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CANADIAN Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XIII.

TORONTO, SEPTEMBER, 1896

No. 9

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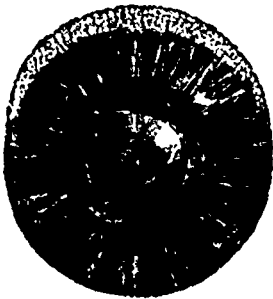
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Editorial

That orders are not coming in freely, is a fact patent to most of our manufacturers at present. While some mills are running full time on orders, most are thinking of curtailing production, and are on the watch for any possible measure of economy which may be adopted without prejudicing the character of their output. In a few mills expensive heads of departments have been dismissed, and in others short time is the order of the day. We believe the idea of a general closing down, such as that recently attempted by the cotton mills of the New England States, to cover a

period of six weeks to three months, is being entertained by prominent manufacturers. For this condition two causes are assigned: the unwillingness of the wholesale trade to accede to the changed credit terms lately imposed by the mills, and the danger which many profess to believe imminent, of injurious tariff changes at the next session of Parliament. It would hardly be truthful to say that these fears are groundless; but that they are not very securely founded may, we think, be safely alleged. The credit terms must be accepted by the trade if the manufacturers do not yield. Those who make these goods know what they are, and that the wholesale men cannot get them elsewhere for the money, even if they do sell them as "imported goods, every inch of it." A little time is all that is required to bring the wholesale sulkers into line. About the dangers arising from the change of Government there is even less cause for doubt. All that even the most rabid free trader advocates at present is a "revenue tariff." All a limit that our debts must be paid, and that the money to do it must be raised largely from duties levied on imports. Now, these words, "revenue tariff," have been the cause of much misunderstanding. By most people it is thought to mean a rate of duty the same as that called by the same name under the Mackenzie Government. But why should this be so? The revenue required by the Mackenzie Government was a small sum to that which is now required to carry on the affairs of the Dominion, and a duty which was ample for the requirements of the last Liberal Government would be wholly inadequate for the present. The revenue tariff of to day is, therefore, not the same as the revenue tariff of twenty years ago, but is probably one hundred per cent. greater. The duties on woolens will remain at a figure which will afford protection, but there will be a strong tendency away from specific duties, and the trade need not be surprised if the duties are levied exclusively on an ad valorem basis.

Colonial Trade.

As a practical result of Mr. Chamberlain's circular letter to the governors of the British colonies, desiring them to collect and forward to England samples of the foreign goods which supplant English products in colonial markets, there is an exhibition of these goods in the London Chamber of Commerce. The exhibits are few as yet, as not many replies have yet been received, but the exhibition is certain to grow in interest

and influence. It is interesting to note that Trinidad reports that woollens from Canada and the United States have completely taken the place of British wares.

Electricity in the Mills.

Electricity is making progress in the textile world in England. The manufacture of hosiery and underclothing in all its branches is now carried on by that means in a big eight-storeyed mill in Upton street, Manchester, England, by the Turton Manufacturing Company. This is the first instance on a big scale in Manchester of electricity supplanting steam as a motive power, and is a fact of far-reaching interest and importance. The power is supplied by the Manchester corporation, at a price per unit which enables the proprietors of the mill to reckon on a saving, as regards the expenditure on driving power, of 35 per cent. as compared with steam power. It is said this saving is equal to the wages of engineer and stokers. But the economy does not end there. Risk from fire is reduced to a minimum, causing, no doubt, a reduction in the fire insurance rates, and the rooms are healthier, being free from heat and dirt, thus enabling the firm to employ five or six times as many workers in a given space of room as would be possible if steam power was used and gas was the illuminant. Some 250 different classes of articles are produced at the factory.

Cotton Prices.

There is no point of interest in the textile market at present which receives more attention than recent developments in cotton prices. Prices of cotton goods generally are lower than this time last year, while with raw cotton at 8½ cents, they should be at least as high. Stocks are not excessive, and it may be assumed that recent advances will be well maintained. Filled grays have advanced five per cent., and bleached sheetings half a cent a yard, or nearly three per cent. The coarse colored cottons are thought to be strengthening, and an early advance would not surprise the trade.

THE London wool sales open on Sept. 22nd, without limitation of amount to be put on sale.

CANADIAN TALENT WINS IN ENGLAND.

In the march past of nations the older ones have often united in presenting arms to Canada, and sportsmen have raised their hats repeatedly, as during the last few months she has carried off a list of championships which would do honor to any people. We have now much pleasure in claiming a salute for the achievement of three brothers in the realm of technical science. The contest took place in England, where the technical schools are well supplied with the best teaching ability and experimental facilities, and are open to the talent of the whole Empire. The candidates were the three sons of Joseph Allen, managing director of the



J. D. ALLEN.

British American Dyeing Co., of Montreal. Each of the sons commenced his studies in chemistry under Prof. Donald, at Bishop's College, and finally decided to devote himself to the science and practice of dyeing. Each entered for examination at the Yorkshire College, Leeds, England, and the City and Guilds



G. Y. ALLEN.

of London Institute. Their record is one of the most uncommon we ever met with. For example: In the examination on the theory, practice and chemistry of dyeing, at Yorkshire College, the results were: J. D. Allen, 1st; W. R. Allen, 2nd; G. Y. Allen, 1st prize and scholarship, value £20. At the City and Guilds of London Institute: J. D. Allen, 1st and silver medal; W. R. Allen, 1st and silver medal and prize of £2, given by the Dyers and Colorists' Association of London; G. Y. Allen, silver medal and £2, the



W. R. ALLEN.

Dyers and Colorists' Association. J. D. Allen is now with Jack & Robertson, in charge of the chemical department; W. R. Allen continues with his father as right hand man, and G. Y. Allen is about returning to England to enjoy the benefits of his scholarship. Many a father is proud

enough if one member of his family gives early evidence of steady purpose and wins the honors of a scholar, and Canada ever waits to smile on the efforts of any member of her comparatively limited population who sustains the honor of the Dominion. Here then are three young Canadians, sons of one father, thrice winning honors in the seat of technical research.

INTRODUCTION AND DEVELOPMENT OF ROPE-DRIVING.*

Its introduction is due to the late James Combe, who in 1856 applied an expanding pulley with V-shaped sides to the differential motion of flax and tow roving frames. The expanding pulley was driven by a round leather rope from a driving pulley grooved with a V-shaped groove. In the course of his experiments in perfecting this motion, he was struck by the large amount of power obtained from round ropes working in V-shaped grooves, and this led him to try their application to the transmission of larger powers. With a view of arriving at the most effective angle for the grooves, a series of experiments were made in the Falls Foundry Works in the following manner: A pulley, fixed from revolving, was made with a number of grooves, each having its sides sloping at a slightly different angle from the others; ropes were then laid over these grooves with weights hanging from them at one end and counter-balance weights at the other, and the effect produced on the biting power of the rope in the groove by increas-

* Extracts from a paper read before the Institution of Mechanical Engineers, by A. Combe.

ing and diminishing the weights, and the counterbalance weights, was carefully noted. The object was to determine in a practical manner the most suitable angle of groove for a driving rope, so that the rope should neither slip nor yet bite too much into the groove; and the angle chosen after the above simple experiments, namely, 45 degrees, was adopted in the first pulleys sent to work, and is at present generally used for rope-driving under ordinary conditions. After several years use of grooved pulleys and ropes for driving from the main shaft of one of the workshops at the Falls Foundry to that of another, the advantages of rope-driving under certain conditions were found to be so great that, on the occasion of replacing one of the main engines in the beginning of 1863, rope driving was adopted for transmitting the entire power of the engine, amounting to over 200 horse-power, from the second motion shaft to the principal shaft. This is the first instance of rope-driving being used for a main drive of such importance, and the original pulleys are still in existence and working daily. After giving technical details as to the relative merits of different materials used in rope-driving, sizes employed, and the speed attained under varying conditions, Mr. Combe said:—"The new method of driving soon became known to several English and Scotch engineers, who joined in its further introduction and development. An extended form of main rope-driving from the second-motion shaft to the various lines of shafts was started in July, 1864, in the Hilden Mills of Messrs. William Barbour & Sons, Lisburn, and is transmitting 600 i.h.p. One of the earliest examples of rope-driving from the fly-wheel of the engine itself was erected in 1873, at Owen O'Cork Mills, Belfast, and was designed by Messrs. Combe & Barbour, by whom also the pulleys were made, the fly-wheel being supplied to their instructions by Messrs. Hick, Hargreaves & Co. Later on in certain districts, especially those in which the cotton industry prevailed, cotton ropes began to be used. These have the advantage of being rather more pliable than manilla ropes, especially when the latter are new. The relative merits of ropes made of manilla and those made of cotton have frequently been discussed; but experience has shown that, if the pulleys are properly designed and applied, and if the ropes are the proper diameter, good results are obtained, whether the ropes are made of manilla or of cotton. One of the great benefits that was found in rope driving at a comparatively early stage was that ropes could be applied with advantage to transmit power between shafts that were not parallel. In 1875 a drive was put up in the works of Messrs. Combe & Barbour to drive 100 i.h.p. from one shaft to another which was not quite parallel with it. In 1878 grooved pulleys and rope-driving were introduced to replace pairs of large geared wheels, which from one cause or another were giving trouble; for example, in places where they were used to combine the power from a steam engine with that from a water wheel, or to combine the power from two engines working under slightly different circumstances. The continued

rapid extension of rope-driving, and more especially of driving direct from the fly-wheel of the engine to the various shafts, led to designing fly-wheels to suit the high speeds. A rope fly-wheel was designed by Mr. James Barbour in 1879 to meet the special requirements. The peculiar advantage of this method of constructing fly-wheels is that, instead of depending solely on a cast-iron arm for connecting each segment to the nave, a strong wrought-iron bolt is used, which passes down through the middle of the tubular cast-iron arm, and connects each segment directly with the nave; consequently this bolt not only receives the tensile strain caused by centrifugal force while the wheel is in motion, but it also withstands the driving home of the cotters when the wheel is being put together. In many instances existing gearing and upright shafts have been thrown out and replaced by rope-driving; and where the rope-driving has been properly designed and erected, the total power required for the rope-driving has in none of the installations which have come under the writer's observation exceeded that which was required when driving by wheel gearing; and in many cases the power required to drive the same amount of work by ropes has been less than it was before the change in method of driving took place. These examples of the transmission of mechanical power by ropes serve to illustrate the development of this method of driving. There is no doubt that other developments will take place in the future which will further extend its sphere of usefulness.

LIFE OF THE HOSEY WORKPEOPLE IN SAXON VILLAGES.

After having given our readers some account of the workpeople engaged in the hosiery trade of Chemnitz, we now propose to describe some of the features of the life of hosiery workers in the villages that surround Chemnitz.

On entering a village, the most attractive building that meets the stranger's eye is not the parsonage, but invariably the school. Frequently its size and style are out of all proportion to the rest of the place. Boys and girls are taught together, but sit separated, boys on one side, girls on the other, with a passage between them. Children are compelled to attend, from the age of six, and the school has six standards, to be passed in one year each. The older children go to school in the morning, the younger ones in the afternoon. The former have twenty-two hours a week, while the latter only have twenty. The school fees are about 2d. a week. Nearly all the schools have a play-ground and gymnasium attached. All the teaching is done by men, except a few lessons in needlework.

As the children are only employed at school for half the day, they are able to help in many of the little details of the manufacture of hosiery, in which their parents are employed. Thus, on a warm day, the little boys and girls may be seen sitting outside the houses with their small blue aprons, counting and tying ribbed tops, pulling through the ends at the toes and heels, etc.

The older children do the seaming and turning off, and all the women help in mending, running on, winding, etc.

The manner in which all members of the household contribute to the work explains the cheapness of goods produced in the villages, for, although the wages are very low, the people manage to live on them, because every member of the family contributes. This system runs through all the industries of the Saxon villages. In the Armabeg district, where trimmings are made, the children may be seen in their spare hours threading beads, and in the toy district they make just one part of a certain toy. All the different parts are delivered to men, who put them together.

Beggars and ragged people are hardly ever seen in any of the villages. The workpeople contribute very little to the sale of stockings, for they never wear them during seven months of the year.

They live in cottages, five or six families in one cottage. Usually the inmates are related or connected by marriage. Each family occupies two or three rooms. The sanitary arrangements are usually of the most primitive nature.

In the spring and autumn, visitors may see a long barrel-shaped cart, with a tap at one end, being drawn by a cow, or sometimes a horse and a cow side by side. This vehicle, in fact, makes its presence known long before it comes into sight. It does the double duty of collecting and manuring. A little farming helps the people to live. A great many potatoes are grown, and many of the people hire a few rows in a field. The cattle are not allowed to graze, but are kept in stalls. If the hay harvest is very plentiful, then, in the late autumn, they may be allowed a short time in the open, but this is a rare treat. The grass is cut three times in the season. The stall life of the cows, of course, affects both the milk and the meat. The few sheep that are kept never see the light of day, and may be seen peering with wan, disconsolate faces through the chinks of a stall. Geese have the best time of it. They are driven in large flocks all across the country, gleaning the fields and following the plough. But their life is not all sunshine. They have to submit to their feathers being plucked out three times a year. A goose often remains in the family for over fourteen years, and is looked upon as quite one of the household. On the death of the owner it may happen that such a venerable beast gets into the market, and woe to the jaws of him who has it for dinner.

The pooriness of the dwellings of the workpeople is amply compensated for by the beauty of their surroundings. The villages are usually cradled amid pine-clad hills and lovely valleys, with fresh mountain-streams dashing along them, connecting hamlet with hamlet. The forests resound with the song of birds, and nightingales are numerous in many places. Often the wanderer may scare up a deer, and hares in large numbers

can be observed even from the railway. Wild rabbits are entirely unknown.

After this slight picture of the surroundings of the hosiery workers, it will be of interest to contrast their present condition with that of ten years ago. Then they were laboring under the disadvantages of old-fashioned machinery. Chimneys and factories betokening steam power were nowhere to be seen. Circular machines for stockings, pants and shirts, were turned by hand. Winding was done by the wheel. The lot of the people was hard, and they suffered severely in the bitter winter months. Since then, an extensive net of railways has been thrown over the country, and the very latest machinery in every department has been introduced. Characteristic of the rapidity of the progress is the jump from candle-light and oil lamps to electric lighting. In some places an electric light may be seen suspended between the trees on either side of the road. Quite recently some electric railways have been started near the Austrian frontier. They cover about ten miles, and have proper stations at all the places along the line.

In a small village factory, which represents the type of the present day, the rooms are well-lighted and lofty. Winding machines and ribbed top frames of the latest construction are employed. Cotton's rotaries, making up to twenty hose-legs at once, and circular standard machines, are to be seen. The proprietor has generally been a workman himself; he lives on the premises, does the bookkeeping, takes the goods to market, attends to repairs; his wife superintends the winding, seaming, turning off, etc., aided by the daughters and daughters-in-law, while the sons and sons-in-law work the machines. The owner and his family live in a very modest way, and are satisfied with food hardly as good as a British workman gets. Excepting when he goes to market he is clothed much the same as his own workpeople.

At intervals in the villages needle and sinker factories are met with. They are well employed in executing orders, not only for home consumption, but for exportation as well.

This branch has been especially developed in recent years. Formerly German steel was not good enough, but of late Americans consider it superior to that got from England.

Of course, the people in the country are subject to the same laws as those in the town with regard to military duty. The taxation for village expenses is not so high, but arranged in much the same way as in the town. The country people take their pleasure just as those in the town, but the facilities for dancing are not quite so great, although every village possesses at least one public house with a dancing hall. English people will be surprised to find no out-door game of any kind mentioned. The nearest approach to anything of the kind is knittles, of which the larger part, however, is beer.—*Knitters' Circular*.

CARBONIZATION OF WOOL.

All wool before being sorted contains much vegetable matter in the shape of seeds, grass, moss, burrs, and such things. Most of these can be taken out in the sorting, or fall out in the carding and combing, but some of them, especially burrs, cling so tenaciously to the fibre that they are carried through every process into the cloth. Among the worst classes of wool, in this respect, are Port Philip, Cape, and Buenos Ayres; they are often literally one mass of burrs.

To pick them out by hand is impracticable, while if the wool is carded with them in, though some may be knocked out by burring rollers and other machines for the purpose, a great number are opened, and laid lengthways along the fibre, in form resembling a small centipede, and in this state adhere more firmly than before to the wool. The only effectual method of removing them is by carbonization. Sometimes this is done to the wool immediately after washing; at others it is done to the cloth before or after milling. The process is generally called carbonization of wool or cloth, but it is not the wool which is carbonized, but the vegetable matter adhering to it. The effect is to reduce the vegetable fibre to cinders or dust, so that it will fall out when the material is washed or shaken.

According to McLaren, there are two methods most commonly employed for doing this. The one is to saturate the wool with dilute sulphuric acid of 4 to 5 degrees Baume, which is afterwards removed by "whizzing" the wool in a circular hydro-extractor. The wool is then spread out in a room heated to 250° F., in order that it may dry quickly. The air being so hot absorbs the moisture very rapidly, leaving the acid in the wool. The acid, which has a strong affinity for water, lays hold of the burrs and other vegetable matters which still retain moisture, and extracts it from them, leaving only the cinders, which are little else but carbon, and which crumble away when the wool is afterwards washed. In extracting this moisture, however, the sulphuric acid is decomposed; and if any is left, it is so little as to do no harm to the fibre of the wool, especially as the wool is immediately washed. The other method is known as Joly's process, from the name of its inventor, a Frenchman. E/ it the wool is saturated with a solution of chloride of aluminum of 6 to 7 degrees of strength Baume, about 8 to 10 lbs. of chloride being used to 16 lbs. of wool. The wool is then whizzed in a hydro-extractor, and well dried in the ordinary way. After it is quite dry it is taken to the carbonizing room, which is heated to 212° F., and left there for three-quarters of an hour. It is then washed with water and Fuller's earth, by which all the chloride is removed, and the carbonized vegetable matter washed away. This method is the one generally adopted now, as it is the simplest and safest for the wool, and at the same time attended with the least inconvenience to the workmen.

Carbonization can also be effected by the fumes of muriatic acid. The wool is placed on hurdles in an air-

tight room, and exposed to its action for three or four hours, after which the temperature is raised to 212° or more. In a short time the heat is stopped, fresh air is let in, and the wool, when cool, is washed. The wool being fumigated must be almost, but not quite, dry.

