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# CANADIAN JOURNAL OF Fabrics

THE JOURNAL OF THE  
Textile Trades of Canada.

Vol. XV.

TORONTO AND MONTREAL, MAY, 1898.

No. 5.

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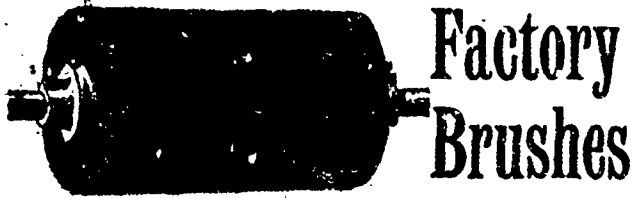
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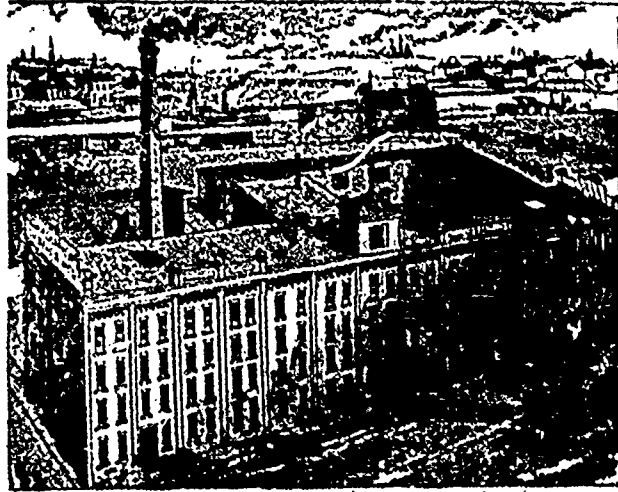
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TORONTO AND MONTREAL, MAY, 1898.

No. 5.

## Canadian Journal of Fabrics

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

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## Editorial.

### SHORTER LENGTHS.

Much is now being said of the slowness displayed by the British manufacturer in adapting himself to the changing requirements of foreign trade. While all that is said or much of it may be true of the British manufacturer the Canadian also shows himself behind the times. Why should the textiles of to-day be sent out in the lengths of a hundred years ago? There is no question that the colors and weaves of that date are not in demand on the market

to-day, and it is quite certain that these are not the only changes time has wrought. The trade wants shorter lengths, and the mill that gives them first will get the trade. This is especially true of those mills which sell direct. Not many years ago the merchant located in a town of 4,000 inhabitants or less could please the customer with a stock of dress goods consisting of from 50 to 100 pieces, but not so now. He must have a stock of from 100 to 400 pieces, and be able to offer not only the various qualities but the latest weaves and novelties. This he cannot profitably do unless he can buy pieces put up in short lengths. The same is true of all cloths, and the new demand must be met. There is a large Scottish wholesale house which does an enormous business in Canada and retains its patrons largely by cutting lengths. Some of our own firms would be perhaps in the way of making a profit if they gave more attention to cutting lengths in future and let prices alone.

### PIECE WORK VS. TIME.

A recent legal decision in Montreal is of great interest both to laborers and their employers. The case was that of Gagnon & Vaillancourt v. Cloutier, *et al*, claimants. This was a contestation of the dividend sheet by a number of operatives who had been doing piece work in the insolvents' boot and shoe factory. These men were collocated by the curator as ordinary creditors, while other operatives, who worked by the week, were collocated under the privileged class of laborers. The curator pretended that the fact of doing piecework placed the present claimants in the position of contractors, and the Court was called upon to define how they should be made to rank. Judge Archibald took the view that the present industrial condition when so much work is done by the piece rendered the point a most important one, and in his opinion the question whether such operatives are or are not under the control of the employer, was a fair standpoint to take in order to determine the nature of their position. He therefore concluded that men doing piecework in factories have none of that freedom which belongs to the ordinary contractor, for they are under the immediate control of the employer, who distributes to them the work and dictates in what order it must be done. The judge ruled that they must consequently rank as ordinary laborers, and, therefore, in the present case the curator must alter his sheet and collocate the claimants as laborers whose salary constitutes a privileged claim.

### COTTON OR WOOLEN KNIT GOODS.

A contemporary published in the United States points out a marked falling off in the production of woollen underwear and hosiery, and an increase in the various makes of cotton goods, which are taking their place. "During the past decade there has been a remarkable shrinkage of hosiery made wholly of wools, in favor of the fleeced and heavy cotton lines," it says. "Ten years ago the commission houses would have considered themselves decidedly unfortunate were they carrying any quantity of cotton hosiery in July (a period of the year which marks the opening of their winter weight goods), believing that they would be forced to carry the bulk of these cotton makes over a full season. Now, however, every commission house displays a complete line of cotton hosiery all the year round." Fortunately, the climate of Canada demands woollens more imperatively than does that of the United States, and we are not likely to see this important industry suffer to any marked extent. The idea that cotton goods can be safely worn as a substitute for woollens is wholly erroneous; in fact, wool should always be worn next the skin, on account of its superior absorbent qualities and the resulting freedom from chills which this ensures.

### VENTILATION OF TEXTILE FACTORIES AND DYEHOUSES, DRYING WOOL, ETC.\*

BY V. H. CASMEY.

(Concluded from last issue.)

The sizing-room is one of the most important departments in the cotton trade, and one in which mechanical ventilation has done much during the last fourteen years. I believe I am correct in stating that the first Blackman fan applied in this country was in connection with a sizing-room. Ten or twelve years ago this department was one of the most unhealthy, the walls in winter being generally wet with condensation, the air at saturation point, and drops falling from the beams often causing the warps to iron-mould. The man working under such conditions the day through and then having to walk home, sometimes a mile or more, could scarcely help getting chills, hence the reason why so many old sizers are found with joints twisted out of all natural shape by rheumatism. Now, however, the sizing-rooms in many mills are as dry and healthy as the room we are in at present. As a result of the improved conditions the men are healthier, and the machine can dry over 20 per cent more yarn in the same time with 10 lbs. less steam pressure, and what is technically known as taping is never found in a well-ventilated sizing-room.

In the cardroom special care is required, as for some cottons a great deal of dust is given off, and unless the fans and inlets are carefully arranged the dust may find its way into the preparing machinery and thus cause dirty work. As a rule the fans are fixed down one side of the room close to the carding engines, the air being admitted on the other side. The fresh air thus

passes over the preparing machinery, carrying any little dust away with it, and onward over the cards to the fans, where it is discharged to the outside. In some cases, however, the air cannot enter on the opposite side to where the fans are placed. The inlets may then be made on the same side as the fans, but near the tops of the windows, the total area of the inlets being equal to the area of the fans. Many might raise the question, Will this not cause a short circuit of the air? It would with a straight-bladed fan where the suction side is only equal to the discharge side, but in the closed-bladed fan the suctional area is two-fifths greater than the discharge, so that the air moves in a semi-circular path and therefore very slowly.

The incoming air being at a greater velocity passes well into the room before it is diffused, when it slowly returns to the fan, carrying the dust away with it. I came across a very interesting case in a cardroom some years ago that is well worth repeating here. The manager informed me they intended fixing more gas jets, as the hands complained they could not see their work properly. Before the additional lights were added, the ventilation was completed, and it was then found not only possible to abandon the idea of more jets, but to dispense with some of the lights they had. Passing more fresh air through the room cleared away the dust which had hitherto interfered with the rays of light, and also supplied more oxygen, so that better lights were given.

Coming to the spinning-room, careful arrangements are essential to give the required results. We must consider that the workers are most susceptible to draughts, and the same remarks apply to the materials spun. In a spinning-room there must be no concentrated currents towards fans, and no drafts from doors or windows. The most satisfactory arrangements I have seen are where fans 18 inches diameter are used for blowing air into rooms, the same sized fans being used for exhausting; the first mentioned being run at a slightly higher speed will secure a slight pressure in the room, thus entirely preventing draughts, as the tendency of the air is to escape to the outside through any openings in doors or windows. In the cotton trade there are a number of firms using this double arrangement of fans, who claim that many days in the year no artificial humidity is required, the moisture in the atmosphere being quite sufficient for the purpose of spinning, and the same remark applies to weaving sheds.

The gassing room is one of the worst departments to deal with because it is the one where ventilation must be as near perfect as possible. The gas jets through which the threads pass must be moved by the air current, and the nuisance from heat and CO<sub>2</sub> along with the fine dust is so great that in many cases the air has to be changed 120 times an hour. Without proper inlets this would be impossible. In the arrangements adopted air is allowed to pass under each frame and to enter the room near the floor line directly under the gas jets. By this arrangement the inlet area is nearly half as great as the floor area, so that taking the room indicated the floor space is 3,000 square feet and the height 14 feet; this gives a cubical capacity of 42,000 feet. The air changed twice per minute

\* Paper read before the Society of Dyers and Colorists, Bradford.

calls for a supply of over 5,000,000 cubic feet per hour, and to do this work six 36-inch fans are used, and still the velocity of the air current is not more than 1 foot per second. This is better understood when I state that a velocity of 3 feet per second is scarcely perceptible to the senses.

There are a large number of sheds in the woolen districts where it is a common occurrence to apply fans to sheds with a floor area of 50,000 to 60,000 square feet, and to deal effectively with such a large space it is imperative that a number of fans should be used, equally distributed; and it is also necessary to have some fans blowing in near the centre, as well as having good air supplies around the walls.

