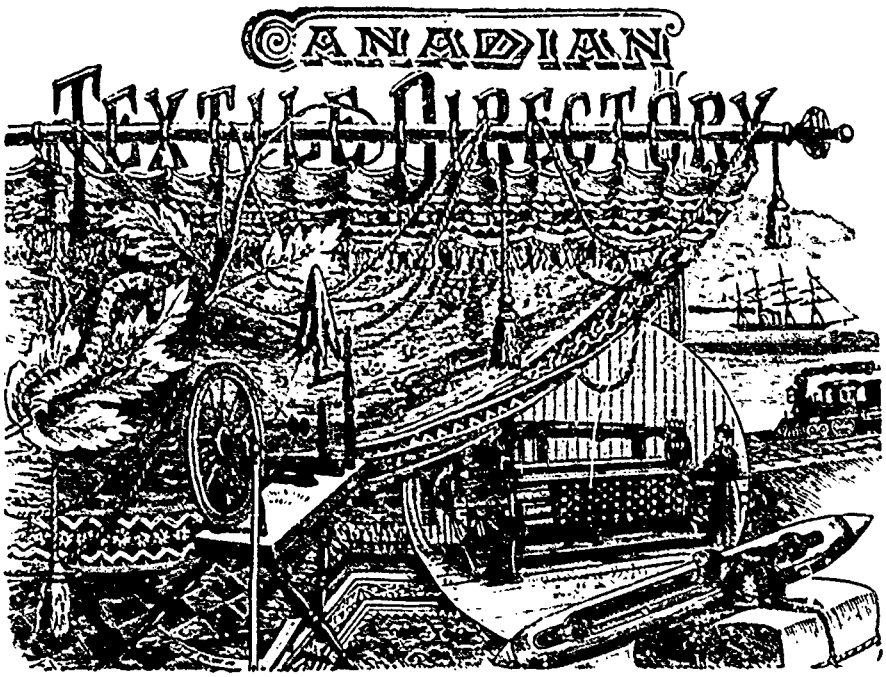
Beautiful calendars have been sent us by the John Whitaker-Reed Co., successors to John Whitaker, manufacturers of loom reeds of every description for cotton woolen carpet and wire cloth mills, John McIntosh, prop., Worcester, Mass., and the C. Turnbull Co., Galt, Ont.

We have received a copy of the Year Book for colorists and dyers, which is a pocket-book of ready reference, presenting a review of the yearly advances in the bleaching, dyeing, printing and finishing of textiles, edited and published by Dr Harwood Huntington, Wool Exchange Building New York. We will review this most interesting work in our next issue.

We have received a handsome desk calendar pad from the Dominion Dyewood & Chemical Co. Toronto.

Guild & Lord, publishers, 620 Atlantic avenue, Boston, Mass., have sent us a copy of the Textile World's Directory for this year. It has been completely revised by thousands of corrections caused by changes during the year. Several new features have been added, viz, lists of mills having worsted machinery, scouring establishments and wholesale rag dealers. It is a most excellent textile directory of the United States in point of accuracy, convenience of arrangement and completeness of contents.

—To remove scorch from linen, use the juice of an onion. Bake a large onion and squeeze the juice through a piece of cloth, a little finely shredded soap and a wine-glass of vinegar. Boil together until the soap has dissolved; leave till cold and then apply the preparation to the scorched linen. Let it dry and then wash in the usual way.



ALL who have seen the advance sheets of the Fourth Edition of the Canadian Textile Directory say it is the best issue yet made. Over 300 pages are now printed and the balance is now going through the press as fast as possible. It is the earnest hope of the publishers to have it issued *next month*. The neglect of some firms to send in reports has been the cause of much trouble and delay to the publishers. The prompt response of all who have received circulars or who see this notice, is urgently requested. The Canadian Textile Directory is a cyclopœdia of textile information to which every one concerned in the business should contribute their quota. Please read the list below and see if it relates to you.

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, Furniture, 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 Dresser, 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

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.

The Rosamond Woolen Co., Almonte, is working overtime

The new boiler house at the Riordon paper mills is finished and in use.

The manufacturers of rubber boots and shoes are finding a market in New Zealand

The Waterloo, Ont., Woolen Manufacturing Co. has over 200 names on its pay roll

The new pulp mill at Mispec, N.B., will be ready for operation next March or April.

The Cornwall Mnfg. Co. is reported to be very busy under the new management of D. Breckenbridge.