Before treating wool in any of these ways it is necessary to have it washed thoroughly, so as to remove every particle of grease. If this be not done, the result will be that the wool will be made tender, and cannot be milled, while it will not dye well. Experiments have been made to test this, and it has been found that "the sulphuric acid, acting on imperfectly cleansed wool, sets at liberty the fatty acids of the grease, which fix themselves on the wool, and cannot be got rid of by the ordinary process." In addition to this, the grease that remains clogs the saw-like edges of the wool, gluing down the points of the serratures, thus making the edges smooth and unable to be felt; and the fibres themselves are considerably weakened, so that on being milled they do not form a compact mass, but are liable to be torn or worked into holes. Where, however, the wool has been perfectly washed before being treated with the acids, no injury whatever is done to it; provided, of course, that the carbonizing is effected properly, and that the whizzing in the hydro extractor is sufficient. Wool washed in the usual way, and wool washed and carbonized, have been microscopically examined, and the scales and serrations of the latter have been found to be just as clear and perfect as those of the former. Strange to say, the strength of the fibre in the latter case is even increased. Herr Weisner, of Vienna, tested horse-hair and the hair of the Angora goat, and found that when the acid did not exceed four per cent. or the heat 60° to 65° C., fibres which previously had broken with a weight of 480 grs., now only broken with 568 grs. When the acid was raised to over seven per cent. the fibre was weakened. Though wool will not bear an equally strong acid, yet if treated in proportion, its strength is not injured.

TESTS OF FASTNESS OF COLORS.

We have only two terms to designate the different degrees of the fastness of colors; fast and fugitive. Fugitive colors generally succumb very quickly to ordinary deleterious influences, whereas those that we call fast are only slightly attacked by air, light, water and soap. The differences, nevertheless, are only relative, and many colors fully resist certain influences, at the same time being sensitive to others. The adherence of the colors to the fibre also depends on their nature and that of the mordant which has served to prepare the fibre for the dye-bath. They are generally faster on woolens and silks than on linen, and their degree of fastness varies according to the kind of mordant employed. If the dyer desires to determine exactly the degree of fastness of the colors on yarns and fabrics, either of the tests that we shall indicate may serve him as a guide. For red colors boil a little piece of the goods in soapy water and another piece in lime water. Both liquids should be very slightly colored. The

color of the clipping should be neither yellowish, brownish, nor lighter in tint. By this test the dyer may assure himself of the presence or absence of Campeche wood, Orchil, Saffron, Santal or Coal-tar substances, which are all very subject to alteration. Of all the yellow dyes the Yellow Madder is the fastest; those of annate and Indian saffron (curcuma), are the most fugitive. Their fastness to light is all about the same, but in washing the madder colors alone preserve their fastness. For tests, samples should be boiled successively in water, alcohol and lime water. If the alcohol and the lime water become perceptibly yellow, the water reddish and the sample of goods a reddish brown, the color is fugitive. A color is fugitive when, boiled in alcohol, it colors the liquid red, reddish violet or blue; or better, when it colors red a bath of Hydrochloric acid, water or alcohol, in which it has been slowly heated. Finally, when the color of the sample turns red or a reddish brown. The only fast violet colors are the combinations of indigo and cochineal and the Madder violet, as all the fast colors when they combine with the fugitives lose their intrinsic value. The violet colors should be considered as fugitive when, after boiling for from ten to fifteen minutes in equal parts of water and alcohol, they give up a portion of their color. The same is true when the piece of goods boiled in a solution of Hydrochloric acid turns brown or a reddish brown or colors the liquid red. In order to test orange, boil the sample in water. This should become neither yellow, reddish yellow nor red. If the water remains uncolored, heat the sample in alcohol, which if the dye is fast, will remain uncolored. A sample dyed green should be boiled for a test, in a solution of alcohol, which should become neither blue, green nor yellow. If it is boiled in a solution of Hydrochloric acid the liquid should be neither reddish nor bluish. With the brown dyes a test is of little value and the method of experimenting is a little more complicated; nevertheless all browns which boiled in water give the liquid a reddish tint and when immersed in alcohol impart to it a yellowish tint, should be considered as fugitive. Black is fast when boiled in water slightly acidulated with Hydrochloric acid; it gives to the liquid only a slight yellowish tint. It is still more fast when it has been passed through the dye vat. One can make the test by boiling a piece newly dyed in a soda solution. The sample which is dyed black with Tannin will become brown, whereas it remains black and turns blue, perhaps also a dark green when it has received a bath at the bottom of the vat. If the water and the Hydrochloric acid in which the sample has been boiled becomes red, or if the color of the goods is changed to a brown, or a reddish brown, it is due to the presence of a Campeche wood dye without a bath in the dye vat, and consequently is all the more fugitive. If the color simply turns blue while the bath becomes red, the dyeing has been effected with Campeche wood and a foundation of indigo. In this case it is relatively fast, or at least very slightly fugitive.—

Le Moniteur de la Teinture.

FOR THE CANADIAN JOURNAL OF FABRICS.
WOOL PROCESSES.

BY B. P. FÉLIS.

A process for putting a coating of wool fibre on a cotton-thread is shown in Fig. 1. In this sketch are

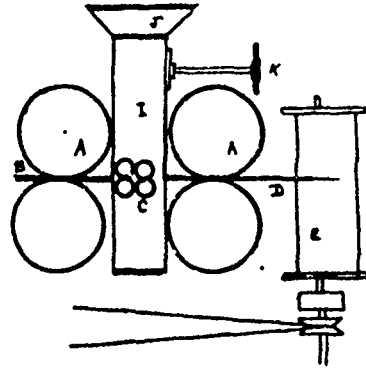


FIG. 1.

the draft rolls, *A, A*, which are in all spinning frames. The strand of roping is marked *B*; this is cotton. It passes through the rolls and to the bobbin, *E*, just as is done in ordinary spinning. *D* is the sliver on its way; at this point the twist is going in. The new invention is centred at the point between the draft rolls, as shown in the drawing. This square, box-shaped affair is made of sheet-iron, and is hollow. The box is shaped like a funnel at the top, being wider, so that the attendant may readily put in the stock to be used for a covering for the cotton slivers. This stock consists of loose, open, and well-carded woolen fibre. Now the object is to place enough of this woolen fibre around the circumference of the cotton sliver to completely cover the latter. At *K* is a regulator which the attendant screws in or out for the purpose of regulating the quantity of fibre which is to be fed on to the moving cotton sliver. That part of the box above the regulator is kept full of woolen fibre. The jar of the box, caused by the constant movement of the rolls, causes the fibre to fall upon the two sets of toothed rolls near the bottom of the box. These rolls are turned slowly and regularly by a system of gears, etc., at one end of the frame. The tendency of the long, sharp teeth is to force the fibre of wool into the body of cotton sliver. When the sliver starts into the first pair of rolls it is purely cotton; when it gets into the box, the work of fixing the woolen fibre begins, and by the action of the toothed gears, the woolen fibre is uniformly and permanently fixed around the circumference of the sliver.

WET GIGGING.

Wet gigging is so called because the goods are passed over the teasels of the gig in a wet or dampened form. Dressed-faced cloths, such as doeskins, moscows, beavers and broadcloths, are gigged by this method. The character of a fabric gigged by this process is materially different in several ways after coming off the gig, even if constructed the same as those gigged by the dry process. The principal distinguishing feature is that the fibre will have a tendency to lie close to the

cloth, and will not protrude out, as in the dry gigging system. Therefore the shearing process is rendered more difficult comparatively, and goods which are required to be sheared close are never subjected to the wet process. The fundamental cause of this peculiarity is due to the effect of the dampness on the fibres, while the cloth is on the gig; the tendency is for the teasels to draw the fibres into one continuous line, and as the moisture acts as a temporary adhering agent, it causes the fibres to hold fast to the surface, consequently when submitted to the blade of the shear the great majority of them still retain their primary positions and therefore the blade glides directly over without touching them.

A very effective and pleasing line of goods is finished by this process. The doeskin, for instance, is a good illustration of the desirable results derived by the wet system. The elegant and lustrous finish for which this class of goods is famous, and the fine, soft feel which is invariably present, could not be obtained by any other method. The use of the shear on goods gigged by this system is merely for the purpose of cropping off the straggling fibres which appear above the common level. The most of those on the surface of the cloth are not disturbed, hence when they are pressed and finished a most desirable and effective result is procured. The method of keeping the goods damp while undergoing this process is accomplished in several ways. Possibly the most crude system is that of using a hose pipe, fitted with a sprinkling tip on its nozzle. Again, common watering pots are used in some mills for this purpose. The best system, however, is that which includes a series of iron pipes, with perforations, which eject the water in a multitude of miniature streams all over the surface of the cloth. A perfect distribution is derived in this way, therefore substantially the same idea is utilized for introducing steam into the goods while they are on the gig.

The gig itself, we find, consists of the large hollow drum or cylinder, to which the teasel slats are securely attached. This cylinder is represented in Fig. 2 by *A*



FIG. 11

and the teasels by *B* and the cloth by *C*. The arrows indicate that the cylinder operates in the opposite direction to that of the cloth, therefore the rapid motion acquired effectually raises the nap on the fabric, which is suspended in front of the teasels by a system of rollers. The cloth, however, travels at a much slower rate than that of the cylinder; it is also so arranged that it may be adjusted at any distance from the cylinder, but as a rule it is set sufficiently close to facilitate a good gigging capacity.

DRY GIGGING.

The process of gigging by the "wet" system was explained in a previous paragraph. The difference between the two systems is suggested by their names, the one being subjected to the action of the gig while in a wet, and the other while in a dry, state. The former is employed on goods which require a fine soft finish. Opposite results are looked for in fabrics gigged by the dry process, for here the object is to elevate the nap as high as possible to permit its removal by the blade of the shear. This end could not be attained if the goods were wet, for the excessive moisture on the fibres would cause them to adhere to the surface of the cloth, and prevent the shear blade from doing effective work, for it could not get at the root of the fibres, and would glide over without cutting off more than the tops of those which happen to be above the common level. The dry-gigging process, however, raises the fibre completely and bodily up, sufficiently high to allow the sharp blades of the revolver to shave it off close to the body of the cloth. Worsted dress goods, coatings, trouserings, and ordinary classes of woolen cassimeres, are generally gigged in a dry state; thus the two principal elements of this portion of the finishing department are substantially the wet and the dry processes. In order to more fully demonstrate the distinguishing features between these two essential factors, the following suggestions are offered for trial. Move the palm of the hand swiftly over the surface of a piece of gigged cloth in various directions. If the nap or pile resists the efforts of the hand to shape them in any particular direction, and if they spring back into the original positions immediately after the hand is removed, it is a positive indication that the goods have been gigged by the dry process, the shear having so effectively removed the fibres that there is not sufficient length remaining to allow the hand to lay them out in any particular direction, and the miniature stump which is left persists in projecting from the face of the goods.

EARLY BRITISH WOOL TRADE.

From 1660 down to 1825 the export of wool from England was strictly forbidden. The idea had become prevalent that English wool was the best in the world, that combing wools could not be produced anywhere else, and that if the raw material were kept at home the market of the world would be reserved for English manufacturers. Accordingly many statutes were passed containing the most stringent provisions, imposing the most severe penalties to prevent the clandestine exportation of wool. Jno. Smith, in his excellent work, "The Memoirs of Wool," exposed the injustice and absurdity of this system, and showed that whatever advantage was thus gained by the manufacturer, more was lost to the agriculturist. The prohibition of export was, however, continued till 1825, when Huskisson's efforts were successful in securing the abolition of this remnant of a barbarous policy. The improvements in machinery had by this time made it possible to employ

short or clothing wools for purposes to which the combing wools had alone been hitherto applicable. This removed the only argument which the restrictionists had been able to urge.

Till 1802 foreign wools were imported free of duty, and as they were the raw material of an important industry, the advantages of such a course are obvious. In 1802 a duty of 5s. 3d. per cwt. was levied on foreign wools, and this was variously increased to 56s. per cwt. in 1819. The results were most injurious, as the home production was not at all adequate to the demands of the manufacturers, and the exports of woollens fell off considerably. Before the committee of the House of Lords, which inquired into the condition of the wool trade before the duties were removed, manufacturers declared that English wools were suitable only for the production of blankets, baizes, etc., and that while they were also largely used to mix with foreign wools, the exclusion of the latter would not increase the demand for the British article, but really diminish it; while the admission of foreign wools would maintain the price of English wool by causing an increased demand for use in manufacturing for export those fabrics to whose production it was so well adapted. The history of prices since the abolition of the duties bears out this statement, for while enormous imports of foreign wools have been made, prices of home grown wools have been well maintained.

Previous to 1800 English imports of wool amounted to about 3,000,000 lbs. per annum, chiefly from Spain. In 1800 they amounted to 9,000,000 lbs., and in 1895 1,558,030 bales of colonial wool alone were imported. Instead of being chiefly derived from Spain, as was the case down to 1814, the sources of supply are now the Australian and South African colonies and the East Indies. It is of interest to note that the prices of foreign wools in London in 1869 and 1896 June sales were as follows:

	1869.	s. d.	s. d.
Australian fleece, superior, per lb		1 8	to 2 2
Cape, average flocks		1 1	to 1 3
1896.			
Victoria (Australia) fleece, superior per lb. ...		1 8	to 2 4
Cape, scoured, superior, per lb		1 2½	to 1 3½

TECHNICAL EDUCATION.

Speaking recently at the opening of a technical school at Epsom, England, Lord Rosebery said:—

"Year after year the officials of the Board of Trade have called our attention to the fact that we are no longer the undisputed mistress of the world of commerce. We are threatened by one formidable rival, at any rate, who is encroaching upon our trade as the sea approaches upon the weak portions of the coast. I mean Germany. A little book has been lately published, called 'Made in Germany,' to which I think attention ought to be called. When you recognize the broad features of the statistics of imports and exports, you will see that the total imports into Great Britain and Ireland are increasing and the exports diminishing. It is not, perhaps, the time to inquire into the cause as regards Great Britain herself, but as regards Germany the causes are not far to seek. The fact is that for the last sixty, seventy, or eighty years she has fitted herself with the most perfect system of technical instruction

in the world, excepting, perhaps, the Swiss system. Germany has been slow and patient, but she has been laborious. She has sent clerks and agents over here, who have taken back with them what secrets we had to afford, and, doubtless, improved upon them. The result is that, though we have not lost our position, Germany is slowly—and not very slowly, after all—creeping up to us in our colonies, in India, and in Egypt—which is under our tutelage for the present—and in each of these Germany has gravely menaced British trade. But at any rate I think we have a right to ask this—there are Committees and Commissions of Inquiry without end. Some are indefinitely postponed, but some are pressing and immediate. Surely an inquiry might well be instituted—which should be thorough, practical, and exhaustive—into the cause of the decline of British trade and the alarming increase of our foreign rivals. We shall, at any rate, I believe, find this—that ever since the great defeat of Prussia by the great Napoleon at the Battle of Jena, she has silently and quietly fitted herself for two great wars. One of them she has accomplished, the other she is accomplishing. The war she has accomplished was the great war for the consolidation of Germany; the war she is accomplishing, and which, in my opinion, is the only meritorious war in which any nation can engage, except under pressure of necessity—is an industrial war, and in that I think and fear—while having the heartiest wishes for our welfare—that unless we take precautions in time, she is likely to succeed also."

FRAMEWORK KNITTING, WEFT AND WARP KNITTING.

Framework knitting in its true form constituted a fabric produced from a single thread formed into peculiarly-shaped loops, each of which hung supported upon one another. It differed distinctly from a woven fabric in this peculiarity, which rendered it adaptable for underclothing by being especially elastic, thus giving it a clinging tendency and enabling it to be perfectly fitting without any rigidity. Where a fabric possessing rigidity was required, those produced by the process of "weaving" were chosen, and for elasticity those produced by knitting. Another peculiarity of the two fabrics was their thread constitution, that of weaving being composed of two threads running at right angles and joined by intersections, and that of knitting comprising a single thread hanging on itself by looping.

Weaving has to the present time retained its character, while knitting has somewhat undergone a change. Knitted fabrics—or, strictly speaking, looped fabrics—are now being introduced, and in a sense compete with woven fabrics. These may be divided into two classes: First, those in which two threads are used in similar form to that of weaving, viz., a warp thread and a weft thread, but combined by looping; second, those having two threads, each of which is a weft thread, the one only being formed into loops and retaining the other by intersections as a straight thread exactly similar to the weft thread in weaving. This latter has also the special feature of being somewhat non-elastic, and so more resembling the woven fabric. It is of these two kinds of fabrics that we intend to treat of in this article, taking that first composed of two threads, warp and weft; and secondly, that of two threads, both being weft threads.

The warp and weft principle is being used in the manufacture of knitted fabrics for several different purposes. A knitted fabric of weft thread only was mechanically produced in 1589, and later, in 1775, machines were introduced making looped fabrics from a number of threads called warp threads, no doubt from their resemblance to the warp threads of weaving. In warp knitting a thread is supplied for each needle, and by a peculiar movement of the guides conducting these threads to the needle, each guide laps over a different needle at each successive row of loops, and so forms a solid fabric similar in construction to weft knitting or knitting proper, the difference that the loops have their sideways joining at adjoining courses, while in knitting proper they are in the same course. Again, in warp knitting the threads run perpendicularly, instead of horizontally, or course by course. In knitting with both weft and warp threads, it will be seen that if the weft thread extends across the fabric from right to left, and left to right, each

needle must have this thread laid over it, and so a loop is formed upon every needle, while the warp thread running perpendicularly has its own needle to feed, so that the two used in conjunction cause a second loop to be laid upon those needles where weft threads are laid. But by a peculiar system of laying these warp threads the loop they form is made in front of the weft loop of the same needle, and remains there in the finished fabric, hiding behind it the other loop. Thus in weft and warp knitting a loop of distinct color may be made upon any particular needle or set of needles, and at any particular course or row of loops, and show only on the face of the fabric at that particular position.

Several varieties of designs are produced by this combination of threads. Fig 1 shows a design produced usually upon latch needle frames having this combination, says a writer in the *Textile Recorder*, England. Here two guide bars are used, each having different movements. There usually being a guide to each needle, a variety of patterns can be made on this principle. At Fig 1 guides on each bar are drawn at intervals, at 1, 2, 3, 4, showing No. 1 bar; and at 15, 16, 17, 18, No. 2 bar. No. 1 bar first moves at each successive course on needles to the right for six courses and then returns. No. 2 bar moves exactly the same, but reverses as shown. By this means zigzags of any width and any number of needles wide can be made.