If, however, air cannot be admitted through the side walls the whole supply should come in through the roof, so that no draughts are felt when the doors are opened. I have known several cases where ten or twelve, and in one case, sixteen fans were fixed for exhausting from a weaving shed, and not a single inlet for fresh air had been provided. The fans under such conditions were practically useless. One firm, I remember, some years ago were recommended to fix ten fans in their shed. They, however, decided that a large fan would do better, so they fixed one at the far end of the shed, close to the boiler-house, admitting air at the opposite end. The results proved most conclusively that ventilation was not their forte. The shed has an area of about 40,000 square feet, and finds work for about 600 hands. The heat from so many workers, and as many gas jets, drawn to one end of the shed by the fan, caused the warmest part before the fan was installed, to increase in temperature about 20°. This result could only be expected, as the fan swept the whole vitiated air and heat in the shed towards itself, thus increasing the evil at that point. The same people would not have been surprised to find a large pile of dust at one end of the shed if all the weavers had been sweeping in that direction. The farther the sweepers go, the larger the accumulation of dirt; and the more people the air passes over, the greater its impurity.

The large fan was taken out and ten smaller ones used, fresh-air inlets being made at a point near the boiler-house, where complaints of being over warm came from, and an even temperature can now be maintained. A point well worth remembering is, never fix a fan at the warmest point in the room to be ventilated, but let the warm point be an inlet for supplying some of the fresh air, and fix the fan some distance away. The temperature can thus be often equalized. It is always essential to have a margin of fan power in a weaving shed. I have known cases where the temperature has been 80°, with not more than 65 per cent. of moisture; a shower of rain has fallen, and in a few minutes the temperature has gone down 10 per cent, causing the humidity to stand at saturation point, which, should a factory inspector happen to call at that time, might mean a summons for allowing too much moisture. With extra fan power, such danger can be avoided.

The finishing and calendaring departments are often found to give considerable trouble the year round. In

summer the heat from the cylinders is almost unbearable, and in winter the warm moist air, coming in contact with cold walls and windows, quickly condenses, causing in some cases serious losses. In many cases large hoppers are fixed over the cylinders, and outlet trunks carried through the roof, the heat from the machines warming the air and thus causing an upward suction, and in warm weather acting fairly well. In cold weather, however, the moist warm air condenses in the trunks and falls on the material.

In many works the hoppers have been dispensed with, and a large fan fixed over two machines, the result being more light in the room, and making the machines get-at-able at any time. One large firm near Burnley have eight drying machines in one ground-floor room, the total number of cylinders being 132. The room is 90 by 50 by 14 ft., and five large fans are fixed, discharging through the windows, three on one side and two on the opposite side. The fans get their air supply from the engines and other rooms adjoining, and although there is no woodwork about the machines the air in the rooms is the same both in winter and summer. The eight hoppers being taken away gives a deal more light, and the total results are so satisfactory that the firm wrote after the work was completed stating how satisfactory the results were.

In some cases the heat from the drying machines, etc., can be utilized in the dyehouse and bleach croft, and it is to such departments we will now turn our attention. There are some of us here who have painful recollections of a dyehouse in frosty weather. What is more annoying than to go the dyeing department and find the steam so dense that is impossible to see more than a few feet around you? Let us consider for a moment why the vapor on such a morning is so dense. Supposing the outside air is 32°, and all the water in the dyehouse is at the same temperature, the air will be quite clear, and we shall be able to see all over the place from one point. In other words, unless there is a difference in temperature between the inside and outside, there will be no moisture visible.

Air at 32° saturated with moisture will carry 2½ grains per cubic foot, but air at 60° will carry 6 grains, and the capacity of air for moisture practically doubles with every 23° of rise in temperature above that point. If, then, we raise the temperature of all water in the dyehouse to 100°, each square foot of dyebeck will evaporate a little over 1,000 grains of water per hour, and the appearance of our dyehouse will now be very different; the whole interior will be one of fog, the density of which will increase in proportion as the temperature of the water increases, as when the water reaches boiling point over 30,000 grains of moisture, or a little over 4 lbs. of water will be evaporated per hour per square foot. If we now apply a fan for removing the steam, allowing it to have its air supply from the outside, we are not surprised to find the fan appears to increase rather than decrease the evil, and from what has already been stated the cause is easily found. With the dyehouse in proper working order the temperature will probably be 70°, the air being saturated or holding about 9 grains per cubic foot. The fan brings air into the room at 32°; this has the effect of cooling the air in

the dyehouse, and so robbing it of its heat or power for holding water in suspension; part of its strength being gone, it begins to deposit its burden first on the ironwork and slates, and later on the woodwork.

The expense and annoyance caused by condensation in dyehouses and similar places is too well known to require enlarging upon here. We might enlarge to any length on this part of our subject, but sufficient has been said to show the cause of the trouble, and we will endeavor to find the remedy. We must supply air to our dye-house as near the inside temperature as possible. To this end, fans are supplied with warm air from the finishing and tentering rooms adjoining, and the results are all that can be desired. The two rooms which supply the warm air are much pleasanter for the work-people since the fans were applied to the dyehouse, and the quantity and quality of their work are very much improved. This dyehouse belongs to a wealthy firm in Lancashire, who, in erecting the building, consulted with a firm of engineers as to what should be done to prevent condensation. They were advised to fix two large pressure fans, and have a cover over each dyevat, connecting each cover to horizontal ducts running through the dyehouse, at the ends of which the pressure fans were fixed. This was done, the whole costing £350. Needless to say, it was as complete a failure as the two 72-inch Blackmans have been a success.

Another and more generally applicable method of dealing with departments where steam is given off and by which failure is impossible, because the conditions attained are the same as we find on a warm summer's day, is to use a steam air warmer and three fans. One of the fans brings the air from the outside and passes it through the heater, and the two larger fans are used for exhausting; by this means a constant volume of warm air is kept passing through the dyehouse very slowly, absorbing the steam and carrying it away. One point may be mentioned here in connection with this class of work. Moist air is much lighter than dry air at the same temperature; this being the case, it is imperative that the air movement be very slow, otherwise the entering dry air will simply pass through the moist air. To get over this difficulty larger fans are used for exhausting, run slowly, being in excess of the fans blowing in by about 25 per cent. at the same speed.

In connection with the woolen trades the question of drying is well worth attention in a paper of this kind, and I therefore propose to say a few words in conclusion on this subject. Drying depends on the quality and the temperature of the air brought in contact with the material to be dried. The secret of all drying is in fully understanding the affinity of air for moisture at different temperatures.

Take, for instance, a yarn-drying stove with the material hung in hanks one above another (a very common practice), the room 10 ft. high. The moisture from the first two or three rows will rise up over the hanks above, and, unless there is some arrangement for preventing it, will condense there, the bottom hanks thus having the best chance. I will give you one case, which came under my

observation some years ago, illustrating this point. The drying room was 45 ft. long, 15 ft. wide, and 6 ft. high; at one end was an exhausting fan, and at the other a large warming battery, the idea of the parties who had arranged this installation being to keep a constant flow of warm air through the room, expecting to have all the material dried at one time. Note the result: The 15 ft. nearest the fan they could not get dry in less than double the time the 15 ft. nearest the battery. I hung three pieces of material (weighing each one) at points, 10, 25 and 35 ft. respectively from the steampipes; each piece of cloth when hung weighed 32 ozs. In ten minutes the one nearest the steampipes was dry, weighing 24 ozs.; the next one weighed 30 ozs., and the one 35 ft. away weighed 40 ozs. The moisture evaporated at the warm end of the room was done at the expense of reducing the temperature of the air, which, being unable to carry the moisture deposited it on the material nearest the fan. Many of you who are here have probably come across similar cases. The remedy was a simple one; we made two more inlets so that the warm air entered the room at three different points 15 feet apart. The temperature of the room was thus kept constant, and the drying in all parts was practically the same. During the last few weeks a yarn-drying arrangement has been set to work. Time does not allow me to mention in detail installations of similar plants for drying wool rags and piece goods, but in every case where this has been done the results are most satisfactory. In conclusion, I must apologize for the incomplete manner in which some of the items have been dealt with, but in an hour's time it is impossible to do anything like duty to the main object of a paper on ventilation. Some here may think I speak too strongly on the subject, but I can assure all, not nearly so strongly as I feel, as I am confident that no other outlay is so beneficial to all concerned as outlay in giving to the workers a sufficiency of fresh, pure air. The health of the workers would quickly improve, with the result that more and better work would follow; nor would the matter rest here. The fresh air would give a keener desire for proper food and less desire for alcohol, so that the net gain would not only be commercial, but the worker would also profit both physically and morally.

#### THE ACTION OF CAUSTIC SODA ON WOOL FIBER.\*

BY E. C. KAYSER.