The St. Croix Cotton Mills, Milltown, N.B., have been very busy lately running on high grade ginghams.

G Whyte, woolen manufacturer, Galetta, Ont., is now running, after putting in some new machinery.

The McKay Woolen Co.'s clothing store, Charlottetown, P.E.I., was burned, Jan. 15th; insurance, $24,000; damages, $55,000.

Charles Burrill, Yarmouth, N.S., will leave for England shortly in the interest of the proposed new pulp mill in Digby county, N S

It is reported that the Blyth Mill, Peterboro, Ont, will be equipped with a complete knitting plant, and will run on high grade goods

The Canadian Colored Cotton Co.'s mills at Cornwall, Ont., were closed down during the holidays while some necessary repairs were made

J. S. Wilson has sold out his interest in Wilson & Co., wool merchants, Front and Church streets, Toronto, and will move to the Northwest

The Dominion Oil Cloth Co., Montreal, has distributed among its friends and patrons a handsome paper knife as a New Year's souvenir.

Brantford, Ont, people are trying to open up the wincey mill At a meeting held January 10th about $10,000 was subscribed towards the project.

The representative of a woolen company has been in Brantford looking at the old Wincey mill as the possible site of a new woolen mill or knitting factory

St. Catharines will offer inducements to the Toronto Rubber Co. to rebuild in that city the works recently destroyed at Port Dalhousie. Merritton is also after the works.

The SS. "Glorana" loaded 1,600 tons of pulp from the Chicoutimi Pulp Company at Quebec, shortly before the close of navigation, being the largest single shipment ever made from Quebec.

The Schofield Woolen Co., Oshawa, Ont., is working overtime and is now placing its output through Millichamp, Coyle & Co., manufacturers' agents, Toronto.

The city of Belleville, Ont., is applying to the legislature for power to borrow $35,000 to pay the bonus recently voted to the Canadian Brussels Carpet Co., Ltd.

The United States Government's $18,000 customs damage suit against John and James Livingstone, the flax merchants of Baden, Ont., has been settled for $1,000.

The Berlin Brush Works, recently burnt out, is being reorganized and located at Waterloo, Ont. The factory starts up this month with fifteen hands to begin on.

Dontigney & Hughton, Arnprior, Ont., have been supplied with a 30-inch picker, and Hamlin & Ayers, Lachute, Que., with a fancy hose loom by the Geo. Reid Co., Ltd., Toronto.

A movement is afoot to form a combination of calico printers in England and Scotland. The owners of two-thirds of all the machines employed in the industry support the scheme. It is estimated that the capital of the new company will be nearly $50,000,000.

The publication offices of the American Carpet & Upholstery Journal, Philadelphia, have just been moved to 102 S. Twelfth street, at Chestnut street, in the Beneficial Saving Fund Building. The office of this journal is a bureau of information for the industries it represents, and the trade generally is invited to make use of it.

Application for incorporation for the Grantham-Fisher Company, Ltd., for the purpose of buying, selling, manufacturing and dealing in all kinds of cordage, ropes and twines, mats, hammocks, and other articles of ropes, cordage, ropes or twines; the chief place of business to be the town of Yarmouth, N.S.; the stock of the company to be $9,000. The names of the applicants are: C. T. Grantham, Yarmouth, N.S.: R. C. Fisher, W. H. Avis, Toronto, Ont.; E. W. Fisher, Dundas, Ont., and H. M. Grantham, Yarmouth, N.S.

Wm. Hewett died at his home on Sherbourne street, Toronto, January 20th, at the age of 69. He was widely known and popular in the textile trade with which he has been connected. For many years he had been a manufacturers' agent in the city, representing chiefly Canadian firms, among which was Wm. Parks & Son, Ltd., St. John, N.B., and also latterly several English houses. Many years ago he conducted a dry goods store at the corner of Yonge and Scollard streets, Toronto.

A petition was recently presented to the Cornwall, Ont., town council from the Canadian Colored Cotton Mills Company, asking that the portions of the Stormont mill on which exemption from taxation expired on January 8, 1899, and that part on which the exemption would expire on February 6, 1903, be further exempted from taxation for periods of ten years each. The petition set forth that owing to keen competition, large sums of money had to be spent in modernizing the mills and that if the exemption be granted, that they would take steps to make considerable additions to their property and increase the number of hands.

The Eagle Knitting Co., Hamilton, Ont., has installed in its factory a 30-h.p. S.K.C. two-phase induction motor, which drives their knitting machinery, and has replaced their steam plant.