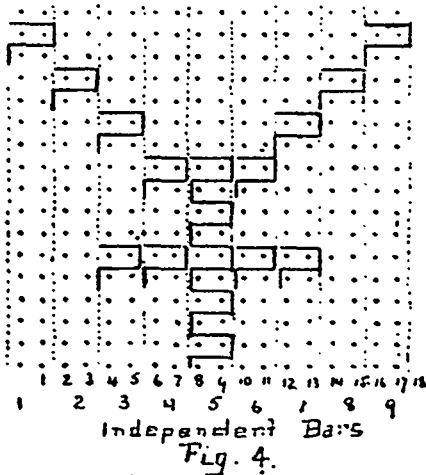
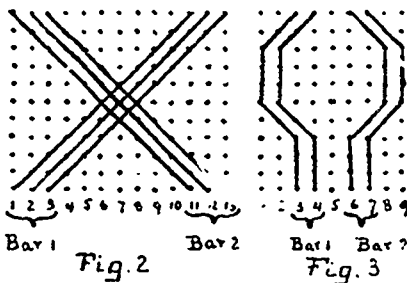
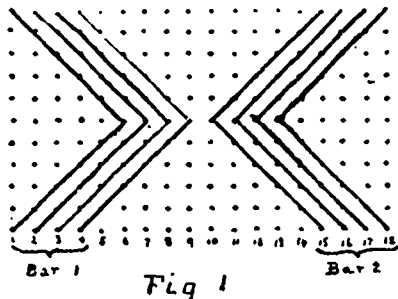
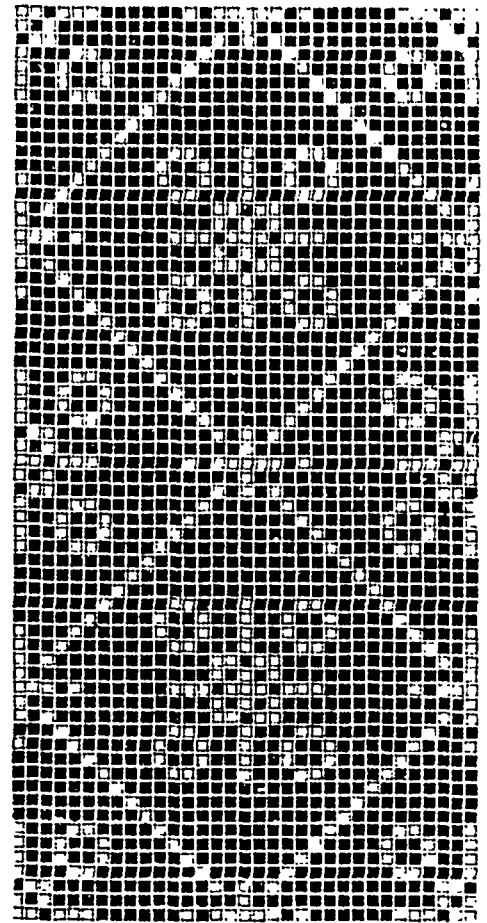


Fig. 2 shows a still further manipulation of the guides, bar 1 having a right hand movement for a great number of courses, while bar 2 has a similar number of movements to the left, each reversing. Guide bars, 1, 2, 3, having different threads, lay loops over needles 2, 3; 2, 3, 4; and 3; 4, 5, and so on to needles 11, 12, 13; and bar

2 lays loops over needles 11, 12, 13, 10, 11, 12, 9, 10, 11, to 1, 2, 3, so forming a cross diamond design.

Fig 3 shows another principle of two bars moving independently, bar 1 first dropping a loop on needles 3, 5, and as shown, while the other bar is lapping on needles 6, 7, as shown, so producing any set design required.



Same Liss. Fig. 5.

It must be borne in mind that the weft thread forms the groundwork upon which these warp threads—which may vary in color as required—form the different patterns shown. The principle of weft and warp knitting has also been applied to the bearded needle frame, such as Cotton's patents, and has ever attained a higher development than on latch needle machines. The guides for laying the warp threads are arranged differently, each guide being so controlled that its thread shall lay a loop round the one or two needles it controls, or by being in a different position leave the needles without a weft thread. By this system some very pretty combinations are produced on ladies' hose. Fancy designs of many different styles being introduced, as by special designing apparatus, any one or two needles can have a different thread, laid at any desired course and at any distant part. To further explain this system, and at the same time to show the vast capabilities it has for designing, reference must be made to Fig. 4. Here eighteen needles are shown, having a guide at each alternate needle, the nine guides standing as follows—

- 1st guide at left hand of frame.
- 2nd " between needles 2 and 3
- 3rd " " " 4 " 5
- 4th " " " 6 " 7
- 5th " " " 8 " 9
- 6th " " " 10 " 11
- 7th " " " 12 " 13
- 8th " " " 14 " 15
- 9th " " " 16 " 17.

This system would be continued across the frame, and each guide have a movement of two needles. Each pair of needles across the frame can be supplied with warp loops as desired. Take design Fig 4 and at course 1, guide 5 only lays loops over needles 9 and 10 for four courses, all other guides still having their threads do not lay the same in knitting position, and so no loop from the warp thread is formed. At course 5 it will be seen that in addition to guide 5, guides 3, 4, 6, 7 come into action, so that warp loops are laid on needles 5 to 14. This continues for two courses, when 3, 4, 6, 7 cease again to lay loops, while 5 continues along for courses 7 and 8. At course 9, guides 4, 5 and 6 come into operation for courses 9 and 10; and at course 11, 13 and 15, guides 3 and 7, 2 and 8, 1 and 9 respectively, only are in operation. By these movements designs in flowers, leaves, etc., can be produced, as the warp threads need not of necessity be all of one color, but suitable colors can be used at any guide bars, and where discretion is used and good taste displayed some good effects are produced.

Fig 5 shows a ladies' hose made on the machine above explained, having the warp design on the ankle and instep, and shows at once the capabilities of this system of knitting, or, as it should be called, weft and warp knitting.

FACTORY LEGISLATION IN EUROPE.

The factory laws of Germany, where they do not remain, as in England or France, a separate group of enactments, are embodied in the Industrial Code of the Empire, which, with odd exceptions, applies as a whole to all trades and industrial occupations. In hackling rooms, or rooms in which machines are used for opening, loosening, grinding, dusting, greasing or mixing of raw or used fibres, etc., young persons may not be employed nor their presence permitted whilst manufacturing processes are carried on. This prohibition, however, does not apply to cards for wool or cotton, but young persons are not allowed to tend the openers. This regulation, it is said, presses hardly in the case of smaller textile factories where openers and other similar machines are at work in the same rooms with spinning machinery. Children under 13 years of age may not be employed in factories, and over 13 years may only be employed when freed from attendance at an elementary school. Their hours of work must not exceed six per day, while those of young persons (14 to 16) may not exceed ten. Further, employers are bound to afford their workers under 18 sufficient time to attend recognized continuation schools, if they desire it. In Wurtemberg a law has been passed making attendance at continuation schools during the day time compulsory until the 16th year. Women may not be employed in factories for more than eleven hours daily, beginning not earlier than 5.30. A mid-day pause of one hour must be given, and women over 16 having the care of a household must be given one and a half hours. Illegal overtime was found in textile factories last year in a considerable number of cases, but convictions were seldom obtained. In the textile factories the number of women employed (over 16 years of age) is about 315,000.

In Austria the basis of labor legislation is also the Industrial Code, and, as in the case of Germany, a long series of laws and administrative orders have followed in its train. Inspectors of industry are appointed, whose duty consists in the superintendence of the enforcement of the sections of the code which relate to: (1) The provisions made by employers for security and health of their workers in workrooms and dwelling rooms; (2) The employment of workers, the daily periods of work and periodical pauses; (3) The provision of labor certificates, affixing of working rules and payment of wages; (4) The technical instruction of young workers. In every industrial establishment registers must be kept of all workers, giving names, age, place of origin, the name of commune supplying the labor book, the date of first employment in the establishment, name of last employer, the mode of employment in the factory, the sick fund to which the worker belongs, and the date of leaving the establishment, the register being open to inspection by the industrial authority. Sanitary provisions receive special attention at the hands of the inspectors, though complaints are very frequent about the insufficient means adopted for accomplishing the objects in view.

The general provisions against truck in the Austrian Code have a similar bearing to those in the German Industrial Code, covering out-workers of every description. The working rules, affixed in all places where not less than 20 workers are employed, must contain a provision as to the nature and amount of fines and deductions from wages, and the mode of applying the amount gathered in this way. The inspector in the Olmutz district found himself compelled to interfere in many cases for illegal deductions, on account of goods or spirituous liquors supplied, and he draws attention to an evasion of the law in the premium system. Under this system a worker, "who continues a whole season in the business, shall receive at the end a premium on each day or piece of work." The real meaning is that on every payment of wages a certain proportion is held back, as a caution, to be paid over at the end of the season. The "caution" of those workers who leave before the end is of course so much gain to the employer. Another inspector remarks that the real effect of this practice is to render the right of a worker to leave at eight days notice an illusory one, although the employer retained the right to dismiss the worker. In a flax spinning works where it was the custom to withhold one florin as a caution on each worker, the practice was stopped at the request of the inspector. The most peculiar form of remuneration was found in a linen factory, where the two foremen received no regular wages, but were paid out of the proceeds of deductions for damaged pieces. The deductions were calculated on so high a rate that they were described by the foremen themselves as unjust. Wherever workmen's committees have been formed, the chief inspector remarks, they have given satisfaction both to employers and workers, and it is particularly noteworthy that from the factories where they exist no complaints were received.

One of the most important matters to be considered by inspectors abroad as well as at home is the proper fencing of machinery, and in this connection there is a report on a visit to the Amsterdam Museum, where appliances are shown for the prevention of accidents and diseases in factories and workshops. The idea of the exhibition first took practical shape in 1891, when a committee was formed to carry out the scheme, in which master as well as workman would be able to study the best appliances for preserving the latter from the dangers to which he is exposed. The Museum was opened in 1893, and is open free to the public on certain days each week. It contains a very large number of appliances fitted to various machines in actual working order, whilst a special department is set apart for the exhibition of models of various methods of ventilation, warming and lighting. The institution is a capital one, and if one on a similar, or rather a smaller scale, could be established in the United Kingdom, paying visits, say, of one or two months duration to the large industrial centres, we are certain good results would follow. Workers are proverbially antagonistic to safety appliances, and the more dangerous their employment the more careless they appear to be, consequently, if such a collection of appliances were on exhibition, and the advantages of the various guards pointed out and made familiar to them, there is no doubt it would have beneficial results.

It is said that the spider has "a spinning jenny and warping mill and power loom in its head." This is not quite correct by way of description, but as to the spinning qualities of the spider there can be no question, and the popular prejudice in which it is held should be lost in our admiration of its wonderful work. It appears that there is still believed to be much hope of setting some sorts of spiders to work in the service of man, or woman, and a learned German professor announces that he has perfected, at least to his own satisfaction, a plan for gathering the filaments of spiders for human use. To counteract their cannibalistic appetites each spinner is to have its own home, a wire ring surrounded by water. Each is to be fed with flies, reared for the purpose, and is to be placed in the stocks every day and compelled to give up its silk. It is admitted that this would involve much labor and require much space, and probably make spider silk costly, but there is no thought, as yet, of setting up spider factories on a large scale, or of putting natural spider silk underclothing on the market.

Textile Design

GRANITE-WEAVES.

Under this system of weaves are classified small broken-up effects, which are derived from the foundation weaves in various ways. Amongst the effects most frequently used are found those that are derived from the satin-weaves. In this manner these figures are designed:



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

Figs. 1 to 3 are granite-weaves derived from the 7-harness satin. The latter is shown in each design by \times .

Designs Figs 4 to 7 are derived from the 8-harness satin. The first two weaves are obtained by adding three additional points of interlacing to each original satin spot (\times).



Fig. 5.



Fig. 6.



Fig. 7.

The last two weaves are obtained by adding four additional points of interlacing to the original one. The original 8 harness satin is shown in each design by \times .

From E. A. Posselt's "New Technology of Textile Design."

THE BRADFORD WORSTED INDUSTRY.

No other great English industrial centre has suffered more from fortune's slings and arrows than Bradford, nor fought so determinedly against a rush of commercial troubles. It is a desperate industrial battle, from which the town has emerged triumphant after much exertion. The manufacturers and merchants of the district owe much of their sufferings in the past to the fact that their eggs were nearly all in one basket. In other words, Bradford's range of samples was too limited, and her principal customers, though large buyers, were so few in number that when one abstained, for whatever reason, from his usual purchases, Bradford was immediately face to face with a commercial crisis. If New York ceased from operating; the local trade was paralyzed; if fashion frowned upon the style of dress goods with which the name of Bradford was principally identified, half the looms in the district ceased running. The fifty or sixty villages to be found within a radius of five or six miles of Bradford, and which are dependent upon it as their central market, suffered in unison, and the inhabitants of the valleys and woods characteristic of that section of the Pennine country felt, and still feel, with the rapidity of an electric spark, anything which affected the parent centre.

Architecturally, Bradford is not an unattractive town. Its warehouses are fine buildings, resembling those of Manchester very closely. Many Manchester houses, in fact, have vast branch establishments in Bradford closely approaching in size the headquarters themselves. And the heads of these Bradford establishments are as much entitled to be considered merchant princes as their Manchester neighbors. One Bradford house sells every year £600,000 worth of worsted coatings alone. The operations of the local merchants are world-wide. The British trade has to most of them been merely a secondary consideration until recently. The American markets (north and south) take considerably over one-half of the total worsted exports of the country, which have fluctuated from six millions sterling in 1893 to about ten and a-quarter millions last year. Worsteds resemble linens in this respect, that if the American trade were taken away the industry would be ruined. There is, however, a very large Bradford trade with the continent, and this in the face of the curious fact that France and Germany pour into Great Britain over £10,000,000 worth of woollens a year. Bradford has just commenced a campaign, the object of which is to capture the home market, instead of depending so much upon the foreign trade. A large and fashionable assemblage was called

together the other day at Hyde Park Court, the London residence of the member for Central Bradford, in order to show the abilities of the worsted town as a producer of fabrics for which it had not previously been recognized as a centre. The shadings, the colorings, the designs themselves were acknowledged to be perfect, and Bradford climbed to a higher industrial plane in five minutes, so to speak. Nearly a dozen M.P.'s and a score of titled and other personages acted as leaders in this very interesting and significant ceremony. Two specimens of the dress fabrics shown were selected for the royal trousseau. There would be an acknowledgment of weakness in endeavoring to make much capital out of such a circumstance. Bradford has wisely refrained from doing anything of the kind.

A noticeable feature in Bradford is the frequency of the piano sewing machine and wringing machine in the cottages of the ordinary weaver, forming financially the lowest class of householders. The average earnings of the operatives are much less than those in Lancashire, the paradise of the English workingman; but they are as a rule comfortably off, and support building societies liberally. If I were asked to distinguish the salient points of difference between the Lancashire operative and his neighbor across the Pennines, I should say that in the cotton districts high wages are more frequently accompanied by an expensive and extravagant style of living. There is certainly more thrift in the worsted districts than in Lancashire, and in this respect the average Yorkshireman much more closely resembles the Scotch than the Lancashire operative. The latter, however, can boast of a trade union which is the strongest in the world, with accumulated funds exceeding £200,000. In their powers of organization to resist employers Lancashire operatives are unequalled the world over. Possibly it is a good thing for the worsted trade that trade-unionism has been of a less aggressive character than in the cotton trade. As to wages, it may be explained that about 55 per cent. of the labor employed in the Bradford trade is that of women. Men form about 25 per cent. of the total, the remaining 20 per cent. being children. The weaving is principally in the hands of women, whose earnings average about 16s a week. Each weaver works two looms in the stuff (women's dress goods) trade, but in worsted coatings only one. The tendency is to increase the number of looms allotted to each weaver, manufacturers hoping by this means to lower the cost of production. The matter has already been a source of friction between operatives and employers from Bradford toward Skipton. In the latter town three looms are minded by each weaver (men and women), but the material is coarser than that of the Bradford trade. As a rule, it may be said that Yorkshire male operatives do not seek to remain weavers, for to be "nobbut a weyver" is too poor a goal for their ambition. Warp dressers receive about 30s weekly, weaving overlookers from 20s. to 40s., and machine wool combers (men) from 12s. to 18s., the women getting from 2s. to 5s. less. Children in the spinning department get from 1s. 4d. to 4s. 6d. a week, and 5s. to 10s. when on full time. The wool sorters earn from 20s. to 30s.

In addition to the mill employees a large staff is engaged in the various home and foreign trade warehouses, and here, of course, earnings fluctuate largely, from the head buyer with his £1,500 or £2,000 a year to the apprentice boys getting their 2s. and 5s. to .0s. a week. A good maker-up or packer will command 30s. a week, but even here the rates are not uniform.

The silk trade established by S. C. Lister (Lord Masham) stands by itself. The Manningham mills, which are the headquarters of Lister & Co. Ltd., formerly employed about 5,000 hands in this trade. The number now is rather less. The story of Mr. Lister and silk waste curiously resembles that told of Titus Salt and the discovery of alpaca. Saltaire, which Titus Salt founded, is only a few miles from Lister & Co.'s mill. The history of these two concerns is the most romantic in the annals of English industry. Change of fashion and the McKinley bill proved a severe blow to Manningham, which at one time transacted a trade of £300,000 a year with the United States in silk plush alone. In 1888 the exports of this class of goods from Bradford to the States exceeded £540,000 worth. In 1891 the value had shrunk to £50,-

000, and the trade has not exceeded that amount since. The result of this serious shrinkage was an attempt to reduce wages at Manningham, followed by a strike of 600 weavers on December 16, 1890, about two months after the McKinley act came into force. One thousand three hundred dyers and finishers were thrown out of work in consequence of the action of the plush weavers, and a few weeks after about 2,600 additional hands struck in sympathy, making in all some 4,500 hands out of employment from this one firm alone. The struggle lasted nineteen weeks and ended in a victory for Lister & Co. The present wages are about 20s. for velvet weavers and 10s. for winders. Mule spinners (men) in the Yorkshire silk trade averaged less than 30s., dyers under a pound, and warpers about 30s. in the good times which preceded the McKinley bill. In the spun silk branches the women earn from 10s. to 14s. a week, and in the weaving department from above 10s. to 15s. Lister's mill is the largest silk factory in the country, if not in the world. The distance around the walls is over a mile, and architecturally the building has a fine appearance.

The machine wool comber (who followed the hand combers, once very numerous in Bradford) is not well paid, but if he has a large family the united earnings from the mills become large. Many families whose children are steady and unmarried have an income of £5 or £6 a week. There is no town in England in which so large a proportion of workmen live in their own houses as Bradford, two of the local building societies having dealt with £18,000,000 in thirty years, all freehold property.