This interesting topic has hitherto received but little attention, and it is only now, under the impulse imparted by the great success achieved in the mercerization of the cotton fiber, that closer investigation is bringing to light new and unexpected facts. No doubt, what has hitherto discouraged attempts to derive useful results from the action of caustic alkali on the wool fiber is the prevailing impression that such action must under all circumstances be a destructive one, and the more destructive the stronger the alkali. This impression, as Buntrock has now proved by a series of experiments, is entirely erroneous. Under suitable conditions caustic soda not

\* From The Textile Recorder.

only leaves the tensile strength of the wool fiber entirely unimpaired, but on the contrary, as in the case of cotton, greatly augments it, and as the treatment simultaneously brings about an increased affinity to coloring matter, there is every prospect that before long it may find practical application, the production of dyed two-color effects on woolen cloth on these lines having been already described in these columns. In compiling tables showing the effect of caustic soda of various concentration on the tensile strength of wool fiber, Buntrock operated with yarn first thoroughly wetted out and freed from water as far as possible by centrifugation; after 10 minutes immersion in the alkali the yarn was as expeditiously as possible washed in one per cent. dilute hydrochloric acid, then in fresh water and dried. The result is expressed in the following figures:—

Original tensile strength .....	610		
After 10 minutes immersion in caustic soda of —			
4 deg. Be.....	510	22 deg. Be.....	195
6 " " .....	485	24 " " .....	200
8 " " .....	475	26 " " .....	235
10 " " .....	430	28 " " .....	240
12 " " .....	250	30 " " .....	335
14 " " .....	210	32 " " .....	420
16 " " .....	180	34 " " .....	440
18 " " .....	110	36 " " .....	580
20 " " .....	95		
		38 deg. Be. ....	740
		40 " " .....	770
		42 " " .....	815
		44 " " .....	740
		46 " " .....	730
		48 " " .....	720
		50 " " .....	620

Accordingly, the destructive action of the alkali reaches the maximum with 20° Be. It then rapidly declines, until at 36° Be. the tensile strength remains at par. From 38-42° Be. we have a rapid increase in tensile strength, and then again a gradual decline. In manipulating with strong alkali care must, however, be taken when neutralizing and washing to prevent, as far as possible, the secondary effect threatened by any rise of temperature, and by the dilute alkali formed in the fiber, or the results will be less favorable than indicated. In regard to other physical changes brought about under this treatment, in contact with caustic soda of from 4-36° Be., the yarn rapidly becomes fiabby and collapses. After ten minutes immersion it can be stretched to double its length, and beyond that easily torn. With the removal of the alkali, the yarn also recovers from the gelatinous state, and resumes more or less its former structure and strength, but it remains strongly felted. Alkali of 20° Be. acts most destructively. Within twenty minutes' time the fiber is thoroughly disorganized, and begins to dissolve. On the contrary, caustic soda of 38-50° Be. hardly brings about any structural disorganization, causes no felting, and, as the tables show, leaves the strength more than unimpaired. As to whether there is in any of these cases contraction analogous to that experienced with cotton, the observer has omitted to state.

The most advantageous concentration of the alkali thus being ascertained as one of 42° Be., it would then, with a view to practical application, be necessary to see how long the treatment may be extended before a retrograde movement sets in. The answer is contained in the following tabular observation:—

						Tensile strength.
After	5 minutes' immersion in caustic soda, 42° Be.,	.....	820			820
"	10 " " " " " "	....	815			815
"	15 " " " " " "	....	760			760
"	30 " " " " " "	....	715			715
"	60 " " " " " "	....	540			540

If the treatment is to be prolonged beyond a space of ten minutes, the intervention of a protective agent becomes clearly necessary, and for this purpose glycerine has been found highly suitable. Thus a mixture of equal parts of glycerine and caustic soda of 42° Be. acts in the following manner:—

						Tensile strength.
After 5 minutes' immersion in equal parts of glycerine and caustic soda, 42° Be.,	.....	830				830
After 10 minutes' immersion	.....	870				870
" 15 " " " " " "	.....	800				800
" 30 " " " " " "	.....	790				790
" 60 " " " " " "	.....	740				740

Lesser quantities of the diluent, however, suffice for the purpose, for even in a mixture of four parts of alkali with one part of glycerine, during 60 minutes' exposure, the fiber retains a resistancy of 715. The beneficial action of glycerine, in fact, is so pronounced, that it finds full expression even when coupled with a highly destructive alkali of 20° Be., for whilst the latter alone effects within ten minutes almost complete destruction, an addition of 25 per cent. of the former leaves to the fiber a tensile strength of 550, and an admixture of 100 per cent. culminates in a resistancy of 700. Interesting as these observations are, they will doubtless be soon augmented by others, directed towards deriving fruits from this new and hitherto neglected field of textile chemistry.

A recent German patent deals with the production of dark blue on cotton cloth by the fixation of suitable alizarine colors on a mixed chromium and iron mordant. The goods are first padded, as usual, in an alkaline solution of chromium containing about 1½ ozs. of oxide per gallon, and, after standing some time, washed and dried, they are then padded in iron mordant of similar strength, dried in the hot flue, aged, if desired printed in the usual discharge acid, and, after the customary dunging process, dyed with gallocyanine, brilliant alizarine blue, or some other suitable dyestuff.

Red, orange and yellow discharges in dyed basics can, according to Romann, be got by the use of aluminate of soda. The cloth is prepared with tannate of antimony, as usual, printed in sodium aluminate, and aged in the Mather-Platt; then dung with sal ammoniac, wash and dye with basic colors, at 40° C. clear in boiling water, and finally dye with alizarine, Persian berry, quercitron, or the like and soap. To improve the brilliancy of the red, the cloth may finally be oiled and steamed as customary for reds previous to soaping.

For the discharge of developed para-red, Messrs. Cassella & Co. publish the following formula:—Boil together for a short time acetate of ammonia 11° Be. 1 gallon, and wheat starch 1½ lbs.; cool and add tin crystals 7 lbs., and citric acid 1 lb. For white, take 6 parts by weight of this discharge paste, 3 parts of tin crystals,



and two parts of gum thickening. For colored discharges, add to the discharge paste suitable basics dissolved in a small quantity of acetic acid, together with the corresponding quantity of tannin glyceride, the latter being a solution of tannic acid in equal parts of acetic acid and glycerine. Thioflavine T, phosphine II., tannin heliotrope, safranin GGS, rhodamine 13, methyl violet BB72, new methylene blue N and R, indazine M, fast green O, brilliant green, and Victoria blue are suitable for this style. Steam the print for five minutes in the Mather-Platt, sour in hydrochloric acid of  $\frac{1}{4}$ ° Be., wash, and soap. Diamine colors, either added from the first to the prepare, or stoppadded over the red, may be simultaneously discharged, and the process may also be extended to puce and brown bottoms developed on a mixed prepare of  $\beta$ -naphthol and amido-naphthol BD and 2B. A new process for reserving para red with basic colors imitates the style practised in aniline black, and is based on the observation that fairly solid ferrocyanide-zinc-color lakes are formed without steaming, and in the presence of carbonate of potash, whilst under the same conditions reduction of the diazo body takes place. The cloth is prepared as usual, printed with a paste containing, besides the basic color and carbonate of potash, about 1 lb. of yellow prussiate to the gallon, the necessary zinc chloride being added to the developer. Further particulars on this process, the invention of a Russian colorist, would be desirable.

For the production of azopink, and in place of nitrophenetidine, the Farbwerke Höchst propose to use ortho-nitro  $\beta$  naphthylamine, the diazo compound whereof yields, with  $\beta$ -naphthol, an orange, which, on soaping at 60° C., changes into a bright bluish pink superior in fastness to that produced from the former base. "Developer E.S.," a new product of the Farbenfabriken, serves for the production of black prints by copulation with diazotised benzidine. The cloth is prepared in a solution of the "developer" in hot water and oleine, and printed with a diazo color, to which, if a green shade is desired, some acetate of chrome may be added. The black is of a good full shade, and fairly fast to soap, and may be reserved with bisulphite. A new series of stable diazo compounds, in powder form, is under the name of "patented azogenes," put on the market by the Societe Francaise de Couleurs d'Aniline. The advantages claimed for these products, which are used as customary, are those generally emphasized by the makers of similar products. In connection with this may be noted a peculiar process by which the Berlin Actiengesellschaft are enabled to present diazo and tetrazo bodies in a dry and stable form. The process consists in diazotising the base in the presence of an excess of sulphuric acid of 50 per cent., mixing the solution with fossile meal (infusorial meal), and drying the pulp at moderate temperature, and finally grinding it into powder. In this peculiar form the diazo bodies prove perfectly stable, and to obtain a concentrated solution thereof, the powder need only be stirred into water, when the mineral constituents will quickly settle out.

#### ANILINE BLACK.

For the production of aniline black, presumably on yarn, Grawitz proposes impregnation with a liquid con-

taining an equivalent each of acetate of soda, chloride of manganese, and aniline salt, and  $\frac{1}{4}$  equivalent of chlorate of soda, in rough figures, 1 part of each of the three former, and  $\frac{1}{4}$  part of the last constituent, to which a small quantity of vanadate of ammonia, or, to make the liquor more stable, of perchloride of iron is added. After development in the ageing chamber, the goods are finally chromed. The process is supposed not to tender the fiber. Another inventor claims to achieve the same end by using lactate of alumina as a protective agent, and prepares to that purpose a bath containing, per gallon, aniline salt 12 ozs., nitrate of copper 3 ozs., chlorate of soda 10 ozs., sal ammoniac 9 ozs., and lactate of alumina 4 ozs., the latter being prepared in solution by double decomposition between lactate of barium and sulphate of alumina. Part of the hydrochloride of aniline may also be directly replaced by the corresponding lactate, giving a proportion of 1 part of the former to  $1\frac{1}{2}$  parts of the latter. The color is developed by 4 hours ageing at 50°C., in a moist atmosphere, and finally by chroming. To render this black fast to acids, the yarns may hereafter be worked cold for 1 hour and at 80°C. for another hour in a bath containing, per gallon, bichromate of potash 5 ozs., aniline salt  $1\frac{1}{2}$  ozs., toluidine-hydrochloride  $\frac{3}{4}$  ozs., lactic acid 3 ozs., and sulphuric acid 2 ozs.; finally wash and soap.