There does not seem to be any prospect of a dividend for the ordinary creditors of the Brandon, N.W.T., Felt Boot Co. Senkbeil Bros. were indebted to their father, who seized the plant, and the salvage will go to the municipality for balance due on mortgage.

Millichamp, Croyle & Co., manufacturers' agents, Bay street, Toronto, are now agents for the Maple Leaf Woolen Mills Co., Ltd. The company has been reorganized, Mr. Millichamp holding almost the whole of the stock, and some of the most experienced manufacturers in the country will be on the directorate.

S. Greenshields, Son & Co., Montreal, did not lose so much as reported, as about 95 per cent. of the loss is covered by insurance. The firm has not matured plans for rebuilding, and is now doing business at the corner Le Moin and St. Helen streets. McIntyre, Sons & Co. are doing business in E. A. Small & Co.'s premises, Beaver Hall Hill.

Most of the employees in the card-room of the St. Croix Cotton Mill at Milltown, N.B., left work on account of a 6 per cent. reduction in wages, Jan. 18th. If they remain out half of the mill will be at a standstill in a few days. Meantime the company is importing quantities of yarn and when the shipments arrive they will not need to take back more than one-third of the hands now on strike.

Ald. Marsolais, Montreal, is suing S. T. Willet, of Chambly Canton, for $5,000 damages for an alleged breach of contract in not supplying the cloth for volunteers' uniforms, as he agreed to do to enable the alderman to fill his contract with the Dominion Government. Owing to the illness of a member of the firm the orders have not been fully kept up with, but now the mills are being run over time in order to overtake contracts.

A serious fire occurred at Port Dalhousie on January 1st, when the factory at that place of the Toronto Rubber Shoe Mfg. Co., was burned to the ground. The fire broke out in the boiler-room, then spread to the varnish room, and next to the main factory, fanned by a strong wind. The flames also spread to the wooden grist mill and destroyed it. On the rubber factory, whose loss is probably $100.000, there is insurance to cover $88,000.

—The recent appeal published on behalf of the Hospital for Sick Children, Toronto, for $25,000 to pay off a portion of the mortgage this year, has met with a generous response, and $22,000 has been received. The remaining $3,000 will, it is hoped, be subscribed within the next few days.

FABRIC ITEMS.

T. B. Dane & Son, clothing, were burned out in the fire which destroyed a number of business houses in Yarmouth, N.S., Jan. 15th.

Robert Downey, Oswego, U.S., a grain and coal shipper died January 17th. He was 60 years of age. He left Napanee, Ont., 13 years ago, where he formerly carried on a large dry goods business.

D. McCarthy, who has been for a number of years the representative of Kenny & Co., Halifax, N.S., in eastern Nova Scotia, will represent S. Greenshields & Co., Montreal, in the same territory.

Fred. Wyld, A. W. Grasett, A. Darling, Maria Louisa Wyld, and Caroline E. Macdonald, have been incorporated as the Wyld, Grasett, Darling Co., Ltd., to do business as wholesale dry goods merchants; capital, $500.000.

R. Taylor, T. McK. Bayne, C. S. Botsford, J. S. Whyte, H. W. Smith, Toronto, have been incorporated as the Taylor, Bayne Co., Ltd., to carry on business as wholesale milliners and dry goods merchants; capital, $100,000

Announcement is made by Lailey, Watson & Co., wholesale clothiers, Toronto, that they have admitted into co-partnership Hedleigh E. Bond, who has been associated with them for a number of years. The firm is now Lailey, Watson & Bond.

From Kingston, Ont., is reported the assignment of A. F. Roney, clothier, doing business as the Grand Union Clothing House. He compromised liabilities of $10,000 at 60 per cent. in 1896. The estate shows liabilities of $15,000 and assets of $11.000.

Louis Shindler, clothier, Montreal, who has paid his way very satisfactorily for the past ten years, and had established for himself a good general credit, disappeared suddenly a short time ago, and is supposed to owe some $7,000 or $8.000, with assets of a few hundred.

S. F. McKinnon, Isabella McKinnon, R. Millichamp, J. S. McKinnon and W. Guthrie, Toronto, have been incorporated as S. F. McKinnon & Co., Ltd., to carry on business in Toronto as wholesale dry goods merchants, with a capital of $500,000.