There are about 18,000 children employed in the Yorkshire worsted trade, about 11,000 males under 18; 67,000 females over 13 (full time), and 32,000 males over 18. Totalling the whole of the Yorkshire returns affecting worsted spinning and weaving, the males number rather over 50,000, and the females over 76,000. The proportions, so far as Bradford is concerned, have already been given. There are over 61,000 worsted power looms in Yorkshire, and about two and three-quarter million spindles. This is exclusive of the machinery engaged in the woolen trade. Information as to the quantity of materials produced in the Bradford trade is not so readily obtainable, as no official statistics exist. Sir Jacob Behrens says that when he came to reside in Bradford, early in the century, the value of the trade done in the warehouses of the town did not exceed £300,000 a year. Twenty years ago the turnover was estimated at from £40,000,000 to £50,000,000 sterling, and the output was put at 3,000,000 pieces a year. The progress of the town drew to it wealthy merchants from Manchester and elsewhere, the first foreign dress goods (or stuffs, as they are termed) concern in the town being founded by Leo Schuster, of Schuster, Fulda & Co., Manchester. In 1884 the value of the whole wool industry was estimated at £60,400,000, and that of the worsted branch at £33,000,000. Last year the exports of woolen and worsted manufactures amounted to £28,300,000, and following the reckoning of Sir Jacob Behrens, who estimates the home trade at about 54 per cent of the total, we have a total of between £61,000,000 and £62,000,000, without including the enormous transactions in raw wool, nor the very large business in machinery and other articles. The consumption of wool in the United Kingdom last year is estimated at 510,000,000 pounds, of which 397,000,000 were foreign and colonial, and the balance domestic growth. This is a larger total than ever before known in the history of the trade, while the consumption per head (13 pounds) has never been equalled except last year. It is evident from this that the trade is not a declining one.

JAPANESE RUGS.

Robert P. Porter writes from Japan of the rug industry of that country, in which he imparts some very interesting information as to the methods pursued in their manufacture. He prefaces his letter with extracts from a letter which he received from a Philadelphia correspondent, as follows:

"Very little attention has been given to a consideration of the competition which American rug and carpet manufacturers are meeting from the Japanese manufacture of jute and hemp rugs. As

you know, jute and hemp rugs of Japanese manufacture have been sent to this country in enormous quantities during the last three or four years, and at prices which have very seriously affected the trade in American carpets of the cheaper grades. I think it would be of very great interest to many of our manufacturers if you could give them some definite detailed information about the carpet and rug industry of Japan, and what may be expected from it in future."

Turning to the export tables, I found that five years ago the export of rugs and mats was small in the aggregate, not over \$250,000 or \$300,000 (silver). In 1893 it suddenly became important and increased as follows:

	Silver Dollars.
1893	\$2,115,336
1894	3,199,565
1895	5,097,271

When it is remembered that over \$4,000,000 worth of this carpeting and matting goes to the United States, it is natural that American manufacturers of carpets, matting and rugs should desire to have definite information as to the probable future of the trade. The seat of the rug industry is near Osaka. A ride by train of less than an hour from the great manufacturing centre of Japan brought me to Sakaye, a manufacturing city of 50,000 inhabitants.

Long before Sakaye rugs were invented, to the annoyance of American manufacturers, Sakaye was famous for its tea houses along the beach, its cosmetic powders, its hardware, and its bricks; a curious combination, to be sure, for excepting that the fascinating geisha girls of the tea house seem freely to patronize Sakaye cosmetics, you would never suspect from the appearance of the houses, the hotels, or the people, that they stood much by either hardware, brick, or rugs. The houses are of wood, the floors are bare or covered with Japanese straw mats, and the fruitless skirmish two pretty maids at the Sakaye Inn made to secure a knife and fork that I might eat my dinner in comfort, did not indicate that Sakaye excelled much in table hardware.

Crossing the bridge from the station, half the people we met seemed to have gone stark mad on the subject of blankets. The Japanese have begun to manufacture woolen blankets, some of which are dyed bright red and others bright green. The jinrikisha men adore these blankets, and so do the people from the country. The day was chilly and a drizzly rain falling. In the vicinity of the depot and the main business streets men and women, on high wooden clogs and wrapped in these gorgeous blankets, greeted us with an inquiring look. Turning from the principal street to the streets given over to rug making and other pursuits, Sakaye looked very much like a deserted village. All the population was indoors, busy at the loom and in the hundred other small occupations which I afterwards found carried on in this interesting old town, for Sakaye has been a manufacturing town for centuries.

This entire day was spent with Sakaye rug dealers, and with the men, women and little children who make them. In the morning, accompanied by one of the largest New York dealers in these rugs, and also by the head of one of the oldest English commission firms in Kobe, I visited the principal warehouses and had an opportunity of inspecting the new rugs which will be put upon the market this autumn. They are certainly making a great variety of these rugs in Sakaye and the surrounding district. Here you find the light blue and gray cotton rug; the oriental hempen rugs in dark red, purple brown, and in the sombre hues peculiar to Persian rugs. Here, too, are made, in smaller quantities, rugs of raw silk, of hair, of cattle, of wool, and of rags.

The size of these rugs takes as wide range as the pattern and material. Measured in Japanese mats, they range from one mat in size to forty-eight mats, or, say, rugs of twenty-five by fifty feet, as the Japanese mat measures the orthodox three by six. The "godowns" or warehouses of Sakaye seem literally weighed down with these rugs. In one place, where my friends requested me to select a few hundred of the most attractive patterns for the American market, fully twenty coolies were at once set to work, and bundles of rugs literally came in from all directions. The prices and qualities took leaps from as low as 5 sen (2½ cents) per square foot

to 20 and 25 sen (10 to 12½ cents) for the best quality. The poorer qualities seem of little account. You could almost count the twisted hempen threads. They were really ugly.

The design in such rugs is not woven, but impressed or dyed in. The quality, as a rule, increases with the number of weft threads, some woven-out designs reaching as high as six hundred threads in the space of six feet.

I found that Sakaye gave some attention to cotton rugs, which are made in the same way, only coarser cotton yarn is used instead of hemp. There are no large factories here, but the business seems to be organized by brokers, who furnish the material and combine brokerage and wholesale dealing. In 1894, owing to the appreciation of the price of the raw material, and also the wages of the hands, the market for these rugs rose by about 16 sen or 8 cents per piece. The average price per piece sent abroad (taking large and small together) is 2.08 yen, or a trifle over \$1 in gold. Hempen rugs of the better quality sell here for 10 or 11 sen (5 to 5½ cents) per square foot. The price this year for a fairly good grade is 7½ sen, or, allowing for present rate of exchange, say about 4 cents per square foot. This makes a rug, say 12 by 12, come to \$5.76, which seems to me a low price. Here we have a fairly good rug, made, as I shall presently show, practically by the dexterous labor of Japanese fingers. The estimates of cost of production which I have made are based on those of this, the largest district, and will not differ much elsewhere. The following figures show the cost of production of one-mat size of hempen rugs. The cost of cotton rugs is about the same—

	Yen.	Dollars.
Hempen threads for figuring out pattern.	800	.40
Cotton threads for weft .....	.150	.07½
Hempen thread for weft .....	.200	.10
Dyeing .....	.150	.07½
Labor .....	.400	.20
Miscellaneous expenses .....	.50	.20½
Total cost per mat.....	1.750	.87½
Sold at	2.430	\$1.21½
Profit per mat .....	.680	.34

Here we have, for a good quality of rugs, a little over three by six feet, a cost, say, of \$1.25 our money. I should think this would represent a fair average price for first-class hemp or cotton rugs, though a presentable quality of rug can be purchased at less than \$1 United States money per mat.

Having given the cost of producing these rugs upon reliable data collected at Sakaye, it will be interesting to compare it with the advertised prices of these rugs in New York city, as follows:

Feet.	Feet.
1-6x3.....\$0 55	6x 9.....\$ 6 50
2x4..... 95	8x10..... 9 60
3x3..... 1 10	9x12..... 12 90
2-6x5..... 1 50	10x12..... 14 40
3x6..... 2 15	10x14..... 16 80
4x8..... 3 80	12x12..... 17 25
6x6..... 4 30	12x15..... 21 60

The above list of prices I should think reasonable. If the estimate herewith given as to cost is correct, the retail dealers here seem to charge, after paying duty, freight, commissions, etc., about double the actual cost of production at Sakaye. A Japanese mat represents rather more than two square yards, so we have these mats produced here at a profit for less than fifty cents per yard, the price paid in the United States for the cheapest and poorest quality of carpets. It will be interesting to learn how it is possible for the Japanese to produce a hand-made article of great durability at a cost less than the cheapest carpets made in enormous quantities by the aid of the latest, the most ingenious, and the most rapid machinery.

It is simply the difference in the cost of living and in the environments of the workman. Let our American carpet manufacturers in New York and Philadelphia and New Jersey do a little ciphering for themselves. Let them inform the readers of this

article what they could do if they could employ in their factories for twelve and fourteen hours every day a pair of dexterous little hands and pay for these long incessant hours of labor the sum of one American cent. I do not mean chubby, rosy, fat, mischievous fingers, but yellowish, delicate, nervous fingers, that twist tiny hempen threads around the cotton warp so quick that the sharpest eye cannot follow the movement—fingers and hands that belong to stunted children, who, from the standpoint of Europeans and Americans, would seem to be three or four years old. I was assured, however, that they were seven.

Grant that those little Sakaye rug weavers were seven, and what a spectacle it was to see them kneeling sometimes on boards, sometimes on a dirty cotton cushion on the bare earth of the weaving shed, in front of the mighty looms, which were slowly unfolding the richly colored designs for rugs, soon to find their way into American homes. The threads are all put in by hand, and each loom is attended by two or three children, one or two lads or girls, and a man or woman who keeps watch of the design. The children are taught a little song or chorus for each pattern, and in this way they keep track of the number and color of the threads.

Poor little mites! I shall never forget how they looked in the first of these shops I entered, and how uncanny the singing sounded, accompanied as it was by the rapid movement of the fingers as the wool was twisted around the warp. I shall never see a Sakaye rug again without thinking of the children who sing the monotonous song of the design throughout the day, in these damp, noisome sheds on the Bay of Osaka. They are such yellow, worn, wan-looking little creatures, and the wonder is that the humane Government of Japan does not stop the whole business. I have already ventilated this outrageous system of employing children in one of the leading Japanese periodicals, with the satisfactory result of knowing that sanitary authorities of the Osaka prefecture will at once take the matter up.

It is only possible to manufacture mats and rugs of this description at the price and in the manner herein named, when wages and cost of living are as we find them in a country like Japan. One pair of busy skillful hands, even if they are small, and even if the body they belong to is emaciated and small and yellow, and the face wizened and anxious, will twist many hempen threads in twelve steady hours' work. The song of the Sakaye rug maker is, indeed, a weary and never-ceasing one, but the end of it is like the song of the shirt, the world gets rugs, and so cheap. Yes, as cheap as human happiness and human life in this part of the world. With hands like these, price one and two cents per day, with stronger and more steady hands for five cents per day, and skilled mechanics capable of supervising one of these beautiful rugs from start to finish at from ten to fifteen cents per day, perhaps our American producer might be willing to look with equanimity even upon Japanese competition. Let him figure it out for himself. It is my duty to give the facts impartially, just as I find them, and this I have done.

And now a word about the technical side of this industry. The manufacture of Sakaye rugs dates from 1831, when a thread merchant of Sakaye named Fujimoto Sozayemon produced, on the model of what were called Sagara rugs, a product of Naboshima, Hizen and a Chinese carpet, a sort of rug. The family of Fujimoto, the originator of the rugs, enjoys the widest reputation in connection with this industry, the present head of the family, a grandson of the inventor, still carrying on the business very extensively. It was he who first tried foreign export in 1878 to America and France, where, especially in the former country, the goods attracted considerable attention, and gradually the quantity of export increased. The rugs for export consisted mostly of hempen rugs of woven-out designs, and rugs of other sorts are chiefly intended for the purchase of home customers. The hemp used in the manufacture of woven-out designs is obtained from the old hempen sacks, but when the supply is scarce the weavers are obliged to use fresh hemp. For rugs of superior quality spun hempen threads and Indian hemp are used. The threads used for cotton rugs of superior quality are hand-spun yarns of Nos 16 to 20, but for cheap cotton rugs yarns of large calibre are used, made of old Chinese cotton

ginned. For wool, eight cotton yarns of No 20 woven together into one are used, while for warp hempen cords taken from hempen sacks are used. The number of wool threads for rugs of woven-out designs is from 230 to 280 for the space of three feet, while the number of other threads is from 250 to 600 for the space of six feet, the number of both threads being of course greater as the quality of the rugs is better. For hempen rugs of woven-out designs, four hempen threads are woven together into one, when the rug to be manufactured is of superior quality; but for goods of inferior quality, the thread obtained from untwisting the sack is united with one wool constituted by ordinary spun hemp.

For woven-out designs the threads that are to constitute the body of the rugs and are to figure out designs are woven in between two woofs (lateral threads), and their ends are cut into suitable length with scissors and then held together firmly by the strong plying shuttle. The rugs with impressed patterns are woven in the same way as velvet and the patterns are impressed upon them.

The rugs of woven-out patterns are woven at the rate of one mat size per day by three mechanics. Their daily wages, I find, range from 2 sen (one American cent) to 30 sen (15 cents) per day. Pattern men are generally engaged by brokers, and their wages, when at a fixed salary, are 4 to 5 yen (\$2 to \$2 50 a month), but when they are paid by the day the sum varies from 15 to 8 sen (8 to 40 cents).

There are in Osaka prefecture thirty-one wholesale dealers, and for foreign export the greatest part of the goods is sold out to resident merchants in Kobe. Since the export of the goods was commenced, about eighteen years ago, the quantity sent abroad has steadily increased by as much as 40, 50 or even 80 per cent. each year, and the weavers have been therefore strictly on the watch against the deterioration of the quality of their product. In 1895, owing to the want of raw material, chiefly due to the excessive demand which the war made on hemp, and also to the interruption of the shipping facilities, the weavers were subject to severe times, and complaint was heard of the quality of the goods having deteriorated. This has seriously affected the prospect of the industry, but it is believed that the old fame will be recovered sooner or later.

Several improvements have been accomplished in the process of weaving. For instance, whereas at first, ordinary scissors were used for cutting off the ends of the thread woven in to figure out the patterns, scissors of crooked shape have since been invented. And while at first the short threads for figuring out patterns were cut into lengths of one inch or so, subsequently the threads were left in longer lengths, so that the waste might be lessened as much as possible. Similar improvement has been accomplished with respect to looms, whose breadth was formerly about one ken (about two yards) at most. Subsequently looms twice as wide and capable of turning out rugs of ten to twelve mats size have become very common, while the largest weaver of the place, Mr. Fujimoto, has constructed looms four ken wide (eight yards), that can turn out rugs of from twelve to fifty mats size.

The principal seats of the manufacture of rugs, besides Sakaye, are the two adjoining counties in Osaka Fu, while in Hyogo Ken a village called Hayastuda is best known. In Osaka Fu the quantity produced, value thereof, number of workshops, etc., in 1894, were as follows:

Number of weaving shops	1,781
Product, mats.....	1,225,277
Value, yen	1,793,856
Female hands.....	11,579
Male hands.....	4,425

Sakaye gives more attention to the manufacture of cotton rugs, while Nishikibe county is chiefly engaged in that of hempen rugs. But the Fujimoto workshops are by far the largest establishment in Japan in connection with this industry, for the number of operatives employed is 1,374 males and 4,122 females, that is, about one-third of the whole number in Osaka Fu. In most of the other workshops the number of hands is less than 100. In the village near Kobe there were six weaving stands in 1894, employing 250 hands, and working 127 stands of looms. The total output was

37,000 mats, worth 96,000 yen. The total product in Hyogo Ken was 1,283 mats of cotton rugs worth 6,076 yen, and 36,093 mats of hemp rug, worth 112,825 yen. Besides cheapness, the Japanese rugs possess some other inherent excellencies, for, unlike the Turkish and Persian carpets, they are regular both in designs and finish of the edge.

Foreign Textile Centres

MANCHESTER.—The absorbing feature of the market recently has been the great rise of $\frac{1}{4}$ d per pound in spot American cotton in Liverpool. It is a very long time since so large an advance was registered in one day. Business here has been paralyzed, as any little business that was in process of negotiation has been given up, and hardly any trade has transpired. The trade, of course, does not know what to do. Most people are puzzled with the situation, and many are not convinced that the crop prospects are as bad as reported. In the meantime, buyers and sellers are watching the development of affairs. In cloth there is scarcely any new business reported. The offers coming round from abroad are for the most part quite out. In the meantime, manufacturers are getting lighter under contract. No weight of business has been done during the last few weeks, and the result is that manufacturers' order-lists are lighter. The smaller markets are also quiet, and business is difficult to arrange. The colored goods trade is reported to be very bad; upwards of 3,000 looms are standing idle, owing to the want of orders. Stocks are held here and there, and to realize old prices have to be taken. Sateens, too, are said to be depressed. In home American yarns there has been hardly anything doing, owing to the state of the raw material market. Spinners have quoted higher rates to protect themselves. Most spinners, however, prefer not to operate till after the Oldham holidays, and until cotton prices are more settled. Bundle yarns generally are inactive. Few inquiries of a practicable character have been heard of. Bolton yarns keep generally quiet, though in some directions there seems perhaps a little more inquiry. It is rather noteworthy that whilst American cotton rose, Egyptians are easier.

OLDHAM.—The going-away clubs, formed first in 1886, have this year distributed nearly £200,000, Pratt Brothers' hands receiving over £15,000. The wide area over which the operatives of the town spread themselves during the Wakes week may be illustrated by the fact that the bookings this year include Paris, Bourne mouth, Killarney, and Scotland, as well as near points on the east and west coasts. Thomas Cook & Son have taken as much as £4,000 on a single Wakes' night at their chief office in Yorkshire street, and their organization has enabled them to pour a ceaseless flow of traffic over the Lancashire and Yorkshire and Midland Railways during Wakes week. It may be mentioned that during the Wakes a portion of the postal delivery in Oldham (which has a population of about 200,000) is suspended.

LEEDS.—In Leeds there is quite an average season's business doing amongst the clothing factories, and operatives are as a rule in full employment. There is a slight improvement in the demand for worsted coatings for the United States, and the home trade demand is good for the better classes of these goods.

HUDDERSFIELD.—In Huddersfield there is some little improvement in business, and rather better orders have come to hand from country customers. Very good class worsteds are in demand for both the home and American market; in fact, for the latter there is little else wanted. There is a steady demand for fine vicunas fancy trouserings, and cheap serges for the clothing trade. The clothing factories, both in Huddersfield and Leeds, keep well employed, and are looking forward to a better overcoat trade this year than last. At Scitthwaite, near Huddersfield, there is in progress a rather large strike of operatives, which at present shows no sign of conclusion. In the blanket and flannel mills business keeps steady for the home trade, and some decent shipping orders are also now beginning to come to hand.