#### WOOL-CARDING MACHINERY.

Let us observe, says J. F. Bolger, in an address to the Philadelphia Textile School, the mechanical operation of a modern set of cards. We shall commence with the first breaker card for wool carding with Bramwell feed attached. The Bramwell feeder must be operated to obtain the best results, and the stock must be properly and uniformly prepared for the card, or the results will not be good. The feed rolls, burr cylinder, and burr guards must be scientifically adjusted to avoid damage to staple or carding surfaces. The first worker next to the feed rolls receives the stock in the shape of small locks or "bunches," and should on that account be set off from the main cylinder a sixteenth to an eighteenth of an inch, so that the fibers, when in a "bunchy" condition, will not be broken, and thus the length of staple and the strength of yarns to be made from it reduced. The next worker should be set somewhat closer, and so on to the worker next to the fancy. This may be termed a graduate setting. There is a different gauging on each worker, so as to gradually comb or card out the stock, thereby preventing damage to the fibers, which you can readily perceive will surely result where every worker is set as close as possible to the cylinder. Where a gradual setting down of the carding points is adopted the results will be more satisfactory, not only in stronger yarn, but the carding surfaces will be preserved from excessive strain, and less grinding will be required. The matter of speeds on the various cylinders of woolen cards must be left to the best judgment of the carder, and is governed by circumstances. The "fancy" should be set to the main cylinder with a fine gauge, to ensure a level setting on each side of the card, and afterwards set in the cylinder to suit; the doffers

should be run fast enough to keep the main cylinder clear, and save fiber and waste.

The second breaker card is governed by the same rules as the first breaker, except that the fiber, having been carded out once, permits a closer setting of the various surfaces, so as to gradually straighten out and parallel the fibers for the finisher card. The side drawings—whether made for the bank creel, ordinary creel, or spool-stand system—should not be twisted hard, but must be handled in the same way as I have suggested for the Apperly feeder, if the best results are desired. The best way to feed stock to the second breaker is to use a  $4\frac{1}{2}$ -inch or a 5-inch iron licker-in, with a "back fancy" to raise the fiber, so that the "tumbler" can clear the licker-in properly at each revolution, and thereby deliver a more perfect fleece to the main cylinder. This rule also applies to the feeding mechanism of the finisher card. The fibers should be delivered to the finisher card by the Apperly feed (or by other means) in a well-parallel condition, so that the work of condensing to the required weight of "roping" will be made with ease and uniformity. But the demand of the times is steadily growing for more and more production from each set of cards, especially on medium to coarse work, where quality is not so paramount a necessity as quantity—as long as the yarn is strong enough to use. For this reason the idea of a double-cylinder finisher card, and also of cards of a large diameter, with an increased number of workers, is growing in favor. By means of these greatly increased breaker and finisher carding surfaces, a much greater production of good yarn can be secured. Many mills are throwing out their old cards with small diameters, and are substituting these modern cards; the vastly improved results soon pay for the expense.

The machinery for making yarns out of the lowest grades of stock for cheap blankets and carpets consists of two cards to a set—the first breaker with a Bramwell feeder of special construction for short stock attached, a finisher card equipped with the Schofield intermediate feeder, and the Barker or other make of rub motion, for feeding and condensing purposes, complete the set. The results are very satisfactory when an experienced man is at the helm, and a manufacturer cannot make a better investment than to employ good overseers. But the machinery must be up to date also, and kept there, for no man, however good or able he may be, can do good work without good machinery, and vice versa.

The modern shoddy card plays an important part in the manufacture of goods to-day. Every successful woolen manufacturer realizes the necessity of extra carding of shoddy fibers, previously used in cloth or other fabrics, in order to card out the threads, etc., and also to remove as much as possible of the artificial twist produced by previous spinning operations, so as to improve the texture of the fabric into which the manufactured shoddy is introduced. The result is we have cards of greatly increased size and length used for shoddy or shoddy yarns in the advanced mills of to-day, here and abroad, compared with twenty years ago, when any kind of a card was considered

good enough to employ on shoddy. This evolution in carding machinery for shoddy materials arises from an ever-increasing necessity of reducing the cost of goods by adulteration, and at the same time of retaining the apparently good quality of these cheap grades of goods sold by our manufacturers to meet market conditions. Without the aid of such modern machinery no manufacturer can succeed in the face of the present conditions, for the growing tendency is towards reduced margins and prices, considering the cost of stock and manufacture.

The carding of worsted wools is a science in itself and when I hear a carder, who imagines he knows it all, claim that any kind of a carder can card on worsted wools for combing purposes, I feel inclined to think that he does not know it all, or that he cannot appreciate the important secret of carding worsted wools, which is to comb out the fibers on the cards, and to send the carded stock to the combing department without any more noils or short fibers in it, if possible, than when received from the stock-room or wool washer.

Worsted wools are fed wet or damp to the card, the carder must understand his business, and see that the wools are properly scoured, as this is an all important feature in the science of preventing damage to the fibers. The carding processes, which must be gradually done. The principle of a gradual setting together of the carding points, which I explained on the first breaker card for wool, applies with tenfold more force to the carding out of worsted wools for combing.

On common to quarter-blood wools the first carding points of contact must be run slowly and set off generally from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch, according to the speeds used and the condition or grade of the wools, the chief idea of the carder being to prevent destruction of fiber, and to keep down the percentage of noils to the desired minimum. A special worsted card is manufactured for long wools, common to a quarter-blood, and has but one main doffer to its two main cylinders of different sizes, the first main cylinder being run at a low speed, the fleecy is doffed to the large main cylinder by an angle stripper, without the aid of a fancy, the wool being so coarse and the speed so low that no fancy is required. The production of this card, 60 inches wide, for this class of wools, ranges from 1,000 to 1,500 lbs. of good carding every ten hours.

The latest improved worsted card for fine wools ranging from half-blood upwards, has a long train of large metallic workers and cylinders running at a low speed, which gradually increases until the first main cylinder is reached, the idea being to gradually open out and straighten the small locks and bunches of fine wools by a gradual increase of speed on each cylinder until the carding operation is completed. Fine worsted wools require more carding than coarse wools in order to straighten and parallel all the fine fibers and prevent noiling, and for that reason these cards are made much larger or longer than for common wools, and the productive capacity is also correspondingly reduced.

The "fancies" on worsted cards must be run so as

to keep clear, and must not be permitted to "wind" and throw out "bunches" of stock to make extra noils, and also cause "slugs" in the yarn. The longer the wool staple is, the faster the doffers should be run, so as to take the fibers away from the main cylinder as straight as possible, to the balling-head on the front of the modern worsted card as built to-day. By running doffers fast the cards deliver the stock better, and the main cylinder remains clear of stock, delivering freely with each revolution; whereas, with a slower speed on doffers, the card is loaded with stock constantly, thereby resulting in damage to the fibers, and also to the card surfaces. High doffer speeds were never possible until the introduction of the fast-running noiseless doffer combs, which improvement has proved to be a great boon to carders generally.

Grinding of carding surfaces requires great care, and the less grinding the better. The card traverse grinder and the floor grinder are the only ones that should be used in a cardroom for grinding, because uniform surfaces can be maintained only by uniform grinding with automatic mechanical processes. Hand grinding does a great injury to the surfaces, because uniform work cannot be done by the hand method of grinding. In order to do good work, card surfaces must be kept perfectly true, and this cannot be obtained by hand grinding, with "saddles" or "strickles" of any kind. The emery-cylinder grinder is a dangerous tool in the hands of an incompetent carder, because while it performs its work in much less time than the traverse grinder, yet if extreme care is not exercised the clothing is quickly injured, by grinding too long, or too hard, as you can readily perceive. The greatest evil our cardrooms suffer from is the grinding of surfaces too hard and too often, a smooth and not too sharp carding surface is what is needed in order to obtain the best all-round results in carding. Our best carders practise this. The clothing of the card surfaces requires great care, because all the surfaces must be clothed from side to side, and throughout, with the greatest caution, in order to secure that uniformity and solidity upon which after results in that department must of necessity depend for quantity or quality of work.