The Toronto firms of S. F. McKinnon & Co., and *Alexander & Anderson, cloak manufacturers*, have decided to unite their interests, and S. F. McKinnon & Co. have accordingly taken over the stock of the other firm. Mr Alexander will be a director of the new company, which will be known as the S. F. McKinnon Company, Limited. As soon as the charter is obtained, a meeting will be held to make final arrangements for the new management.

A meeting of the creditors of Ferguson & Thibadeau, dry goods merchants, Chatham, Ont., was held at Toronto, Jan 10th. Assets are placed at $14,000, with liabilities about the same. In addition to a number of Montreal firms the chief creditors are Gordon, Mackay & Co., and Wyld, Grasett & Darling, of Toronto.

Alex. Troup, formerly in the employ of Murdock's Nephews, who are retiring from business in Halifax, has accepted a position with Manchester, Robinson & Allison, St. John, N.B. Mr. Troup will have charge of the new sample rooms in the Roy Building at Halifax, which Manchester, Robinson & Allison intend establishing at once.

The second failure of Lahey & McKenty, dry goods, Napanee, Ont., is reported. The first took place in August, 1896; then they settled liabilities of $31,000 at a discount of 40 per cent. Since this time the firm has carried a heavy stock of goods with keen competition, and has not made any substantial progress, and the result is as above stated.

A. A. Fournier & Co., dry goods, Ottawa, are reported asking a settlement at 50 cents cash, or 60 cents spread over eighteen months. The present firm, in which Mrs. Fournier figures as the sole partner, dates from 1893. Previous to that Mr. Fournier was of the firm of Fournier & Forest, which failed, and were wound up. The liabilities are stated at $48,000 with apparent assets of $49,000.

The firm of John Macdonald & Co., wholesale dry goods merchants, Toronto, is celebrating this year its jubilee. It was during 1849 that the founder of the firm, John Macdonald, afterwards senator, began on his own account as a young man, in a modest retail way, at 103 Yonge street, west side, second door from Richmond street. Four years afterward the business was removed to Wellington street, north side., near Leader Lane, where it was wholesale only, and in 1862, to accommodate the growing trade, part of the present handsome premises was built.

The large wholesale dry goods firm of W. C. Pitfield & Co., of St. John, N.B., is in embarrassed circumstances and a statement is being prepared for their creditors. The financial difficulties of the firm have caused surprise, as it was generally believed that they were on a sound basis. The Merchants' and Dominion Cotton Companies are among the creditors, as also are many of the woolen mills throughout the country. The liabilities are expected to reach to somewhere between $125,000 to $150,000. The partnership was a limited one, Samuel Hayward being a special partner for $30,000, and the term of partnership expired on the 1st of January.

The death recently of James Baylis, Montreal, removes one of the commercial landmarks of that city, in which he had lived for nearly seventy years, being aged 80 at the time of his death. While yet quite a young man he was a member of the old dry goods firm of Robert Campbell & Co In 1859 he went into the carpet business himself, under the name of James Baylis & Co., and in 1896 the business of the firm was wound up. Mr. Baylis was a prominent member of the Board of Trade, and was a strong advocate of teetotalism, prominent in the Y.M.C.A., and a hard worker in religious and philanthropic circles.

—A carload of sheep was sent recently from Toronto, where it was collected, to Newfoundland. The Newfoundland Government is the purchaser, and the sheep, which are all registered, are made up as follows. Ten South Downs, 10 Shropshires, and 20 cotswolds. The men selling are some of the best breeders in Ontario for each class. This is a trial shipment, and is likely, if the sheep do well, to be followed by more The experiments of the oldest colony in wool growing will be watched with interest.

—At the wool auction sales held in Antwerp, Jan. 11th, 4,200 bales were offered. The attendance was good and the bidding very spirited. Better cross-breds advanced 5 and fine haired merinos 10 to 15 per cent. Owing to the limited supplies holders fixed high limits on their goods, and consequently only about half of the offerings were sold. Following are the sales in detail: Buenos Ayres—934 bales; 70 to 190 francs. Montevideo—614 bales; 80 to 220 francs.

CHEMICALS AND DYESTUFFS.

The demand for chemicals is good for the season The same remark applies to dyestuffs Caustic soda is firmer; soda ash has advanced 10 cents per 100 lbs.; bluestone in sympathy with copper has had a sharp rise and is now quoted at 5½c. per lb; sumac according to cables receiver is up $5 per ton; gambier owing to the manipulation of speculators is fully ½c. per lb 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
Cocoanut oil	0 06½	"	0 07

THE WOOL MARKET.