DEWSBURY.—In Dewsbury there is a better tone evident, and

the heavy woolen trade seems to be distinctly improving. There are more new orders for overcoatings, serges and fancy cloths, both for home consumption and for shipping. Mantle cloths also show some signs of revival after a very quiet time. There is a good trade in the beautiful upholstery printed seals, which, in the improved style of printing, are most handsome goods. There is a fair home trade in white blankets, and there is also a better demand for colored blankets and rugs for shipping.

ROCHDALE.—A few merchants have visited this district, and now sorting up orders are upon a more extended scale. The orders for export, which come to hand in the autumn, are now beginning to fall in, although so far not to any great amount. Prices keep steady, and are practically without change, and the mills generally are working full time.

BRADFORD.—The tone of the wool market here recently has been rather more cheerful, but the issue of the returns of the past month's trade with the United States seems to have given another check to the improvement, and very little real progress can be reported in the past week. However large a trade is, a decrease of nearly half a million sterling for the month of August as compared with the corresponding month of last year, leaves a deficiency which takes a good deal of replacing, especially when both home and other shipping markets are generally quiet. In manufactured goods of various kinds, there is a falling off of some £330,000, so that the large number of idle looms are thus fully accounted for. The head of an important house here has given it as his opinion that Bradford received but little benefit from the textile trade to the States. The business was done on very small margins, and the periodical booms like the one recently past prevented manufacturers from putting forth greater efforts to capture from the French and Germans a larger part of the home trade in better class goods. There has been, however, no further decline in prices in any class of wool, and holders of fine wool and tops are more confident, and expect that spinners will soon be coming again into the market. Some classes of English and Colonial crossbred wools are a shade dearer, and there has been more business offering at rates which would recently have been accepted. There is not yet much actual new business in either bright wools, mohair, or alpaca, but there has been sufficient inquiry to arrest the falling values. Should the market retain its firmness an increased business may be looked for. There are more inquiries for twofold mohair yarns from the Continent, and there is some little business doing in single mohair yarns for dress goods, but the demand cannot be yet called at all brisk. In piece goods, business is generally quiet, and manufacturers are competing keenly for any new business which comes forward. The rise in raw cotton has brought a few Eastern orders, and there is a fair business doing in lower grade linings for the home trade. For the coming winter season, there has been more inquiry for better class Bradford dress serges in blues and blacks, and some of the novelties in bright effects in curl fancy costumes are being well repeated. Buying for the spring trade is becoming more general as the season advances, but in some instances buyers are delaying their purchases of even plain goods in hopes of getting still further concessions in price. In fancy goods, bright colors are again being ordered for next spring, but for outdoor costume cloths, I am told, grays will be more than usually fashionable.

SOUTH OF SCOTLAND.—There is not much activity in the South of Scotland woolen trade. The spring confirmations are coming in very slowly, and manufacturers are naturally much disappointed. Judging by the orders which are being received for small quantities, merchants seem only anxious to supply their immediate requirements. A better time is anticipated, but at present business is not at all satisfactory. Worsteds are still in demand, but the ordinary makes of Scotch tweeds are steadily coming back into favor. The price of wool continues firm. The Paisley Trades Council report that carpet weavers and tailors in the town are dull. The home demand for woolen goods is increasing, and this satisfactory state of affairs is expected to continue. Reports from Dunfermline indicate that a favorable season is all but assured. The same, however, cannot be said for the export trade, which has been in a perilous state for some time.

DUNDEE.—The advices received from Dundee during the past few days regarding the jute crop are regarded as serious by those most interested. The latest telegrams indicate a great shortage as compared with estimates of two years ago, when many firms were closing forward orders which it may now be impossible to fulfil. This is the first attempt to bring Calcutta in competition with Dundee at her own doors, and against "very brithers." About 400 tons of a trial shipment have been received of 8 lb. to 10 lb warp, and are reported to have been sold at 17s 9d. to Dundee firms. This price works out to 1½d. per lb., and as a comparison, it may be stated that 8 lb. warp of alleged equal quality of Dundee spinning is quoted at 2½d. The development will be watched with the keenest interest by the Dundee manufacturers.

BELFAST.—Business has been very quiet in the linen market, with no evident signs of improvement in the near future. This remark applies generally to every department, as the depression is not in any particular class of goods, but is felt in every department. Manufacturers have up to the present been kept fully employed on existing contracts, which were placed in the early spring months, and are not yet quite exhausted. These contracts, however, are being rapidly worked out, and, as there are no new ones coming to hand, nor likely to be during the remaining months of the present year, the only course open to spinners and weavers will be to produce stocks such as are likely to be required in the near future. Such a course as this is not to be commended, as stocks sometimes assume larger proportions than the majority of manufacturers desire, and consequently these goods have to be disposed of at prices which do not admit of even the smallest percentage of profit, and the effect is a weakening of prices all round. Without a reaction shortly in the way of fresh business the foregoing state of affairs will be realized. The United States, of course, is the main support of the linen market, and the unsettled state of the market is due to the present electioneering campaign. The home markets have been taking off a moderate quantity of goods, principally of the finer makes and better class lines. The Continental demand remains quiet, with no immediate prospects of better trade.

LYONS.—The demand for silk fabrics is limited, the market is dull, and business on advance orders is quite restricted. While formerly the hand looms alone suffered from the protracted inaction, it has now affected the power looms, work for which has become scarcer and harder to find every week. With the exception of the old favorites, muslin, crepe lisse, etc., which still occupy a good place on the looms, and some other lines, such as satins in the cheap qualities and piece-dyed umbrella silks, for which some orders have been placed, the looms are scarcely employed. In figured and fancy silks orders are so scarce that it might be said there were none, and production is limited to the completion of previous orders. In moire antique and fancy moires there is some little activity on the part of producers in order to be in time with their deliveries. The ribbon market is quiet, and for plain goods, as well as for fancies, the demand is limited. The situation in velvets is unchanged; production continues good, but new orders are not large.

CREVELD.—The silk goods market shows little change, and the same disinclination to place orders ahead of requirements still prevails. The cooler weather has had some influence, and buyers are now ready to take deliveries which they were formerly eager to postpone. Little is being heard from retailers, and as their season has not yet opened the activity which their reassorting operations would give to the market is still among the things to come. Moires have been gradually gaining in the estimation of buyers. The best sellers in moire this season are not likely to be the plainer and simpler styles. Buyers seem to be more in favor of combinations in which moire shares, but in which weave effects play an equal if not a more important role. In this respect this moire popularity differs from that which prevailed a few years ago. Cloakmakers show a little more activity in their demand for linings, but this is principally for ready delivery, little being done on advance orders. Plain and changeable taffetas and cheap merveilleux find a market for this purpose. In the silk industry there is no change, and no

improvement as regards work on hand. In dress and trimming silks the looms have not much work ahead, but fall business is likely to cause a change for the better. In tie silks, for which plenty of orders should have been booked, the improvement is very slow. Ribbons are quiet, while umbrella silks are still the most favored branch. Business for export is quiet, very little being done for the United States. Fall business in England is commencing with a demand for linings. The velvet and plush market is quiet, but plushes are improving, and some good lots are being taken out of the market. Plain and fancy velvets are not very active. Velvet ribbons are in good demand.

ZURICH Demand for raw material is light, and in the absence of order business for spring fabrics the demand is of a hand-to-mouth character, with no long-time contracts. Prices, however, are rather firm. Japan silk is strong. Quotations of China silk are not so regular. In Italian silk no concessions are obtainable except on the more common grades.

CHEMNITZ—Trade in this market is very quiet. Buyers have been here and looked over the various lines, but their purchases were very light. Nevertheless prices are firm, and, except in some few staple lines, even quantity cannot break them. The market seems to be at its lowest point now. Offers made by importers for extremely large quantities have been refused by the manufacturers, although the difference in price was very small. Wages of the workmen have arrived at a point where they cannot go lower, and as other branches of business are very good in this country, many working people are moving away from the hosiery centres. This, of course, cuts down production, and as overproduction has for several years been injuring our hosiery trade, this will prove beneficial to both manufacturer and buyer, and it will stop many of those stock sales at unprofitable prices. Hermsdorf black seems to be still the leading article, although tan shades are bought in liberal quantities. The colors chosen this year are a good deal darker than those used last season, chiefly dark leather or bronze shades. Slates are not called for so much. But by various makers a very satisfactory business is reported in fancy hosiery for ladies, not only in the low grades, but also in better cotton and lisle qualities. For plain black hosiery the so-called herringbone sole is getting more and more familiar for ladies', men's and children's wear. Trade in coarse gauze hosiery is comparatively slow. Underwear manufacturers are doing well, but the orders are small from the United States. Trade in fabric gloves is reported satisfactory by the better makers, although it is not as good as that of other seasons. Ladies' gloves are mostly taken with four pearl buttons. In gauntlets some good orders were placed. All indications point to higher prices in the near future, and buyers will do well if they do not wait too long to cover their wants.

FINISHERS' SHADING BLUES.

One of the minor operations in the washing of white cloths is the bluing through which they are passed. This is done to make them appear of a better white than they would otherwise have and give them a more pleasing tint, for white cloths, just as they are washed, have a faint yellow tint that is far from being pleasant, writes G. E. Hoelz, in the *Dyer and Calico Printer*. The bluing depends for its effect on a peculiar color phenomenon, that when blue and yellow colors are mixed, white is the result, hence the addition of the blue neutralizes and destroys the yellow and a whiter cloth is obtained. Usually rather more blue is used than is sufficient to effect this, and hence the original yellow tint is replaced by a blue tint in the finished article which is more pleasing to the eye.

The finisher has precisely the same correction to make as the laundress; a piece of bleached cotton cloth when viewed in the mass has this yellow tint, and to overcome it the bleacher adds to his finishing sizes, or mixings, a little blue that destroys the yellow. This gives a faint blue tint to the finished cloth that is pleasing to the eye and has a material effect upon the sale of the article. Although only a small quantity of blue is required for each piece of cloth, yet the aggregate amount used is very great, and shading blue is a most important article of the finisher's storeroom.

Tinting, too, requires some attention at the hands of the finisher, for it often forms one of the points in finishing to pattern, and the addition of a little too much blue, or the use of a different blue, may change the tint of the finished goods to a considerable extent. Then the bluing is influenced by some other conditions. The pieces as they come from the bleach croft, have not always the same tone of white; some are yellower than others, and some may have a slight reddish tint. Sometimes a batch of white cloths may come up which have been imperfectly washed, and therefore contain traces of chlorine, and this may act on the blue and destroy it; while often the finishing process may affect the quality and quantity of the bluing.

A good tinting blue should possess the following characteristics: First, the power of resisting the influence of traces of chlorine, which may be left in the cloth, any acid which may be left in, and of any acid which may be formed from the materials used in the finishing by fermentation; secondly, power to resist the alkali which is present in any soap or soluble oil that may be added to the finishing size; thirdly, ability to stand heat, not only that which is applied to the size in the process of making, but that of the calenders used in the finishing process; fourthly, it ought to be able to overcome the effects of the addition of china clay, or mineral which renders some blues rather chalky. The blues should also be either readily soluble in water or so fine that they will remain in suspension in water for a considerable time, this property being important as tending to give even tints. When blues are coarse and insoluble, they are apt to produce specks which the finisher desires to avoid.

A very old blue used for this purpose is indigo extract, prepared by dissolving indigo in strong sulphuric acid and neutralizing the product with soda. Indigo extract is usually supplied in the form of a blue paste readily soluble in water. It gives to cotton a greenish blue tint that is very pleasing in appearance. The blue is fast to acids, chemically, however, discharges it; alkalies give it a slightly greener tone, as does also heat. It fades on exposure to air in about a month, and this is its most disadvantageous quality. Its use in finishing is now very moderate.

A very important shading in blue is ultramarine, a compound of silica, alumina, soda and sulphur, which is most complex in its composition and constitution. The variety most commonly met with is a beautiful blue of a faint violet tint, but it is obtainable in a variety of tints—some pale, some dark. Some of these will resist boiling in alum without becoming redder in tone than will others, and these are much used by paper makers and bleachers. Ultramarine is a very fine impalpable powder, quite insoluble in water, but as it remains in suspension for a very considerable time it does not give rise to specking. Alkalies have no action on it, neither has heat or light. Its weak point is that it is decomposed by even very weak acids, becoming discolored. This necessitates the finisher always using it with a size that has an alkaline action, so as to neutralize any effect which might follow from traces of chemically or acid being left in the cloth, or of acid in the atmosphere where the cloths are stored. Ultramarine is much used in the finishing of cloths, but it would have greater use if it resisted the action of acids. There is one feature in this connection that should be mentioned, when acids act on ultramarine, sulphuretted hydrogen is evolved, which might impart an odor of rotten eggs to the cloth. One important point about ultramarine, and that is heat has no action on it, so that cloths sized with a size containing ultramarine do not change in tone in passing through hot calenders, as some tinting colors do.

G. H. Hurst, in his "Manual of Painters' Colors," gives the following analyses of a few samples of ultramarine:

	Sulphate.	Soap Makers.	Calico Printers.	Paper Makers.
Silica, SiO ₂	49.685	40.647	46.885	45.420
Alumina, Al ₂ O ₃	23.000	25.047	24.110	21.147
Sulphur, S.....	9.234	12.953	13.740	11.624
Sulphur trioxide, SO ₃	2.464	4.814	3.047	5.578
Soda, Na ₂ O.....	12.492	14.264	15.618	9.906
Water, H ₂ O.....	3.125	2.275	2.600	6.325

It may be mentioned that sulphate ultramarine is of a pale

greenish blue tint, while the others have a violet blue tint, and that it is more readily decomposed by acids.

Prior to the introduction of artificial ultramarine, the bleacher and finisher made great use of smalts, but, practically, it is now out of date for this purpose. This is due to the fact that it has a violet tone which is not desired, that it was heavy and very liable to speck, and, further, that there was such a difference in the shade of wet and dry cloths tinted with it that finishers had great trouble in working to shade. It is the most resistant of all the blues used for shading, as it is not acted upon by acids, alkalis, heat, light or air. Smalts is essentially a glass stained blue by means of cobalt ground up very fine.

Prussian blue, which is largely used as a bleacher's and finisher's shading blue, is a peculiar combination of iron, carbon and nitrogen. It has a fine, deep, greenish-blue color, some makes tending to a more violet tone than others. When well made the dry color has a bronzy lustre. The best variety is sold under the name of Chinese blue, and this, when ground into a paste with water, mixes fairly easily with that vehicle and imparts to it a fine blue color. There is another variety also sold as soluble blue which dissolves freely in water, and this is the best variety for finishers to use. It may also be mentioned that Chinese blue may be made soluble by means of oxalic acid or oxalate of ammonia. Prussian blue in all its forms is unaffected by acids, and what is very important, it is not acted upon by chlorine, so that any traces of chemic and acid which may be left in the cloth do not discharge the color as they do if ultramarine be used. Heat has no effect, while it is quite fast to light and air. The only agent or agents which have any action on Prussian blue are soda, and the alkalis or alkaline substances like soap, soluble oil or borax; these tend to discharge the color and turn it brown. Therefore, Prussian blue cannot be used in sizes which contain soda, potash, ammonia, lime, soap, soluble oil or borax among their constituents.

That ubiquitous material, coal tar, has at the hands of the color chemist been made to yield a goodly number of blue coloring matters, and it is no wonder that these early attracted the attention of the finisher and maker of bleacher's shading blues, and that many have come into fairly extensive use for that purpose. They have over those described the great advantage of being soluble in water. They, therefore, do not speck, and give more uniform shades than the other descriptions of blues. With the coal-tar blues, every variety of tint, from pale sky tints to the deepest blues, and from the greenest to the reddest of blues that can be imagined. Naturally they are extremely variable in their properties; some are not altered by acids or alkalis; acids attack others, while some are fast to acids, but not alkalis, and vice versa, all are not fast to light, although there is a considerable amount of difference in this respect, some being very fugitive, while others will resist a moderate degree of exposure. It is impossible to do more than mention a few of the most used in this place, and give a hint as to what are worth attention.

Soluble blues and cotton blues, on account of the exceeding brightness of the tints they produce, and of the fact that they have a weak affinity for the cotton fibre, are much used. They will resist the action of such weak acid influences as may be met with in finishing, and also of weak alkalis, although these have a decolorizing effect; they are fugitive to light, which destroys them after a few days' exposure. It may be mentioned that they are made in a variety of shades from a reddish blue to a greenish blue, so that the finisher may by choosing an appropriate brand produce any tint he may require.

Alkali blue and Nicholson blue have a family relationship to the last mentioned. They require the addition of acid to develop their color. In general their properties resemble those of soluble blues; they are, however, rather faster to light and acids.

Blackey blue has met with a wide use in tinting; it gives some good tints, not affected by acids, but which are reddened by alkalis. It is slightly faster to light than the cotton blues.

Victoria blues can be used with some success, and fine tints can be obtained by their means. They mix with all sizes, but must not be boiled too long.

Indulines are largely used for tinting on account of their standing light, acids and chemic better than most other blues, alkalis have a slight reddening action on them. They are rather variable, not only in their shade but in their degree of solubility, hence finishers should be particular in the selection of the induline which they may use.

Nile blue is useful when a greenish tint of blue is wanted; it resists acids fairly well, but alkalis turn it reddish. It stands light better than do the soluble and alkali blues.

Keton blue 4 BN can be used most successfully on account of its great solubility; it gives greenish-blue tints of a fair degree of fastness to light, weak acids and alkalis.

New indigo blue F is also useful, as it is quite resistant to acids, alkalis and fairly so to light, while it is rather more soluble than many other blues.

Many of the direct dyes, such as Diamine blue 2B, Titan blue 3b, Pacific blue B, Benzo blue 3B, are well worth attention for this purpose, as their affinity for the cotton fibre enables them to tint the cloths in slightly faster shades than some of the other blues which have just been named.

THE THOROUGH DYEING OF HEAVY FABRICS.

Translated from the German.

The complaints that heavy (thick) woolen cloth will dye through, only with difficulty, commenced at the time when such cloth was first dyed. These complaints have increased largely since the introduction of dyes, the qualities of which are not sufficiently known to the dyer.

The evil is most frequently to be met with by the cloth-dyed indigo blue in piece, and only when the hydro-sulphite vat is used. Experience has shown, however, that the evil is not due to the vat, but to the circumstance that it has not been kept sufficiently alkaline. If such a state of affairs is noticed in a new vat, soda or ammonia should be added at once.