In conclusion, I wish to add a few words of advice to the students of this Textile School, in regard to the carding and spinning departments of your school, which are fully equipped with the best of modern machinery in all departments, and at the head of which, as instructor, is one of our most practical wool carders, John F. Scott, who is thoroughly up-to-date in all his ideas, and of whose teaching you all should avail yourselves at every opportunity. I fully appreciate the fact that I have before me here this evening, young men who will in time become the great woolen and worsted manufacturers of this country, and to them I have particularly addressed myself. I especially urge upon you, one and all, the absolute necessity of acquiring knowledge at every opportunity, because "knowledge is power." Whether you are simply taking a course in dyeing, designing or weaving, you will never have cause to regret it, if, while you have the present opportunity, you will learn all you can about carding and spinning, and the proper preparation of stock, so that in

future you will have some practical knowledge of the structure of fibers and learn how to make and recognize the quality of yarns, as well as of fabrics. In this way you will save considerable time and money in the future, when you go forth to make your mark in the textile world. Before I close my remarks, let me warn you that if you desire to keep on acquiring useful knowledge after you leave this school, you will find no better or surer way to gain it than by treating courteously all commercial men who seek your offices on business. Never hesitate to interview them fully, and seek their views on men, methods, machinery and prospects. In this way you can keep yourselves thoroughly posted upon every practical subject of interest to you. Do not imitate those who never have any time for commercial men. Every man amongst you is the ruler of his own destiny, and the surest way to succeed is by careful, constant study, the acquisition of useful knowledge, the courteous treatment of all with whom you come in contact, and the adoption of the best machinery and methods submitted to you.

#### SELECTION OF FINE WOOLS.\*

If you think of the subject for a moment, you have touched a department in which there are no text books, you have come to a subject of which there are no teachers, there are no established rules; there are no printed nor published principles that relate in any way to the question of the best selection of fine wools for mill purposes. The whole knowledge on the subject is still in that peculiar position of being in every case the result of personal experience. When you find a man who follows the profession of buying fine wools, you find a man who has gathered very largely what he knows in the hard school of his own experience, and the older he grows the more he ought to know, as he is constantly meeting questions out of which he gets, from his own experience, information that has not been given him by anybody else, and which is difficult for him to impart to anybody else.

The equipment of a man who buys wool is very simple; he wants a pair of stout shoes, good strong overalls and an apron; then he wants a pair of normal eyes. There is a very great amount of discussion about the quality of fine wools in which each man is, in his own judgment, not opinionated, but a final arbiter; but if his eyes were examined—if all our eyes were examined—he might find there is a great variation from the normal. And yet, there are few of us who deal in fine wools who would confess that the arguments and disputes that sometimes arise on them might be founded on the fact that we see the same thing differently, but each man, when he announces that in his opinion wool is of a certain fineness, means it to be understood that his opinion is a final settlement of the question, and I am bound to say I would not want to trust very far a man in the business who did not believe very firmly that his opinion on the subject is a final settlement, because one of the peculiarities about dealing with fine wool is that the moment a man loses that down-

\* Address of Charles H. Harding before Warp and Weft Club, at Philadelphia Textile School.

right and absolute confidence in his own judgment on the question he is very nearly worthless.

Having said that much on the general subject, may I say that the first thing one wants to have in mind in this matter of procuring fine wools is to know exactly what he wants. Of course to know just what he wants he must know the requirements of the mill in which he is working. To know what he wants he must know what among the possible lines, characters and qualities of wool he may be able to find to reproduce the qualities and effects that are wanted in the goods by the designer who is getting them, and by the salesman who is deciding on what patterns and qualities are to be used; because it won't do for him to satisfy himself with the simple conviction in his own mind that a certain fineness of wool will make a certain quality of goods. Wool changes from leaving the sheep till getting on the surface of a piece of goods; and what appear to be, and what mathematically might be proven to be, wools of exactly the same fineness, as far as the diameter of the fibre is concerned, will, after they have gone through the processes necessary to make a piece of goods, produce various effects; and after a man is through with the instruction that the wool grader or wool sorter will give him, the very first thing that he wants to know is, what are the results that are to be obtained from different varieties of wool which are practically identical as to the matter of their fineness? Then he faces the question at once as to whether the wool that he is going to use for the required purpose is to be found in that large variety of wools called domestic wools, or whether there are some things about the necessities which will require that he gets outside of that line and investigates the foreign wools. When he has gone that far—supposing he has a theory well fixed in his mind, and, under the charge of a very good educator, has been taught to decide as to the fineness of different parts of fleeces, and has begun the examination of bales of fleeces as they are found in the domestic warehouses or marketed by foreign countries—he is up against a new problem right away; and although he may not have thought much about it before, and although the boss sorter may not have put it in words to him before, the first thing he finds out is that he has been getting nearly all his education (if he has been left to himself and has not been checked and corrected occasionally) on one side of the fleece; and when he goes out into the markets he always sees the other side of the fleece. I suppose that is one of the first things that a man, who has come to be even a very dry sorter, finds in his way when he is turned out to be a selector and grader of wool; he has looked at fleeces on the side on which the rain falls, and now he looks at the fleece on the side that has been on the sheep's back; and there is a wide difference, with the possibility of a very serious self-deception. The first honest impressions of a man, whose habit of mind is altogether confined to thinking of what I will call now the top side of the fleece, are wrong, and here a frequent difference of opinion comes, and especially when handling domestic wools, between the men who manage the wool warehouses and who judge of wool fleeces from the sheep's side, and the

new man who goes out as a buyer and grader, and who is accustomed to judge of the fleece from the top side. Of course, in time, all this wears away. When a man comes to make his selections from foreign wools, one of the first things he finds out about them is that as a rule there is not that wide difference in the very finest wools, from those two points of view, but he will find out very soon that his foreign wools will be very widely divergent, as to giving him just what he wants, depending upon the climate and the character of the soil from which they come. But this is a problem into which I shall not go to-night at all.

For four years we had what political economists were pleased to consider a very great blessing in the form of "free" foreign wool; one of the facts that remains out of that experience is that the people who were in the habit of using certain fine foreign wools, before there was free wool, kept on using them. Another is that many people who had not used them before made experiments which were costly to them, and I imagine that some of them paid a great deal more for their schooling than they now think it was worth. Another is that there was comparatively little increase in use of the classes previously shut out by the duty. We are back again to-day to the position of having foreign wools dutiable, and I prophesy that the people who have been using foreign wools, dutiable and free—fine wools—will continue the use of the same foreign fine wools now that they are again dutiable, because this is largely a question which is decided by the predecessors of the young men in the business, who insist that certain designs that they prepare for certain fabrics must be worked out with certain effects to the touch, and you must find your wool anywhere in the world, that will give your arbitrary designer that effect that he says must be had; and so people will go where they have heretofore gone; duty or no duty, they will continue to use certain fine foreign wools for this purpose. In other words, all wool manufacturers will continue to hunt and use the wool that will answer their purpose. The only difference will be that the imposition of the duty makes the wool cost higher, which makes the yarn cost higher, which makes the goods cost higher, which makes the suit cost higher. One thing about the selection of these fine foreign wools, further, before I go away from that general point of view, is this: The imposition of any duty, of any size, on fine foreign wools, always establishes a practical limit for the shrinkage of imported wool and the experience of this country has been, under its late wool duties, that there is never imported any considerable quantity of fine wool that shrinks over sixty per cent. That is the practical limit for the possible importation of fine foreign wools; and there are very few people indeed that will import much that shrinks over 56, for the moment it goes above 56, as you can see by a little figuring, the burden of the duty at so many cents a pound begins to fall very heavily on the resulting quantity of scoured wool. When you import a hundred pounds of fine greasy wool and get out of it only 40 of clean wool (by a shrinkage of 60) the 11 cents a pound becomes a very serious question, and fine wools that are heavier are rarely imported at all.

If one is selecting fine wools, the very first question raised is whether the wool is being selected for carding purposes or is to be combed. The people who do the buying of wool for carding have certain points in mind, which, while they may be considered in a rather indifferent way by the man who is buying wools for combing purposes, are not the main points in his mind. He who is buying wool for carding purposes has the thought chiefly, whether the wool that he wants is a wool for warp or filling purposes; and what his decision will be, as to the fitness of the wool, will be governed very considerably by that. As most of his other questions are the same as those considered by the buyer of combing wools, we may pass to consideration of that business.

In buying fine wools for combing purposes a man gets a continuous line of thinking in a very definite order. He looks at a lot of combing wool and first has to make up his mind generally as to its quality. If that is satisfactory to him, the next thing that he thinks of is what percentage of the wool at which he is now looking he will get of the particular quality that he wants, in sorting his fleeces; while he is talking possibly about something else he is making an investigation that is settling his mind—that important question to him, whether it is 60 or 75 or 85 or 45 per cent. of these fleeces that is going to come out of the particular quality he wishes to get. While deciding that, he is also deciding as to the length of the wool, and the required length of the staple will be determined by what he is going to do. If for cassimere warp purposes, he will have one theory as to length; if combing for trade in knitting yarns or dress goods, where the ideal yarn is bulky with little weight, and needs not the solid qualities of a strong hard warp that would stand severest work in looms, he will have another notion as to the length of the fiber; he may not be so particular as he would be for the warp yarn. When he has settled in his mind the question of what percentage of his quality he is going to get and how long his wool is, he will immediately want to know how strong it is; for it is a very important question for a comb, whether the average of the strength is right; and then he will want to know about the evenness of the fibers in the particular fleeces—of the fibers of the whole mass—whether they are largely of the same length. He is better off possibly with a fleece of fine wool whose fibers are not over two and one-half inches, than he is to have intermingled with them 25 or 30 per cent. of fibers that are very long; and after he has been at his trade a little while he will find, in very fine wool, that it nearly always happens, when he gets his extra long fiber, it is a two years' growth. There is no advantage in a two years' fiber which is going to break in the middle here and there in the processes afterwards.