Montreal.—More enquiry from the manufacturer is noted, and prices for all Capes and Australian merinos are higher, and good lines have been sold at the advance, but even at the prices they cannot be replaced.

Toronto.—There is no movement reported in Canadian fleece on the Toronto market. There are still large lots of wool in the hands of local buyers, which cannot find any outlet at a profit owing to high prices early in the season. There is a fair demand from factories for pulled and foreign wools. All the mills are busy. Coarse and medium wools are unchanged in price while merinos and fine wools are advancing rapidly.

—W. T. A Strange, vice-president of the Silk Association of America and head of the well-known silk manufacturers, the William Strange Co., Patterson, N.J., died of pneumonia, Jan. 10th, 1899, in New York. Mr. Strange was vice-president of the Silk Association of America for many years, succeeding his father, Albert B. Strange, who was one of the pioneers of the silk ribbon industry in America. Their first venture in the domestic industry was undertaken at Williamsburgh on Long Island in 1863, the business being removed in 1868 to Patterson, under the firm name of William Strange & Co. Mr. Strange's father and uncle carried on the New York house under the firm name of Strange & Bro., the house having been founded in 1838 at the corner of William & Beaver streets, New York. When the firm removed to Patterson in 1868 they organized a much larger plant and their mill became noted as a model mill. Broad silk weaving was soon added to their business, and during all these years the firm with which Mr. Strange has been identified has been considered among the foremost silk manufacturers of the United States. Thus was gradually developed the conviction formed in their minds that they could successfully produce in this country the class of goods which for many years they had been importing.

RECENT TEXTILE PATENTS IN CANADA.

No. 60,742.—Knitting machine; Automatic Knitting Machine Co., New York.

No. 61,619.—Sewing machine; Joseph Eli Bertrand, Boston, Mass.

No. 61,628.—Button hole sewing machine; William Manning House, New York, N.Y.

No. 61,650.—Process for water-proofing textiles; Josef Rudolf, Gera Reuss, Germany.

No. 61,654.—Wool drying apparatus; *John Fielden, Rochdale, Lancaster, England.*

No. 61,603.—Rotary cleaner for textile machinery; James Thomson, Pawtucket, R.I., U.S.A.

No. 61,726.—Sewing machine; The Special Sewing Machine Co., Chicago, Ill.

No. 61,735.—Sewing machine for lasting boots or shoes; Napoleon & George Goddie, Winchester, Mass.

No. 61,709.—Fabric printing process; A. B. Sherwood, *Chicago, Ill.*

—It has been suggested by Major-General Hutton that the present tunic, which is expensive and unsuited to hard work during the summer months, should be abolished and a serge substituted. Each man might then have, by careful regimental arrangement, two serges, one of which should be new or nearly new, and the other partly worn and available for ordinary drill and fatigue duty. To give the new serge the appearance necessary for full dress, cord, aiguillette and epaulettes might be added, which should be the color of the facings of the regiment. These epaulettes would be detachable and only used for church parades and special occasions.

THE LONDON WOOL SALES

The first series of wool sales for this year opened Jan 17th with a very large attendance All sections were fully represented, including some American reports Merinos of a fairly representative character comprised the larger portion of the offerings French and German buyers secured a good quantity after spirited competition with the home trade Scoured merinos received special attention and sold a shade better than greasy, the home trade buying largely of this grade A small selection of cross breds and a few parcels suitable for their wants were taken by the American representatives Slipes and inferior stocks showed firmness Cape of Good Hope and Natal sold quickly at 7½ per cent advance The number of bales offered to-day numbered 6,684. The second series for this year will open March 7, and the third series is scheduled for May 2. The lists for each series will close eight days before the opening date or when the quantity has reached 300,000 and 250,000 respectively. The attendance was larger on the second day Prices advanced 5 to 10 per cent over December rates The third day's offerings amounted to 11,940 bales, including the first supply of Victorian, new season's Geelong cross bred and merino, comparing favorably with the previous clip Yorkshire bought fine greasy at full rates and American buyers secured 300 bales of the same grade, paying 10d for cross breds The sale was very brisk on the 20th and prices hardened somewhat on the 21st

—C. P. Brooks, of Lowell, has accepted an appointment as managing director of the new textile school in New Bedford The head office of the American Correspondence School of Textiles, of which Professor Brooks will retain the directorship, has been removed to New Bedford,