The alizarine dyes, which are of so great an importance to-day in the dyehouse, also belong to the dyes that penetrate only with difficulty. The diazo dyes, produced by diazotizing an azo dye and combination of this product with a phenol or naphthylamine sulphonic acid, also belong to them. The explanation is quite simple. The affinity of the diazos for the animal fibre is very great under certain conditions. One of the factors, and, indeed, the most important, is an excess of acid, another is heat. An excess of acid (we mean principally sulphuric acid) alone suffices to have the aqueous solution of the dye enter in the cold upon the fibre. But heat alone will not effect this. This of itself furnishes us with the solution of the question of the penetration of the diazos. As is known, they are found in commerce principally as soda salts, and when dyeing with them the tinctorial acid must first of all be liberated, and so much of an excess of sulphuric acid added to dull certain amido combinations contained in the wool fibre and opposing the dyeing operation; the operation can take place only when this has been done. If, for instance, woolen pieces are boiled in the aqueous solution of the soda salt, of the proper dye, no color is obtained, even if the boiling were continued for hours. The cloth has absorbed only so much of the dye as was contained in the water of the solution of the dye. But if this operation is reflected with an excess of sulphuric acid, the dye bath will be exhausted surprisingly fast and become almost as clear as water, but the stuffs dyed in it are not perfectly dyed through.

Better results are obtained if the tinctorial acid is first set free by an addition of a little sulphuric acid, and treating the stuff at a boil in this solution. By this it is possible that the thus liberated tinctorial acid itself neutralizes the amido combinations of the wool and fixes little by little upon the fibre. In this treatment with periodical addition of sulphuric acid to the dye bath, the dye fixes gradually, and having sufficient time, it penetrates equally into the interior of the cloth.

If the dyer desires to employ diazo-dyes, it is advisable to work in concentrated baths. The quantity of sulphuric acid to be added at the start varies with each single dye and can be determined only by experiment. The single dyes vary too largely in their

capacity and in the quantity of their so-called diluting agents, such as Glauber's salt, dextrine, etc., to permit of fixed proportions being established. The concentrated baths only serve for forcing the dye at the beginning of the operation into the interior of the cloth. Enter boiling into the dye bath and continue to boil for at least 30 minutes; after this the bath may gradually be diluted and acidulated. It is true the use of sulphuric acid is open to the objection that too large an excess is easily added at the beginning of the operation if the dyer is not acquainted with its strength. It is better therefore to use in place of it bisulphate of soda (tartar preparation). Very good results are also obtained with purified tartar, which being an acid salt, readily liberates the tinctorial acid, its high price, however, forbids its use. Another reason which excludes the employment of tartar is the presence of calcareous salts, contained even in the refined products. This impurity precipitates the diazo dyes at lime salts, they are therefore rendered inactive, which causes a loss of dye.

There is another way to prevent the rapid precipitation of the diazo dyes upon the fibre; the liberated tinctorial acid is offered opportunity, therefore, to penetrate into the cloth. This way consists in adding acetic acid in the presence of Glauber's salt. The Glauber's salt is used for the purpose of raising the boiling temperatures, while the acetic acid acts as neutralizing agent of the above-mentioned amido combinations, liberating the tinctorial acid at the same time. The bath is filled only three quarters full, the dye solution is added and next 20 per cent. of the weight of the cloth of Glauber's salt, the cloth is entered, reeled fifteen minutes, then reeled out, a little acetic acid is added, the cloth is entered again, and this is continued until in short intervals 4 per cent. acetic acid have gradually been added into the dye bath. The boil may be continued for one hour, and during this time the color develops but slowly upon the fibre, and the bath is exhausted little by little only—which is desired. When the bath appears to be nearly void of color and almost exhausted, an addition of one per cent. sulphuric acid is sufficient to completely exhaust the bath and fix the dye upon the fibre.

The alizarines that are used largely for dyeing woolen piece-goods at present, cause great difficulties when employed for heavy woolen goods. The alizarine blue especially is quite difficult to handle for one not accustomed to its use, and yet the treatment is very simple. Good results are obtained with alizarine blue S—that is, its bisulphite combinations. Clean the goods with great care and mordant it at once with 3 per cent. bichromate of potash and 2½ per cent tartar.

When using alizarine blue, attention must be paid to have the tartar as free from lime as possible, because alizarine blue will stand no lime salts. Boil in the mordanting bath for 1½ hours, never less than one hour. It does not hurt to enter the cloth into the boiling bath. The cloth is washed carefully after mordanting and then dyed without loss of time. The dyeing is performed in a vat filled one-half full with water, to which the alizarine blue, stirred with water and strained through a sieve, was added, as well as acetic acid. The bath must at the entering of the goods have a temperature of 122° F. The cloth is permitted to run in the half-filled vat for 45 minutes, during which time the temperature is raised to 150° or 160° F. Do not raise it any higher, because the bisulphite combination of the alizarine blue dissociates already at 167° F, after which it can no longer penetrate the cloth. After a treatment of 45 minutes in the manner indicated, the vat is gradually filled with water and slowly raised to a boil, when the full beauty of the color will be developed.

The dyeing operation must in the concentrated bath always commence at a low temperature, if good results are expected. The presence of lime salts is a condition only for alizarine red and orange. A clean, pure red is obtained only when neither the mordanting nor the dye bath contains iron salts, or even traces of them. Should any be present, add sumac or tannin to the baths, and skim them.

The Smith Wool Stock Company, Toronto, is defendant in a suit for damages for personal injuries, instituted by William Howarth

UNDERWEAR SIZES

In manufacturing women's underwear there is a noticeable tendency in the trade towards large sizes. A writer in the *Textile World* says: For a long time the trade has demanded a larger shirt for a No. 2, for a garment made on a 11-inch machine is too small to be very satisfactory. Indeed, the market calls for a general increase in size of shirts, and it is probable that manufacturers of underwear will run their sizes up another year. Domestic manufacturers will quite generally adopt this course, and we learn from the handlers of foreign goods that they are being made from 6 to 12 needles larger than before. The customary practice hitherto has been to knit a No. 2 on 11-inch machine, No. 3 on 12-inch, No. 4 on 13-inch, etc., but now many are using an inch larger machine per size. One of the largest American builders of rib knitting machinery informs us that he has felt this tendency of marking up sizes in the character of his sales, as the demand for the smaller sizes of machines, such as 11-inch, has been very limited, although he says that up to the present time they are not selling any larger machines than 13-inch for ladies' ribbed vests in shaped goods. This trade is so largely one of specialties that it is difficult to formulate a general rule, as certain buyers specify certain sized shirts; but if a man is putting in new machinery, we think it would be much safer to mark up sizes, and knit a No. 2 on a 12-inch machine, and so on up, rather than starting with two on 11-inch machine. Some mills we know of are using even a larger machine than 12-inch for a No. 2. Another machinery manufacturer remarks that he thinks goods made on 11, 12, and 13-inch machines are large enough, provided all the needles are in the machine. There has been a tendency on the part of some manufacturers to take out a lot of needles to make certain patterns, which would have the effect of making the goods narrower. Naturally, one cannot expect to get regular width goods unless all the needles are in the machine. Some manufacturers also use yarn that will not fill up the gauge, and this also makes narrow goods. A prominent selling agent remarks that while he has not heard of any concerted movement to have shirts made larger or wider, or in other words, to have the sizes changed, he notes that buyers will almost without exception refuse to buy size 2, and will buy very few of size 3, but will want sizes 4 and 5.

CONTRACTS CANCELLED.

A number of contracts which were let, some for two years, others for three years, by the late Government, have been cancelled. These contracts which have been cancelled are as follows: W. E. Sanford, of Hamilton, for tunics, jackets and pantaloons. This contract was for three years, commencing 1st July, 1896. The three-year contract has been cancelled, but the department will continue taking the above goods from Messrs. Sanford & Co. for the balance of the present year, or up to July 1st, 1897. Mr. Sanford had another contract to commence July, 1897, and it has also been cancelled. H. Shorey & Company, of Montreal, had a contract for great coats and trousers. It was for three years from 1st July, 1896. The three-year contract has been cancelled, and Messrs. Shorey & Co. have been placed in the same position as Messrs. Sanford & Co. A two-year contract with Shorey & Co., to commence July 1st, 1897, has also been cancelled. Doull & Gibson had a contract for trousers. It was for three years, commencing July last, and two years has been deducted from the contract. The Auburn Woolen Company, of Peterboro', had a three-year contract for cavalry cloaks commencing July last. Two years from July, 1897, of this contract have been cancelled. E. Boisseau & Co., of Toronto, had a contract for great coats. It was to commence on July 1st, 1897. It has been cancelled. Gillespie, Ansley & Dixon had two contracts for forage caps and helmets. One was for three years, commencing 1st July last. Two years have been deducted. The other contract was for two years, commencing 1st July, 1897, and it has also been cancelled. The Government claims that those contracts could not have been properly let till the money had been voted by Parliament.

CULTIVATION OF INDIGO IN MEXICO.

Indigo is cultivated in Chiapas, in Colima, in Guerrero, Jalisco, Michoacan, and in Oaxaca. Three kinds are found, namely, *I. tinctoria*, *I. disperma*, and *I. anil*. The spring is the best time for sowing, and in the months of September and October the plants begin to flower, while in order to save the indigo in them, especially in the leaves, the stems are cut as soon as the yellow leaves appear on them, or the little buds begin to bloom, says Sir Henry Dering in "Productions of Mexico." The substances which form indigo reside in the leaves, but the whole plant is subjected to the process of fermentation and agitation, by which the dye is manufactured. Two cisterns or vats are prepared, the first about 8 by 16 feet and 5 feet deep, and the second 12 feet square and 4 feet deep, and below the second a third may be placed, into which the contents of the second is run and allowed to stand for the dye to settle at the bottom. Unless, however, the operation is done on a large scale, the setting of the fluid can take place in the second cistern. Bundles (about 125 pounds each) of freshly cut plants are placed in the first cistern, and water is then run in so as to cover them to a depth of 3 or 4 inches from the top. A few hours after the introduction of the water it becomes turbid, then turns to a beautiful emerald green; the solution sets free carbonic acid gas, and traces of ammonia, and discolored pellicles float on the surface. The fermentation generally lasts from 12 to 16 hours, and that according to the stage of the growth of the plant: if the plant is fully matured going into seeding, the fermentation should last for 12 to 16 hours, but if the stems are cut when flowering, the maceration should be stopped in 10 or 12 hours. A sure indication as to the time when the solution should be transferred consists in the gas bubbles disappearing almost altogether, or when the solution, by rapidly stirring it in a glass vessel, forms small blue flakes, which in a little while separates into granules. The solution, when run off into the second cistern, is constantly agitated for a period of from 1½ to 3 hours. The liquor may be agitated by some mechanical contrivance, a hydraulic wheel, or by men going into the cisterns, beating and churning the fluid with wooden paddles. As the beating goes on the green liquor becomes of a deeper color, violet, and then gradually turns to a very deep blue. Then a small quantity of precipitant called "cuajo" or lime water is added in order that it may combine with the carbonic acid formed during the process of fermentation and help the precipitation by coagulating the fluid. This precipitant is prepared from a wild white grape called "olavere" found in the Isthmus of Tehuantepec and Chiapas, from a wild tree known as "quagatinta," and from the leaves of the marshmallow. After introducing the coagulating fluid the whole is stirred up, and then the coloring matter is allowed to settle, and in two or three hours the indigo will have subsided in flakes and the amber colored fluid will have remained on the top. This clear fluid is drawn off by means of the cocks until nothing is left in the cistern but the indigo, which looks like a bluish black mud. This mud-like stuff is then taken out and put into conical linen bag filters, which are hung up so as to allow the surplus moisture to drain away. The dye is afterwards taken out of the bags and placed in a large cement-lined kiln, where a gentle heat is applied until the whole is rendered dry. It is then subjected to hand-mill pressure, thereby formed into blocks, stamped with the plantation mark and placed in heavy boxes, each holding 25 pounds. The actual cost of indigo raising amounts for the first year to \$66.88 per hectare, and for the following years will be about \$53. Thus a planter will have an annual income of \$687 per hectare (1.47 acres) by selling his indigo product at an average of \$1 per pound.

COTTON MANUFACTURING IN SHANGHAI.

This year, as the British Consul at Shanghai shows, there has been a new departure altogether in the development of the cotton-spinning industry at Shanghai. It is no longer a question of a few mandarins owning mills; the whole industry has, by the Japanese Treaty, been thrown open to the capital of the world. Besides the companies already at work at the mills now in course of erection,

several other companies are "in the air," among them two Japanese, but they seem to be holding back pending the settlement of the taxation which the Chinese authorities may impose both on the produce of the mills and on the raw material required for their use. Probably, also, it is desired to see what success attends the new ventures. The Chinese companies, of course, publish no accounts, but report credits there with very handsome profits. At all events they have been running night and day all the year round with every sign of prosperity. It appears to Mr. Jameson beyond doubt that the cotton-spinning and weaving industry in Shanghai has a great future before it. The demand for yarn from Bombay on the average of the last three years was 180,000 bales per annum for Shanghai alone, of the value of nearly 10,000,000 taels, say, £1,500,000. Yarn is now, since the commencement of the year, being imported freely from Japan at 72 taels per bale, 4 taels over what Bombay yarn fetches. This yarn is made mostly from Chinese cotton, which, after paying back to China in its manufactured state, pays the mill owner a profit. It is therefore difficult to see what is to prevent China in time manufacturing the whole of her yarn and a very considerable proportion of the cloth which she now buys in the form of drills and sheetings, and even the commoner forms of shirtings. It seems thus certain that before long there will be considerable shifting of the existing lines of trade between China and Great Britain. Consul Jameson says it by no means follows, however, that British trade, as a whole, will be a sufferer. On the contrary, it may even be a gainer. All our experience shows that China has been a good customer up to the full extent of her means. She takes value in goods for everything she sells. The manufacture of her own yarn and commoner cloth will set free a present annual payment of, say, £2,000,000 to £3,000,000. She will want to spend this in something, no doubt. What particular form it will take remains to be seen, but Mr. Jameson philosophically concludes that Lancashire will have a share in supplying her with an increased quantity of the finer cloths. Just as India continues a good customer, notwithstanding the Bombay mills, so, no doubt, will China, long after she has learnt to make her own yarns, and all the better probably for the increased wealth which the new industries will bring to the laborers of China. The prospect, from the Bombay point of view, awaits Mr. Jameson's consideration; at least he makes no reference to it in his present report.

TO CATCH TRADE.

A writer in the *Liverpool Mercury*, in the course of an article on German competition in foreign markets, says that he was very much impressed, when in Frankfort-on-Maine a few months ago, with the free Mercantile Museum attached to the Bourse. In this Museum are exhibited samples of products of English, German and other manufacture, side by side with the native article originally used and now superseded. It is thus possible to learn at a glance the historical reason for a trade preference, and to gain important hints as to what defects should be avoided. The Germans show no prudery, scruple or sensitiveness whatever in meeting the wishes of their customers. If the purchaser desires to have the soles of his boots behind and the heels in front, they at once make them for him. Should he show a preference for pea-green trousers, or trousers with three legs, they are without delay faithfully made and exported according to sample. It need hardly be said, also, that any catching trade marks are remorselessly imitated. In short, no stone is left unturned in order to push German trade.

To take a few instances in point. The Chinese have for centuries been used to certain breadths of cloth. Such breadths may vary only by an inch from the corresponding Manchester breadths, but when millions of people have been accustomed for centuries to estimating their sumptuary requirements by a breadth of 18 inches, they have the strongest instinctive objection to having 17½ inches or 19½ inches forced upon them. In China certain yellows are confined by law to the Emperor, certain sashes to the Imperial family; blue is the sign of woe, certain tints of red are exclusively used for young women's trousers—the original saffron dye—and certain borderings and fringes are considered de rigueur for such trousers. The Chinese are all very particular about the tints of

green they use. For funeral purposes the flimsiest of sized cottons are preferred (so long as they are cheap) to the most durable materials which may not look so well, the reason is because the hangings, flags, banners, and adornments are never required after the funeral is over, or, if required for perquisites to servants, need no particular quality to recommend them.

Again, the Japanese, who seem so destitute of judgment when they attempt to garb themselves in European attire, are easily offended by the slightest solecism against their own canons in matters of native dress, and many prints or checks considered fashionable in England are regarded as vulgar in Japan. On the other hand, certain prints which, to a Japanese eye, are in the very worst of taste, appear, to the fancy of the Demerara negro or the Mexican Indian, to be the pink of perfection. The Burmese women are exceedingly lavish in their expenditure upon turbans and htameins (the sarong like sheet of silk or cotton which forms for both classes the sole garments below the waist), but they will not look at a check which is not to the national taste, nor will they wear a turban which is not of the exact bright color in vogue. The Jamaica negroes prefer white, and they must have a material which will wash frequently, almost daily, without deterioration; their taste in ornamentation runs usually to red, blue and green are abhorred.

To take up another aspect of the case; symbols, which Europeans are perhaps too ready to regard as remnants of antiquated nonsense, are often of no small importance in the recommendation of our goods to other peoples. The sign of the Cross goes a long way with the Roman Catholic peoples of Central and South America. The dragon, unicorn, peacock, and tiger are as popular with the Chinese as the camel, lion, bear, or boar are neglected or despised. Spanish vanity is easily flattered by symbols complimentary to the *hidalgo* nation. None of these points escape the attention of the German trader, in numberless ways, whether it be in exact shade of color, in choice of signs and emblems, in "luckiness" of size, shape and measurement, in the use of weights and measures easily understood, in arranging reasonable credits, in providing show rooms, cheap refreshments, advertisement sheets in the vernacular, or what not, the Germans everywhere show themselves to be more reasonable, bland, accommodating, and shrewd than many of our own traders.

FANCIES OF THE MOMENT.

The following outline of cloths and their prices, appears in a recent number of the *American Wool and Cotton Reporter*.

Astrakhan A cloth of silk and worsted material, with a long and closely curled pile, in imitation of the fur of that name, price, \$1 12½ to \$8.

Bearskin, Dreadnaught, Fearnought: A coarse, shaggy woolen cloth for overcoats, price, \$7 to \$8.

Beaver or castor: A cloth with very fine kersey face, with a loosely woven back, much softer handle than kersey, and used for men's overcoats, price, 55c to \$6 25.

Broadcloth fine woolen cloth, commonly black or blue, with a fine finished surface, originally named from its breadth; price, \$1 50 to \$6.

Cassimere, casimir A woolen cloth closely woven and closely sheared, used principally for the quieter trade, price, 90c. to \$7 50.