There will also come up in his mind the question of the freedom of the fiber; I don't mean by that its freedom from other matter; but I mean the freedom of the fiber in being taken apart, hair from hair, how far that collection of fibers resembles, say, the flower of the dandelion. You know how that is; when you blow your "four-o'clock," every filament flies distinct and separate. As much as you

may want good felting qualities in your wool after you get to a certain point, you don't want to find your wool somehow or other has matted together and has commenced to felt on the back of the sheep. The people who are in the business call that sort of wool cotted wool, and the man who is buying fine wool for combing warp purposes, all other things being equal, will turn his back to the cotted wool and take the wool which has this peculiar freedom of fiber. At the same time he has been looking for what I would call the final chance to find fault—the presence of vegetable matter in the fleeces. All the other things up to that point may be right; but if he finds that there is chaff, or "beans," as the Australians call them, or hard burrs, or that curse of the wool trade, that abominable spiral burr, or that peculiar variety of grass that occurs in California wool (it looks like oats and has at the bottom of the seed a head that is like ivory and can't even be carbonized), as he strikes any one or more of those things, his estimate of the value begins to go down; and he has to make a mental calculation as to where he is going to come out, because somehow, either by mechanical means or by carbonizing, he must get rid of this vegetable matter; and this means low in weight and added cost.

After having passed in review the thought of the percentage that he is likely to get of the desired quality—the length, strength, evenness, the freedom of the fiber, and the absence of vegetable matter, he is about ready to make up his mind on buying his lot of wool. In the meantime, in considering these questions, he has settled for himself what he thinks will be the noiling of his wool. You understand what I mean by the noiling: He is figuring how much of this wool is coming out on the right side of the comb in tops, and how much at a very depreciated value, on the other side of the comb, in noils; and this involves the questions of strength and evenness, and this quality of freedom, and another thing that some people do not always think about—the fact of having a good, solid tip to the fiber, or having one that is going to give way, and its having a sound end next to the sheep or one that is not enfeebled by disease of any kind. Those things together have made up his conclusion as to the question of what is to be the noiling of his wool. All these questions we have raised used to be determined by the handling of every individual fleece. And I can remember twenty-five years ago there was a body of men in this country, buyers for combing mills, whose members spent almost their entire time in going about the country, or the large cities, standing all day long at a table, at which fleece by fleece of the wool that was already purchased was handed up for their inspection, for the purchase was made then, with the proviso that the wool was to be approved by the professional buyer of the mill. I mentioned this old-fashioned method of deciding on these things by handling the individual fleece to say that that trade is out of date.

The bulk of the people who now buy the wool do not subject it to that individual inspection. That has come about from two reasons: One of them is that the men who prepare the wool for the buyer are more discriminating

and are more careful than they were when they could afford to take risks, because the buyer had the option of refusal of the individual fleece. As the buyer has come to throw the burden of careful grading more largely on them, and so put their reputation at risk, by the character of the stuff they sell and pack, of course they have reason to be more careful than formerly. It was a very easy thing in those old days for the man who was putting up wool which the buyer was to pass, fleece by fleece, to let in questionable and objectionable, and sometimes (in the case of washed wool) unmerchantable and unwashed fleeces, because the buyer could throw them out if he didn't like them, and the most of us had a personal pride in throwing out a little. Our judgment was worth something; and if there was a man who was an expert in the warehouse, who could put wool up exactly right, so that our individual judgment need not be exercised, we had either to trust him implicitly or prove to him once in a while that he was not the only man who had an opinion about wool. And I can remember some men who took some pride in passing judgment that was sometimes adverse to the grader of a wool house, because they wanted to be considered as of some use to that house, as well as was the treasurer of the mill, or the head of the firm which they represented. But, as I say, the dealers as a rule have arisen to the new requirement; and the bulk of wool bought now can safely be bought pretty nearly as the man who deals in wool and has a good conscience and a high reputation will put it up for sale.

(To be continued.)

#### TRADE RESULTS OF THE WAR.

Whatever is the issue of the war between Spain and the United States, there can be little permanent benefit to British or Canadian trade expected to be the outcome. If the United States annexes Cuba, which they have undertaken not to do, the commercial development of that very rich country will of course be great; but equally, of course, no effort will be spared to shut out all alien traffic, and secure the resulting trade to the United States exclusively. This is the probable outcome of the war if Europe does not interfere. If Cuba is made a free republic, there will be commercial stagnation approaching that in free San Domingo, and the trade will be comparatively valueless.

In this connection it is interesting to notice that English trade with Cuba has been going down for many years, partly because of the insurrection and partly owing to the inroads upon Cuban trade which Barcelona (Spanish) houses, by the aid of a preferential tariff, have been able to make. The demand for Yorkshire goods from Cuba and Porto Rico is not large—£20,000 to £30,000 a year—but British cotton and linen shipments, made largely from Manchester, were at one time very important, and even during the recent troubles, have been maintained at a fairly high level. At one time Cuba and Porto Rico took, between them, about £1,000,000 worth of Manchester goods yearly, while the linen trade with Cuba alone, forty years ago, was worth from £300,000 to £500,000 per annum. The figures of late have not been so large. The whole trade of the island has languished so much that

Manchester houses, in some cases, have transferred their headquarters to Barcelona, where they could deal in the specially-favored products of Spain sold to Cubans at high prices, so that the manufacturers at Catalonia might prosper.

#### TEXTILE IMPORTS FROM GREAT BRITAIN.

The following are the sterling values of the textile imports from Great Britain for March, 1897-1898, and the three months ending March, 1897-1898:

	Month of March		Three months to March	
	1897.	1898.	1897.	1898.
Wool .....	£ 312	£ 5,781	£ 2,672	£ 18,599
Cotton piece-goods .....	31,808	42,753	134,506	162,067
Jute piece-goods.....	8,447	12,264	26,738	35,612
Linen piece-goods.....	9,924	10,968	35,728	42,548
Silk, lace.....	761	672	2,048	3,348
“ articles partly of.....	1,548	1,775	6,015	7,524
Woolen fabrics.....	23,381	19,455	71,546	74,323
Worsted fabrics.....	41,233	48,271	177,892	207,511
Carpets ....	23,712	27,577	64,811	75,259
Apparel and slops.....	25,596	35,718	69,732	84,531
Haberdashery .....	20,414	17,477	52,989	49,414

#### WATERPROOFING CLOTHS.

One very common method of waterproofing is just simply to fill the pores of the material by precipitating alumina in them. With wear the alumina gets rubbed out and the waterproofness is lost. If the fabric is impregnated with ammoniacal oxide of copper, a gelatinization of the outer surface of the fabric is produced, and the stuff is made waterproof, but its strength and durability are much impaired. Breitenfeld adds materials which hinder this action on the part of the copper compound, such as tannin, albumen, or ferrocyanides. He thereby gets tannates, albumenates or ferrocyanides of copper precipitated in the pores of the fabric. Fabrics prepared according to this process, and buried in wet earth, retain both their color and their imperviousness to dihydric monoxide. They are imperishable and odorless.

Stuffs prepared by the Breitenfeld process can be subsequently treated with paraffin, soap, or the like, in the usual way. The following examples show how the process is applied: (1) The fabric is slowly drawn through a 20 per cent. tannin solution, the excess of which is removed by passing the stuff between wooden rollers. The piece is next drawn through an ammoniacal solution of copper at such a rate that every part of it remains therein for 2 or 3 minutes; afterwards dry quickly. The strength of the copper solution is such that it contains 12 to 15 per cent. ammonia, and about 1.6 per cent. of copper. (2) The piece, on leaving the copper solution, is strongly pressed between iron rollers, and then sent back through the tannin, and finally dried quickly at 70 deg C. (3) Draw the material through a 4 per cent. solution of white of egg, gently press between rollers, draw through the copper solution, and quickly dry. (4) The stuff is drawn first through the copper solution, strongly pressed, and then drawn through the white of egg solution, and sharply dried. (5) Soak the fabric in a 4 per cent. solution of potassium ferrocyanide, lightly press, pass through the cupreous solution, then through water to remove the soluble potassium salts, and sharply dry. Two per cent. acetic acid may be used instead of water to remove any excess of copper. (6) The material is treated as in the last example, but reversing the order, using the copper solution first, and then the ferrocyanide.—Ex.

—Captain Alfred T. Mahan has written a paper for the June number of *The Century* on the causes of the failure of the Spanish Armada. It accompanies an illustrated article giving the story of the famous catastrophe, based on manuscript records and on the narratives of survivors and other Spanish documents.

### NEW ANILINES.

**Paper Yellow R** This new product is claimed by the manufacturers to be admirably suited for paper dyeing, and is a direct improvement over Metanil Yellow in that it is entirely absorbed by the paper fiber, and shade is not altered by pressing over the drying cylinders. As is well known, Metanil Yellow is affected by acids, and should even a slight excess of Alumina Sulphate be added to the pulp, the shade turns reddish, whereas Paper Yellow R is not affected. This new color is productive of many new shades in combination with Auramine or Orange 11 B, and being a cheaper dyestuff, should prove of interest to paper manufacturers.