Cheviot, tweed: A cloth more loosely woven than the cassimere, and not sheared closely; price, 50c. to \$2.50.

Churchilla: A fabric made of the long fibre wool for overcoats, roughness of face, softness and warmth being its characteristics; price, \$1 25 to \$7.

Covert cloth. A woolen cloth generally made of double twisted yarns, both in warp and filling, and woven very close, price, \$1 to \$6.

Doeskin: A woolen fabric of fine quality, without visible twill, and supposed to resemble the skin of a doe, price, \$2 to \$6 50.

Drap D'Ete A worsted fabric, used principally for religious garments, very fine twill and closely woven, price, \$1.50 to \$7.

Flannel A fabric made in various ways and with some nap,

and used principally in blues for seamen, uniforms, etc.; price, 60c to \$2 25.

Frieze A heavy, woolen cloth, covered with an irregular nap, and having a more or less hard, harsh handle. Originally in Ireland, but now made and used in all parts of the world; price \$1 12½ to \$6.

Fustian, corduroy, moleskin, beaverteen, velveteen, thickset, etc. A stout, cotton fabric, especially that which has a short twilled nap; price, 75c to \$2.50.

Homespun: A coarse, loosely woven woolen material, made in imitation of actual homemade cloth; price, 70c. to \$2.50.

Kalmuck a coarse, shaggy cloth, resembling bearskin; price, \$5 to \$7.

Kersey, kerseymere, cordillas. A fine, closely woven cloth, with regular nap, used principally for overcoats. It has a high finish; price, \$1 to \$6.25.

Melton: A fabric woven something like a kersey, but with a dead finish; price, \$1 to \$6 25.

Petersham cloth: A heavy woolen cloth, generally of dark blue color, used for heavy overcoats, etc.; price, \$1.50 to \$5.

Pilot cloth: A heavy woolen cloth, such as is used by pilots for pea jackets, also for overcoats and uniforms, indigo blue being generally used, as other dyes do not stand sea water; price, \$1 to \$6 25.

Sattnets: A cheap fabric, composed of cotton and wool, usually printed and used for the cheapest kind of clothing; price, 10 to 35 cents.

Serge: A rather wiry, twilled fabric, made in all weights, and used for all purposes; price, 50c. to \$3.

Thibet. Made from very soft wool, and with an unfinished face; 60c to \$3.50.

Tricots: A woolen fabric, with diagonals running straight across the piece, and something like cassimere handle; price, from \$1 up.

Vicugna or vicuna. A woolen cloth made from the softest kind of wool of vicugna; price, \$1 to \$5.

Worsted. A cloth made from long staple wool, which has been combed, and is more or less hard twisted.

Corkscrew: A fabric made from worsted, and woven with a smooth, round wale; price, 70c. to \$6.

Clays or diagonals: A variety of flat twisted-worsted which is woven in a twill, similar to that of serge, the diagonal lines lying flat on the surface. On account of the weft and warp being slackly twisted, the cloth does not take a gloss, as in the case of the ordinary hard-twisted worsteds. The name is derived from an English manufacturer.

Undressed worsted Any worsted with a rough face, such as diagonals, corkscrews or fancies; price as above.

FABRIC ITEMS.

The employees of Burns & Murray, Halifax, N.S., wholesale dry goods, have received notice that their services will not be required after January 1st.

The English Privy Council has given judgment in favor of Stewart in the celebrated case of *Stewart v. McLean*, reversing the judgment of the Supreme Court of Canada, and restoring the judgment of the Court of Queen's Bench and Superior Court. The case is regarded in commercial circles as of vast importance. It establishes the right of partners in insolvent concerns, after settlement with creditors has been made, to claim on each other for failure to contribute their proper share of the capital of the partnership, and to bear a relative share of losses.

Victoria Square, Montreal, will soon be adorned with two new structures, each of which will replace buildings of historic note. On the corner of Latour and Beaver Hall Hill, Mr E. Maxwell, architect, will erect a four-story building on the site once occupied by the old Zion Church, and later by the *Herald* Publishing Company. This locality was also the scene of the Gavazzi riots, and also of several big fires. The new building, which is to be occupied by the wholesale clothing firm of E. A. Small & Co., will

have a frontage on Beaver Hall of ninety feet, and a depth along Latour street of a hundred and forty feet. It will be made of red pressed brick with Bath stone trimmings. It will be fifty-five feet in height, and will have four stores on the ground floor. The main entrance will be in the centre of the building.

Edouard Dagenais, dry goods, 1060 Ontario St., Montreal, has made an assignment at the demand of Hon. A. A. Thibaudeau, *et al.* The assets consist in stock of dry goods, book debts, bills receivable, one lot on Montreal Ave., and one lot on Ontario St., with buildings. The liabilities amount to over \$43,000, the principal creditors being Thibaudeau Bros. & Co., \$6,402; Thos May & Co., \$2,200; J. Johnston & Co., \$2,730; J. G. Mackenzie & Co., \$2,500; Lonsdale, Reid & Co., \$2,335; McIntyre, Son & Co., \$3,035; S. Green-shields, Son & Co., \$1,792; Gault Bros. & Co., \$1,660; P. Garneau, Fils & Cie., Quebec, \$1,397; M. Fisher, Sons & Co., \$840; J. Fisher, Sons & Co., \$771; J. Macdonald & Co., Toronto, \$984; J. MacLean & Co., \$663; *La Press.*, \$425; Credit Foncier (mortgage), \$5,000; Dame E. Dagenais, mortgage, \$3,000; Dame H. David, mortgage, \$2,000; W. Agnew & Co., \$525; Caverhill & Kissock, \$910; R. Linton & Co., \$426; Filtzibbon, Schafheitlin & Co., \$786; A. O. Morin & Co., \$300; Liddell, Lesperance & Co., \$623; A. H. Wolff & Co., \$220; P. P. Martin & Co., \$656; Glover & Blais, \$332; Finley, Smith & Co., \$297; Leon Dagenais, \$250; Ferd. Racicot, \$360, etc.

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.

D. M. Fraser, Almonte, Ont., is running his knitting mill day and night to overtake orders.

The Almonte Knitting Co's mill, Almonte, Ont., has closed down for a couple of weeks.

The Dominion Cotton Mills Co. is making some extensive repairs to its dam at St. John, N.B.

The Yarmouth *Telegram* says that several car loads of Nova Scotia wool have recently been shipped to Ontario mills.

The Magog Woolen Mills, A. L. Grindrod & Co., Sherbrooke, Que., have lately been improved by the addition of an iron roof.

N. Garland and R. Jenkins, Toronto, who bought C. S. Herbert's stock from W. A. Campbell, the assignee, claim \$115 rebate.

W. H. Howard has been granted a permit to build a dye-house at his tailoring establishment, No 27 Rebecca street, Hamilton, Ont.

Peter McCallum, superintendent in the Elmsdale Flannel Mills, Almonte, Ont., has been laid up recently with a sprained shoulder received while employed in the mill.

Among the contracts annulled by Sir Oliver Mowat is one of the W. E. Sanford Manufacturing Company, Hamilton, Ont., with the Militia Department for the supply of clothing.

The Montreal Steam Laundry, Montreal, T. H. Love, proprietor, was destroyed by fire, September 10th. Loss, \$200,000; insurance about \$50,000.

Roderick Chisholm, head dyer in the Rosamond Woolen Co.'s mills, Almonte, Ont., has recently returned from a pleasant trip to Europe, during which he spent several weeks at his old home in Inverness, Scotland.

The St. Croix Cotton Mills at Milltown, N.B., are running again after some improvements and repairs being made.

The Montreal Cotton Company has declared a dividend of two per cent for the quarter, being at the rate of eight per cent per annum.

The Standard Fibre Lining Co., Ltd., will be incorporated to manufacture lining materials, and paper generally, from wood pulp. J. A. Marquis, H. Vale, R. F. Cox are provisional directors. Capital, \$40,000.

The Rosamond Woolen Company, Almonte, Ont., has commenced to run three-quarter time. Till further notice there will be no work on Saturdays, and the mill will close at five o'clock each evening.

The Toronto Junction Braid Co., now closed up, is trying to negotiate with the town of Markham, Ont., to establish mills there if a loan of \$20,000 could be guaranteed by the town, says the *Whitby Chronicle*.

Foreman Howarth, of Wm. Parks & Sons, Ltd., Courtney Bay cotton mill, has severed his connection with that establishment. Mr. Armstrong, of Lowell, Mass., succeeds him. Mr. Howarth and family have removed to Windsor, N.S.

Thos. Germyn, an employee in Livingston's flax mill, Listowel, Ont., came near losing his hand recently. He slipped on some seed, and in falling one of his hands came in contact with the thresher, which crushed the ends of his two fingers.

The Mount Forest Woolen Mills Company, Ltd., with a capital of \$15,000 in 750 shares of \$20 each, is being formed for the purpose of manufacturing and selling tweeds, flannels, blankets, yarns, etc., and the company intend to buy the property in Mount Forest known as the Enterprise Woolen Mills.

J. Meiklejohn, superintendent of the Paton Manufacturing Co.'s Mills, Sherbrooke, Que., has severed his connection with the company. Mr. Meiklejohn came to Canada from W. Bliss & Son's mills, Chipping Norton, England, about two years ago. He is greatly liked by all the mill employees, who will regret to lose him.

Wm. Burwell, of Hamilton, was in Brantford, Ont., recently, making inquiries relative to his brother, James Burwell, who some ten years ago ran the engine at the wincey mill there. Information as to his whereabouts is required by some lawyers in England, who write that he has fallen heir to a legacy left by a deceased relative in Spalding, Lincolnshire.

The Government, through the Department of Trade and Commerce, has sent out the following circular to manufacturers: "Gentlemen,—In connection with the coming revision of the tariff, it is desirable that the Government should be in possession of all possible information in regard to the manufactures of Canada, and I will be obliged if you will at your earliest convenience furnish me with a list of the articles manufactured by your company, together with the quantities and values of each produced in 1896."

The boiler in Heiderman & Tracksell's new flax mill, Shakespeare, Ont., exploded recently, completely wrecking the stone building in which it was situated. It was almost a miraculous occurrence that no one was injured, as fifteen or twenty people were working in the immediate vicinity at the time. The boiler was a very old one, having been in use in Kalbleisch & Schaefer's planing mill, Tavistock, Ont., thirty years ago, and it is supposed the accident is the result of the boiler being worn out. The proprietors, Heiderman & Tracksell, have been extremely unfortunate of late, as the mill was burned to the ground only a few months ago. The loss is about \$500.

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LOWELL, MASS.

The creditors of Foster & Pender have accepted an offer of 60 cents on the dollar and a new arrangement has been arrived at, by which H. Block, Toronto, will take over the business. Liabilities of the old firm were \$57,000, and assets \$72,000.

Notice is given that application for a charter will be made by C. I. Higgins, J. J. Westgate, and J. Simpson, Montreal; B. W. Higgins, Cote St. Paul; B. Ball, Rock Island; J. Pearson, Toronto; J. A. Hanway, New York, and J. A. Young, Toronto, under the title of "The Boston Rubber Company of Montreal, Limited." The chief place of business will be at Montreal, and the factory at St. Jerome. Capital stock is fixed at \$200,000, in 2,000 shares of \$100.

LITERARY NOTES.

Marion Crawford has written a new story specially for *The Century*. It is called "A Rose of Yesterday," and it will begin in the November number and run for six months. The story opens in Lucerne, and while it is entirely separate in interest, some of the personages that appear in it will be familiar to readers of "Don Orsino." It is wholly romantic in character. General Horace Porter's personal recollections of General Grant, which *The Century* will publish beginning in November, are to be called "Campaigning with Grant." General Porter first met General Grant at Chattanooga, he soon became attached to his staff, and was with him constantly from that time until the close of General Grant's first term as President, during which he was Grant's private secretary. At his first meeting with General Grant, General Porter was deeply impressed with the genius and power of the great commander, and he made a practice of jotting down impressions of the important events then crystallizing into history, with full notes of his conversation with his chief. The result is a series of graphic pen-pictures, which will give the reader a close and intimate view of the great general.

The *Canadian Magazine* continues in September its successful career. The short stories and articles are well written and the whole magazine shows careful editing. Ian MacLaren's story is continued with undoubted interest and charm.

Massey's Magazine for September evidences a most progressive management. The subjects are the most alive possible, and the articles are well written and charmingly illustrated. Some of the topics are: Cuba in War Time; The International Yacht Race; Placer Mining in British Columbia.

CHEMICALS AND DYESTUFFS.

There is a little more inquiry for dye-stuffs from the mills, indicating better trade. Prices are steady and unchanged for nearly all lines. Castor oil is higher in the primary market, also sulphur. The following are current quotations in Montreal:—

Bleaching powder.....	\$ 2 00	to \$ 2 10
Bicarb soda.....	2 25	" 2 35
Sal soda.....	0 70	" 0 75
Carbolic acid, 1 lb bottles.....	0 27	" 0 30
Caustic soda, 60°.....	1 80	" 1 90
Caustic soda, 70°.....	2 25	" 2 35
Chlorate of potash.....	0 13	" 0 18
Alum.....	1 35	" 1 50
Copperas.....	0 70	" 0 75
Sulphur flour.....	1 75	" 2 00
Sulphur roll.....	1 75	" 2 00
Sulphate of copper.....	4 75	" 5 50
White sugar of lead.....	0 07	" 0 08
Bich potash.....	0 10	" 0 11
Sumac, Sicily, per ton.....	60 00	" 65 00
Soda ash, 48° to 58°.....	1 25	" 1 50
Chip logwood.....	2 00	" 2 10
Castor oil.....	0 08	" 0 09
Cocconut oil.....	0 06½	" 0 07

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 Maker of Wrap Reels, Wrap Blocks, Yarn Examiners, Yarn Twisters, Yarn Testers, Hank Quadrants, Shaft and Spindle Indicators, Barrel Stands, Umbrella Hank Stands, Worsted Balling Machines, Roller Covering Machine, Cloth Testers, Rove Reels, Cloth or Crape Measuring Machines. All kinds of Spinners' Accessories.





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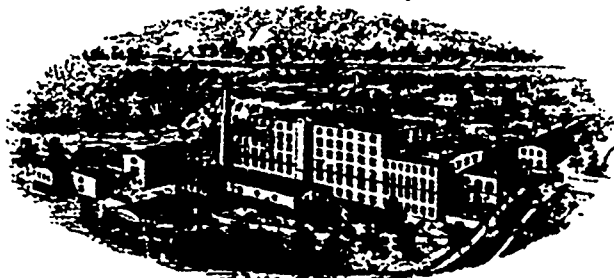
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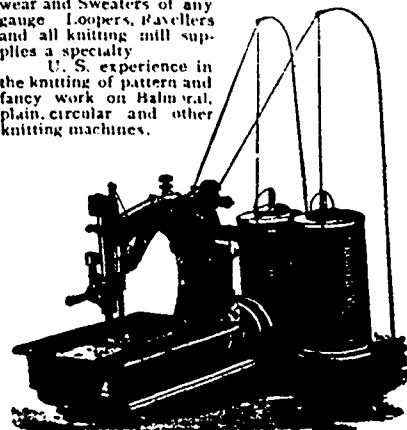
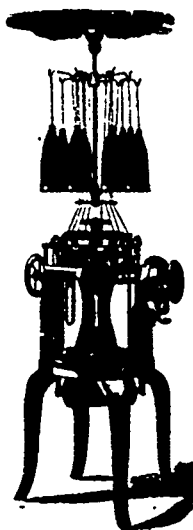
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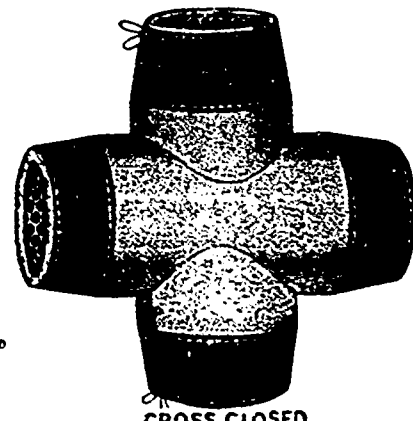