**Benzo Green 2 B**—Color resembles the Benzo Green G, recently introduced. The G brand being such a useful color, and being met with such a ready demand, the Farbenfabriken of Elberfeld have produced a similar color, but which is considerably bluer in shade. Benzo Green 2 B dyes the same as ordinary benzo colors. Circulars and shade cards mailed on application to the Dominion Dyewood and Chemical Co., Toronto.

**Intensive Blue**—Is a new addition to the many easily level dyeing blue colors now on the market, however, a cheap and good blue for wool dyeing, fast to alkalis, will without doubt meet with a favorable reception. As the name implies, this color is very intense, also has great covering power. Special circular describing its properties, and shade card of self color and combinations (just arrived), mailed on application to the Dominion Dyewood and Chemical Co.

### BRITAIN WANTS CANADIAN PULP.

Canada is a country to which the paper manufacturers of Great Britain are paying no little attention at the present moment. Two recent issues of the *World's Paper Trade Review*, published in London, have a great many references to the possibilities of this country in the production of the raw material of the paper industry. At the annual meeting of the Papermakers' Association of Great Britain, held a short time ago, it was stated that the imports of foreign paper now amount to £3,000,000 per annum. The chief anxiety of the British papermakers seems to centre on the inroads that foreign countries, especially the United States, are making in the British markets. At the meeting referred to, considerable discussion took place as to the possibility of ejecting the foreign paper manufacturer from Great Britain. The association looks to Canada to help them out of their trouble. It was strongly urged that the council of the association should do something to enable the colonies to become more closely associated with them, if it only had the effect of increasing the price of the raw product of the foreign competitor, and a resolution was passed to the effect that it would be advisable to cultivate closer relations with Canada, and become interested in the wood pulp trade of that country; further, it would be beneficial both to the Canadians and the papermakers in this country if a duty were placed on the exports of pulp wood to the States. The British papermakers, in short, want Canada to afford special preferential treatment to Great Britain in this particular industry. The upshot of the discussion was that it was decided to appoint a committee with a view of conferring with the Canadian Minister as to the possibility of increasing the exportation of the raw material from the Dominion of Canada to Great Britain.

### THE LATE M. B. PERINE.

Moses B. Perine, the head of the firm of M. B. Perine & Co., whose works have for many years been the mainstay of the village, died at Doon, Ont. April 23rd. He was an American by birth, being a native of Washington county, N. Y. He came to Ontario about forty-five years ago and in connection with his brother, the late J. S. Perine, established the first power flax mill in Ontario, at Doon. The firm was known as Perine Brothers. Branch mills were opened at Conestogo and subsequently at Floradale. These later operations were conducted under the firm name of M. B. & J. S. Perine. Fifteen years ago the deceased took up his permanent residence in Doon, and although then well on in years put the energy of a man of fifty into the business, which grew with the years. Up to almost the very last Mr. Perine took a deep personal interest in the conduct of the business, which had also the close and trained superintendence of his son, Edward G.

Perine. Two years ago he had a stroke of paralysis—he was then in his 82nd year—warning him of the approaching end. Recovering somewhat from it, he was again seen around the mills. He suffered another stroke on the 2nd of February last, and the worst was anticipated, and from this he never recovered. The deceased, who was in his 84th year, leaves a widow, one son, Edward G., and one daughter, Mrs. Donald Tait, of Quebec.

### NEW DYESTUFFS.

**Benzo Nitrol Colors**—The demand for colors on cotton fast to washing, obtainable by as simple a method as possible, has led the Farbenfabriken Co. of Elberfeld, Germany, to the discovery of the after-treatment with diazotized paranitraniline. The colors suitable for this process have been named Benzo Nitrol colors. Since in many dye-houses the preparation of diazotized paranitraniline was too troublesome a process, an endeavor has been made to simplify same, resulting in the discovery of a developer called Benzo Nitrol Developer, in paste. The above developer only requires to be stirred up in cold water with a little acid to bring it into solution. This process is exceedingly simple and the Nitrol Developer will facilitate the introduction of the Nitrol colors, producing fast shades previously beyond the reach of direct dyeing colors. Benzo Nitrol Brown 2 R—As a direct dyeing color, this new addition to the Nitrol group is not of any great value, but developed with paranitraniline or Benzo Nitrol it gives a full reddish brown with all the advantages of Benzo Nitrol Brown G., viz., cheapness, extreme fastness to washing, fullness of shade and fastness to light. In combination particularly this brown would prove very serviceable. It is equally as applicable as the old brands for dyeing loose cotton, hanks or piece goods, whilst for velveteen or mercerized piece goods, it can be employed for shades which owing to the fullness of same overhand were hitherto only obtainable with the assistance of basic colors.

**Azo Fuschine G. N. Extra**—This latest addition to the Azo group resembles very closely in shade and properties the well-known Azo Fuschine G., whilst in concentration and price it will be found considerably cheaper. To meet the demand for cheap red level dyeing colors on wool, the Farbenfabriken of Elberfeld put upon the market last year and the year previous, Azo Crimson L. and S. and have now added to these colors a new homogeneous product similar to the familiar Azo Fuschine and which has been called Azo Fuschine G. N. extra. In almost every respect, this color resembles Azo Fuschine G., particularly in its level dyeing properties and exceptional fastness to light, and combines a low price with about double strength of the G brand. It is employed in producing the most delicate shades on yarns and ladies' dress goods. Its shade is considerably affected by salts of chromium, aluminum or copper, the presence of which must be avoided in dyeing. Azo Fuschine G. N. extra is equally as adaptable as the G brand for producing black and white effects on mixed goods and wool goods, as the silk remains almost perfectly white, whilst the red dyed wool when afterwards chromed is converted into a black (See card No. 559, 1896). For samples of color, dyed shades, circulars and latest pattern cards: address, the Dominion Dyewood and Chemical Co., Toronto, sole agents in Canada for the Farbenfabriken vorm. Friedr. Bayer & Co., Elberfeld, Germany.

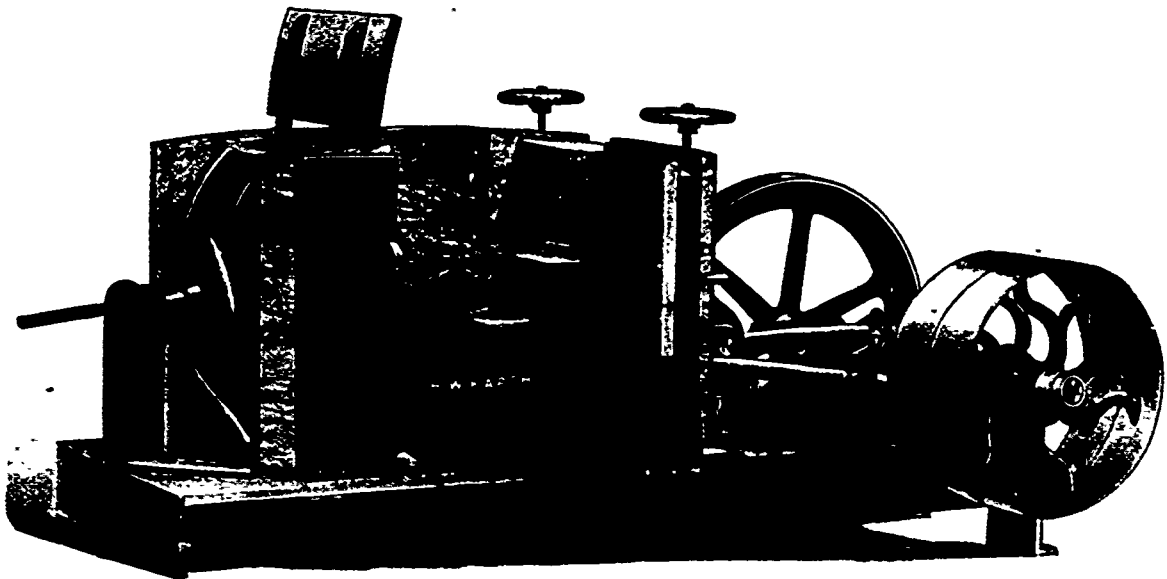
### WORSTEDS FOR NEXT SEASON.

Fashion makes greater demands upon the brains and skill of designers and manufacturers as time goes by. Keen competition, especially that from the countries on the continent, and the more scientific methods of manufacture, have rendered the production of most classes of worsted and woolen cloths almost a fine art. In a number of patterns recently put before us, and which consist of the latest ideas for next season's production, this fact is exemplified. The parcel contains a great variety of effective cloths, suited chiefly for gentlemen's wear, although part could be adapted for the use of either ladies or gentlemen. In serges, which fabrics have had a long run and still continue in great favor, the leading colorings in the plainer and solid makes are dark blues, grays and slates in various shades, the weaves being in the ordinary run. In the more fancy cloths of the serge description, the above named shades are utilized as a ground work or most prominent

part, and small effects in checks or stripes, in subdued colorings, are shown very effectively. In some cases, an overcheck is worked in on a two or three-inch scale. In worsteds, suitable for the home and continental trade, the patterns, both for suitings and trouserings, are mostly in dark shades in both plain and fancy makes of cloth, the lead being taken by those of a slate blue color, although there are others of a navy-blue shade. The plainer makes are mostly woven in diagonal or twill styles. In fancy worsteds most of the patterns are of a subdued character, the grounds being slate, dark blue, or black, with small checks or stripes in shades slightly lighter than the groundwork, but not such as to show up very prominently. There is an absence of large and distinct effects, the tendency being to tone down the fancy portion almost to the level of the body of the cloth. There is a very great variety in the lighter makes of fabrics, adapted specially for the warmer temperature and tropical climates, and it is in these in which the artistic taste for coloring and pattern can be fully taken advantage of by the designer. Nearly the whole of the samples are of light colorings, running mostly over the whole scale. The design effects are chiefly small, but are woven so that they show up distinctly. Checks are the leading feature, there being but few samples in stripes, and after checks comes a variety of the basket weave makes, their monotony being broken by overchecks in silk or fine yarns in contrasting colorings. The shepherd plaid check in various styles and colorings is much used.—Ex.