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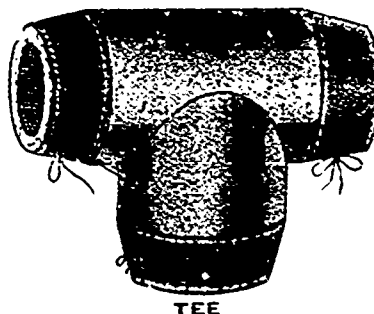
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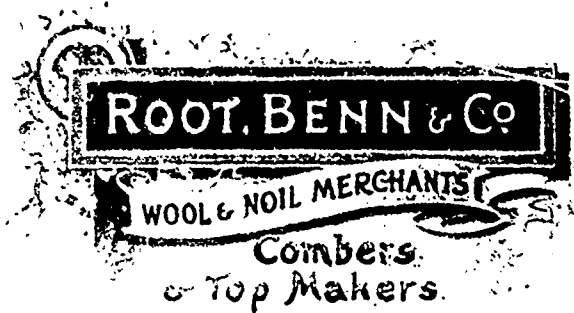
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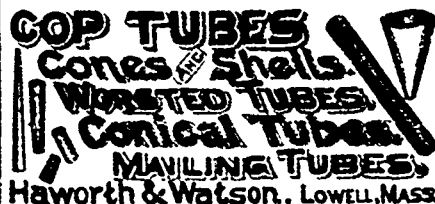
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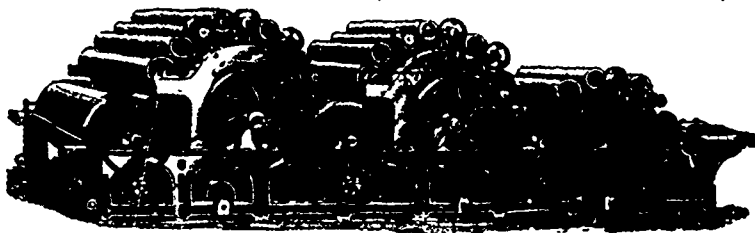
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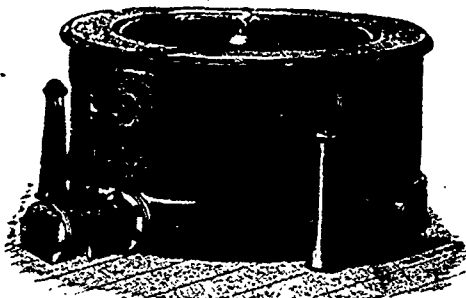
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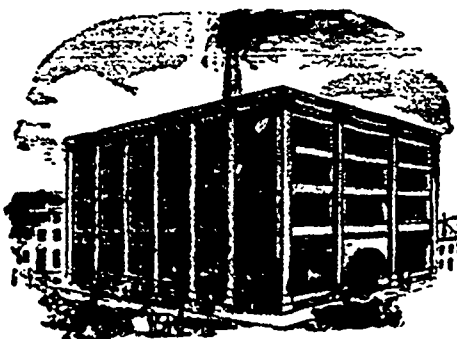
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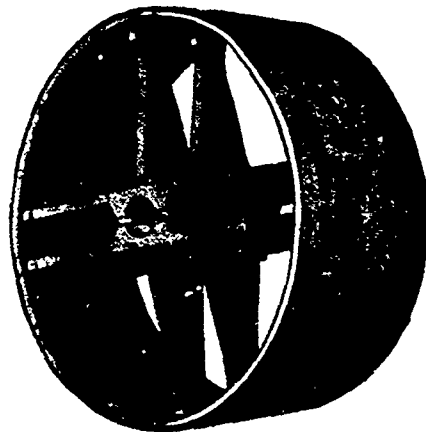
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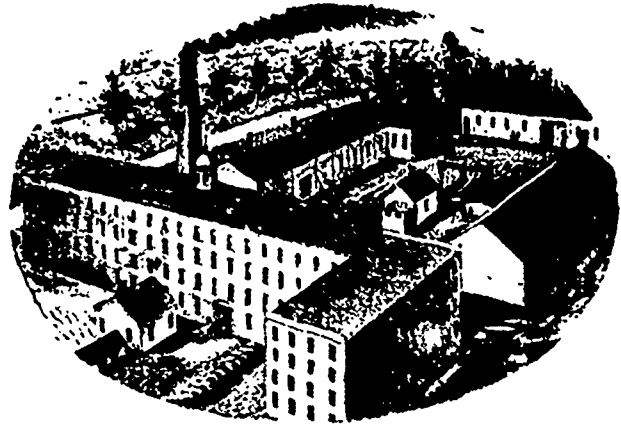
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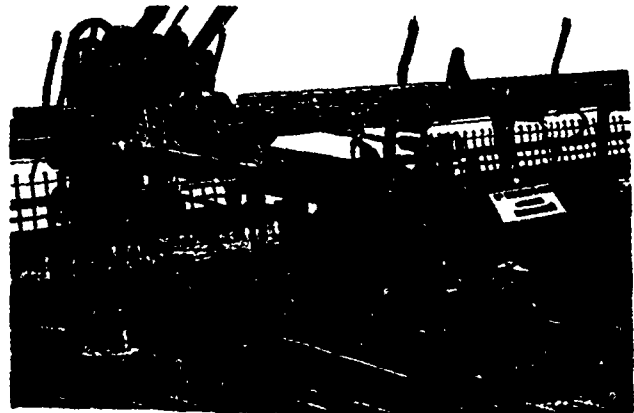
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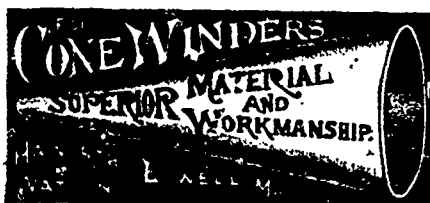
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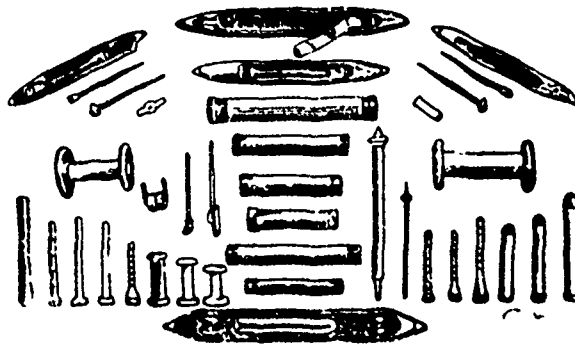
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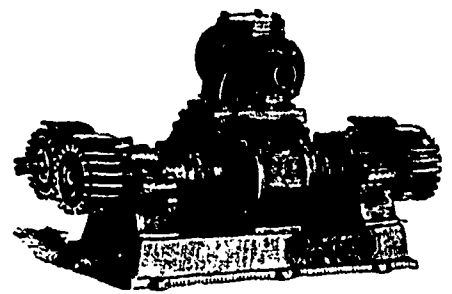


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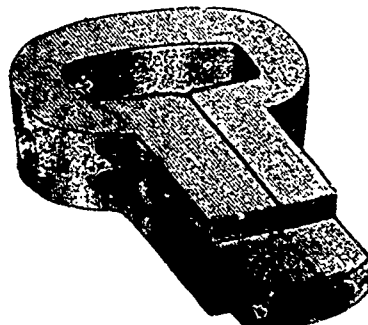


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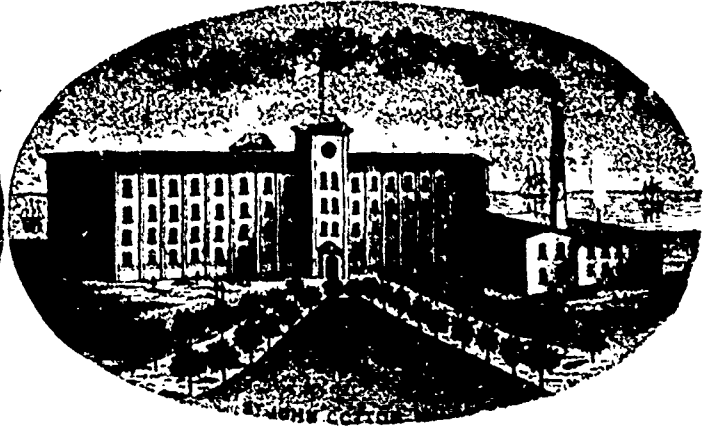
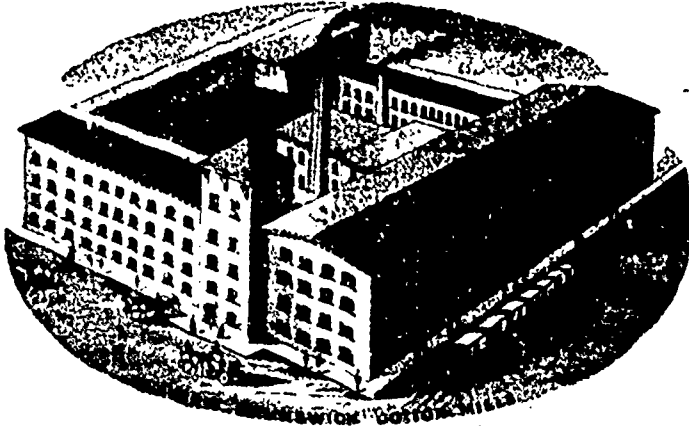


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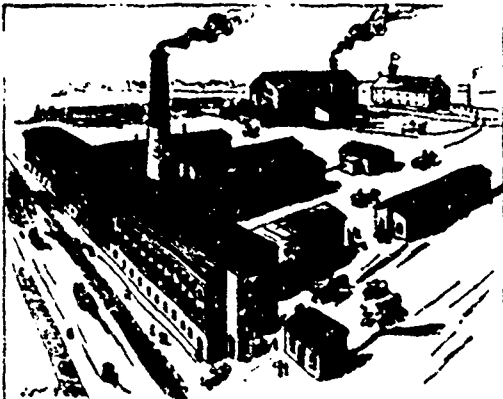
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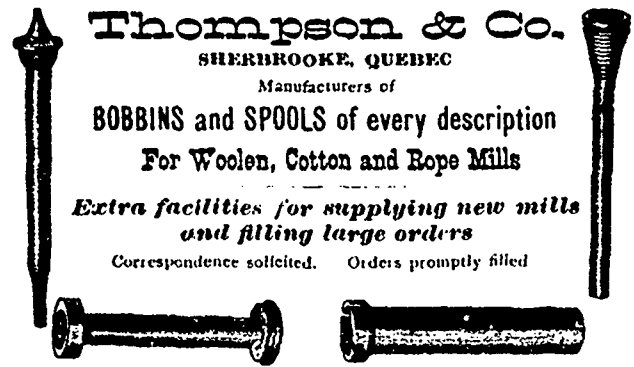
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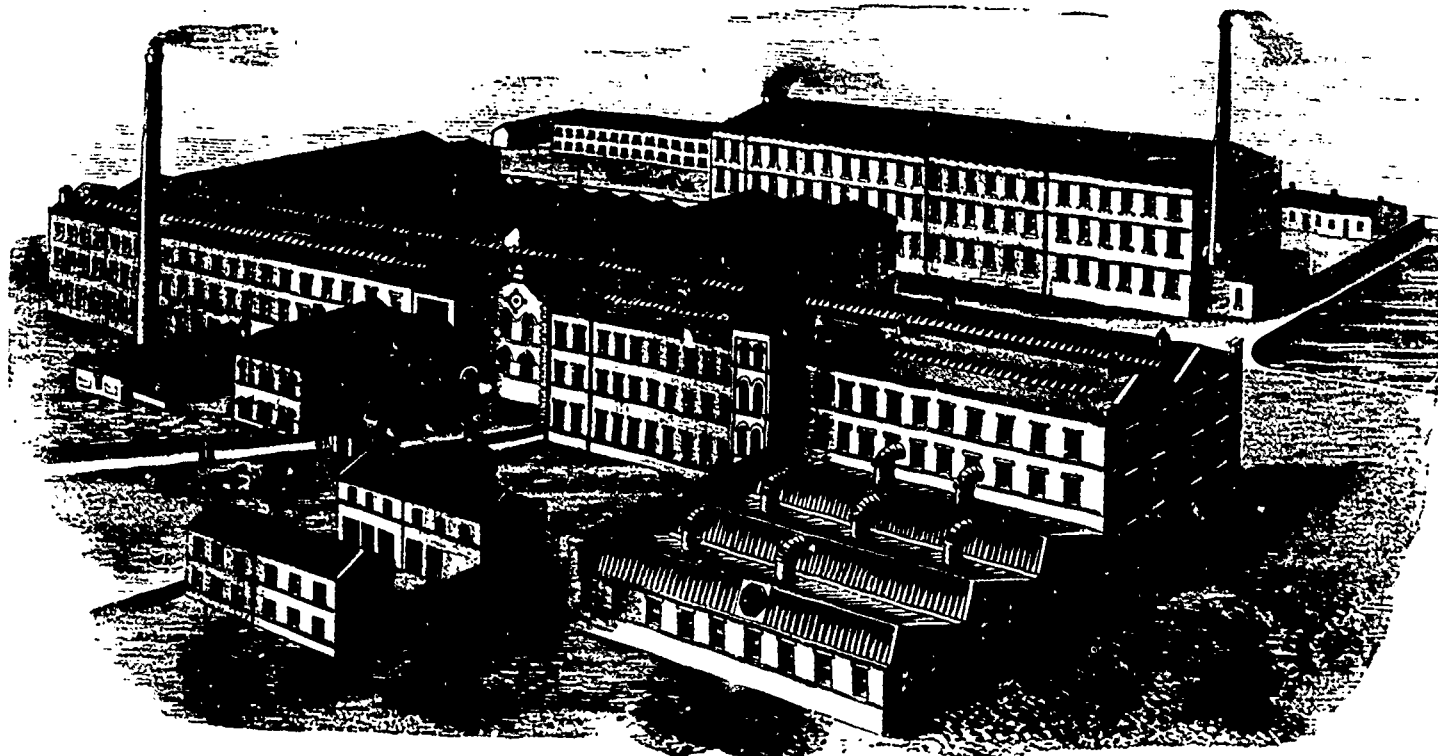
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PRACTICAL HINTS ON WEAVING.

A loom should be kept well oiled
 Heddles should be kept straight
 Loom belts should not be kept too tight
 Shuttles should be kept very smooth
 Hard twisted filling should be steamed.
 Every weaver should understand drawing in.
 Harnesses should be hooked with uniform tension.
 Cloth and warp beams should be perfectly straight
 Weavers should be made to share the responsibility of the work.

Side weights are better than temples for most kinds of work.
 The more a loom is kept running the more even a cloth will weave.

Hoop iron faced with leather makes the best friction for heavy work.

Harnesses should be kept well oiled and cleaned, and not allowed to chafe.

Spoolers should not be allowed to learn to tie any other than a square knot.

A warp will weave with much less strain in an open shed than in a close shed loom.

No heavier weight than is actually necessary should be used on a conditional "take-up."

Cotton rope for friction, with very little on the "take-up," will make even cloth on light weight goods.

Nothing is gained, but great loss is generally the result of speeding looms higher than they should run.

A little brush made of waste, tacked on the lay near the shuttle box, is better to prevent filling drawing in on the side of the cloth, than friction on the filling.

The shed should be only just deep enough to admit the shuttle in its passage without chafing the warp.

Reeds should be well cleaned before warps are drawn through them

A good selvage not only improves the general appearance of a piece of cloth, but is of great advantage in the weaving.

Fining weavers for bad work is not the best method to adopt. Cloth can be made perfect, and weavers receive the full pay for weaving. Persons of vicious, slovenly, and immoral habits have been the cause of such rules being made, while good weavers, by accident, have suffered by it. Hence the penalty of fines should not be applied indiscriminately.—*Baldwin*

TEXTILE IMPORTS FROM GREAT BRITAIN.

The following are the values, in sterling money, of the textile imports into Canada from Great Britain for July, 1895, 1896, and the seven months to July, 1895 and 1896:

	Month of July		Seven months to July.	
	1895.	1896.	1895.	1896.
Raw materials—Wool.....	£1,216	£214	£4,783	£5,680
Cotton piece-goods.....	30,556	32,476	289,478	291,466
Jute piece-goods.....	10,383	9,830	58,556	89,322
Linen piece-goods.....	13,632	12,595	89,999	93,609
Silk, lace.....	184	243	17,866	6,087
" articles partly of....	4,956	2,285	21,251	17,111
Woolen fabrics.....	31,280	41,529	126,048	157,401
Worsted fabrics.....	66,270	65,672	323,887	343,928
Carpets.....	4,931	5,383	114,363	113,541

THE WOOL MARKET.

TORONTO—The market is almost without any noticeable features. Very little is doing in fleece wools and prices remain at from 18 to 19c. Puffed wools are very slow and we quote 19 to 20c for supers, and extras 21 to 22c. In foreign wools little is doing, but there is a prospect of slightly better trade, as a number of mills are now receiving orders more freely.

MONTREAL—There is nothing new in the wool market; no change in prices of Cape, and some small sales have been made within the last few days at 13½ to 15c. We quote Canadian fleece 18 to 20c.; B.A. scoured, 25 to 32c.; North-West, 10 to 12½c. Some small parcels American territory wools have been offered in this market at 9 to 10c., but so far we hear of no sales having been made. Their heavy shrinkage is against them.

REFINED CONCENTRATED FULLER'S EARTH.

Historically, archaeologically and socially, Bath is distinguished, and it has also an important relation to the commercial and industrial life in England. It is in the neighborhood of Bath that large supplies of fuller's earth are found, and it is here that its scientific preparation for effective use in the arts and industries has been brought to such perfection. This material is of course no novelty in itself, but on the contrary, as everyone knows, one whose use is of such venerable antiquity that we fail to trace its earliest employment. The singular circumstance about it is, that through all these thousands of years it should, until recently, have been used only in what we can only describe as such a barbaric form—that is, as a mere clay. It was simply dug up, dried and mixed with water into a "slurry" for washing woolens, or ground to a powder for oil refining; and in the finer forms of powder used by druggists for domestic purposes. All this has now been revolutionized. The present proprietor of the refining works, Midford, perceived the advantage which would accrue to all users of fuller's earth if they could be certain of obtaining it pure, instead of paying for and receiving earth which is, either naturally or purposely, composed largely of sand, clay and other dross. During several years experts were employed to effect this, and as a result have brought out several combinations of fuller's earth which are far more effective than fuller's earth in its natural and crude condition; so that the purposes to which this mineral can be applied are being greatly extended, especially in refining oils without the use of acids. It is difficult to exaggerate the importance the last-named advantage has secured for oil refiners, both in the matter of economical production and the improved quality of the oils produced by this process.

ONE of the remarkable features of trade between the United States and England has been the falling off in imports of American cotton by the latter nation during the seven months of 1896, ending July 31. The imports of American cotton into England during that period were but 5,984,712 cwt. against 9,113,721 during the corresponding period of 1895.

In discussing the question of negro labor in southern cotton mills, James L. Watkins, of Alabama, in the *Tradesman*, of Chattanooga, recalls to mind the fact that negro labor had been employed in cotton mills at the south previous to the war. Even as far back as 1827, he states, quite a discussion took place in the newspapers and periodicals of the south in regard to manufacturing cotton goods, cotton bagging and cordage with negro labor.

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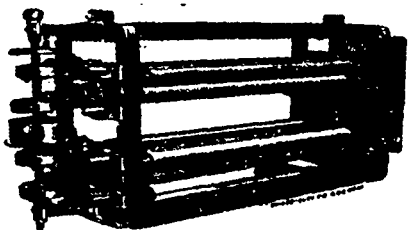
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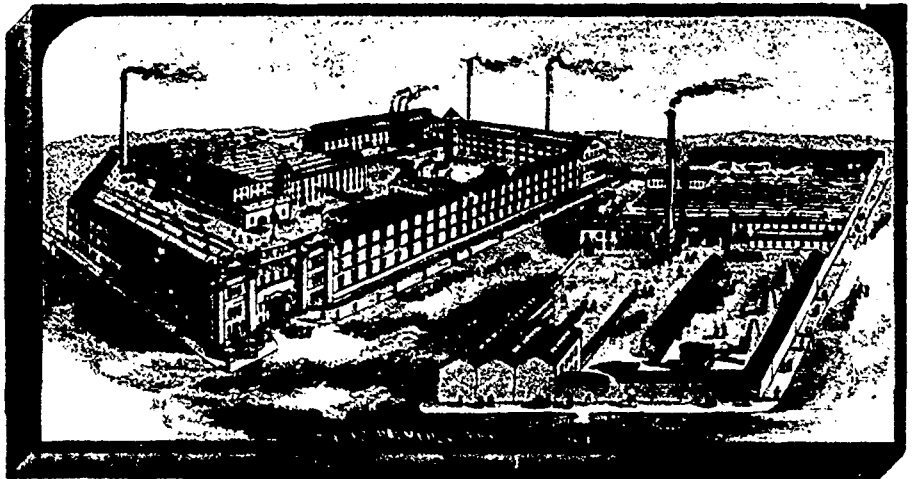
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delphia, 1876. Gold Medal, Paris, 1878. Highest
Award, Medal, Melbourne, 1880.



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