### THE KICKER FULLING MACHINE.

The Kicker fulling machines supply a long felt want in all woolen mills. Any woolen manufacturer knows that goods fulled in the rotary mill only will streak, commonly called mill wrinkles, on some lines of



goods not so apparent as on others; but all classes of goods will be greatly improved, the maker states, by being left from one-half to one inch wide from the rotary mill and finished off in the Kickers. It will straighten out the goods, give a firmer felt, and leave the surface in better condition for finishing than by any other process. The surface of the goods is smooth, and the nap has a woolly appearance. It takes away that dragged look that some goods have that are fulled in the rotary mills only. It also makes the goods feel lofty and firm. There are some lines of goods it is almost impossible to finish properly without Kickers or falling stocks, such as tweeds with wool warps and worsted filling, and cotton warp with wool filling. The best way to get these goods even is to run them through a soaping machine, fold up and run in the Kickers till they start to felt, say half to one hour, take out of Kickers and run in rotary mill to within half-inch of width wanted, take out and finish off in Kickers, say fifteen or twenty minutes. Some lines of goods are claimed to have a much better finish when fulled altogether in the Kickers, such as Cheviots and Bannockburns and all twist goods that don't require very much fulling, they are felted

evenly, and colors come out brighter than if allowed to get too warm in the rotary mill. The Kickers full from 100 yards to 225 yards 10-oz. goods, and can be adjusted in a few seconds, increasing or decreasing the space to suit the weight of goods requiring fulling. This is a great advantage over the old style of Kickers or Falling Stocks. They are strongly built and lined with hardwood, the cloth coming in contact with nothing but wood, therefore will not spot or stain the most delicate colors. The angle or back circle at which the Kickers are set can be adjusted to different degrees, keeping the goods constantly turning faster or slower as may be desired. The machine is strong and durable, and is well adapted for fulling knitted and felt goods. The maker has special facilities for manufacturing this machine and can confidently recommend it to all in want of such, knowing it will do what is claimed for it. The Kicker fulling machine is manufactured by H. W. Karch, Hespeler, Ont.

### THE LONDON WOOL SALES.

At the supplementary wool sales held in London, April 21st, there were offered 3,274 bales of sheepskins. There was a good attendance and a fair demand from the continent and the home trade. Long wooled and short wooled stock were firm at unchanged prices. Cross bred were irregular and in buyers' favor, especially coarse and short, which were a farthing cheaper. South Australia sold best, better combing advancing  $\frac{1}{4}$ d. to  $\frac{1}{4}$ d. Punta Arenas was unchanged. Following are the sales:—New South Wales—71 bales; clothing and combing,  $4\frac{1}{4}$ d. to  $6\frac{1}{4}$ d. Victoria—96 bales; clothing and combing  $5\frac{1}{4}$ d. to  $8\frac{1}{2}$ d. South Australia—950 bales; clothing and combing, 3d to  $6\frac{1}{4}$ d. West Australia—422 bales, clothing and combing,  $2\frac{1}{4}$ d to  $6\frac{1}{2}$ d. Tasmania—96 bales, clothing and combing,  $4\frac{1}{4}$ d to  $9\frac{1}{4}$ d.

New Zealand—287 bales, clothing and combing,  $2\frac{1}{2}$ d. to  $6\frac{3}{4}$ d. Punta Arenas—184 bales; clothing and combing, 3d. to 6d.

The third series of the colonial wool sale opened in London, May 3rd, with buyers rather hesitating, but the bidding improved later in the day. Merinos and cross-breds were in equal supply, with scoured merinos predominating. There was a good strong demand for good merinos, especially from continental buyers. Medium stock was firm in tone. Inferior wool was in large supply, and sold 5 per cent lower than cross bred. This wool was taken eagerly by the home trade. Medium coarse stock ruled irregular, with sellers rather holding off for better prices. There were frequent withdrawals. Cape of Good Hope and Natal was spiritedly offered, and scoured snow whites sold quickly to the continent at unchanged rates. Greasy sold at 5 per cent cheaper than the last series. Following are the sales of the first day in detail New South Wales—4,200 bales, scoured, 9d. to 15  $5\frac{1}{2}$ d., greasy,  $6\frac{1}{4}$ d. to 10d. Queensland—400 bales, scoured, 11d. to 15 3d., greasy,  $5\frac{1}{4}$ d. to  $8\frac{1}{2}$ d. Victoria—500 bales, scoured, 11d. to 15  $4\frac{1}{2}$ d., greasy,  $7\frac{1}{4}$ d. to 10d. West Australia—600 bales, scoured, 11d. to 15



18 2½d greasy, 5¼d. to 7½d Tasmania—300 bales; scoured, 6d. to 7½d greasy, 6¼d to 10½d New Zealand—6,000 bales, scoured, 5½d to 10½d, greasy, 5¼d to 10d Cape of Good Hope and Natal—900 bales, scoured, 8d. to 1s. 5¼d., greasy, 5½d. to 7½d.

The offerings at the wool auction sales on the fifth day amounted to 13,394 bales. Competition was active and prices generally firm. Fine Tasmanian greasy sold at top prices to the home trade, and good Queensland greasy brought rates equal to the March sales. During the first five days of the sale 54,500 bales were sold. Seventy-five thousand and seven hundred bales were offered during the first week of the sales. The arrivals for the next series number 143,923 bales, including 21,000 forwarded direct. The imports during the week ending May 7th were—New South Wales, 15,822. Victoria, 3,911. South Australia, 19,803, West Australia, 1,819, Tasmania, 3,040. New Zealand, 36,261, Cape of Good Hope and Natal, 2,810; Bus-sorah, 1,720, and elsewhere 674.

### THE WOOL MARKET.

TORONTO.—The season's clip is to be a good one, as the sheep are reported to have wintered well both in Eastern Canada and the North-West. Lambs are plentiful and the prospects for next season are bright as far as supply is concerned. The price is, however, the debatable ground. It appears certain that anything like last year's prices will not be paid. The United States duties, as affecting Canadian wool, are as follows. Washed combing fleece, 12c per lb., unwashed combing fleece, 12c per lb., tub washed, all grades, 36c per lb., unwashed clothing, 11c per lb., washed clothing, 22c. per lb.; cotted, burry, seedy and black, 12c per lb. The ordinary wool exports from Canada are thus subject to the very considerable duty of 12 cents per pound. John Hallam, a recognized authority on wools, says: "Owing to the extraordinary purchases of last year, many of the large mills having supplied themselves with stock sufficient for two years, there has been little or no demand for Canada wool; and there is still unsold in the United States over a million pounds of last year's clip belonging to Canadian dealers. Current quotations in a number of the United States markets for Canada wool range from 28 to 30 cents. Deducting from this 12 cents for duty, one cent for freight and charges, 16 cents is all dealers should pay, and for the few lots offered in this market that has been the price given." We quote fleece washed 16c., unwashed 10 to 11c.

MONTREAL.—The market has been rather quiet for the past week; prices are firm for all grades except low stock. We quote Capes 14½ to 16½c, according to quality and condition, an advance of washed and scoured wools, such as Australian and B.A. stock of about 5 per cent. The London Colonial Sales are now in full swing and competition for most grades is good. The demand is principally from the continental buyers, very little being taken for the United States at this series.

### LITERARY NOTES.

The May number of *The Century* appears in a special cover, printed in gold and colors, after a design by Fernand Lungren, representing the great mesa of Katzimo. This is apropos of an article in the number by F. W. Hodge, of the Ethnological Bureau, describing his recent "Ascent of the Enchanted Mesa." Mr. Hodge claims to have discovered proofs of the truth of the old Ancoma tradition that the mesa was once the site of a Pueblo settlement. The article is illustrated from photographs and with pictures by Mr. Lungren, who also contributes a supplemental article, "Notes on Old Mesa Life." H. E. Krehbiel, the musical critic, writes of "The Beethoven Museum at Bonn, and there are pictures by Louis Loeb. Prof. Louis Boutan, of the Sorbonne, gives an account of his successful experiments in "Submarine Photography," and there are reproductions of several photographs taken under the sea at various depths, including one made by artificial light. A timely suggestion is that this sort of photography may become useful in examining sunken vessels. A characteristic sketch by Thomas Bailey Aldrich is "His Grace the Duke." Oscar Christman contributes an article on a novel subject, "The Secret Language of Childhood," with whimsical examples. Lieut. General Joseph Wheeler, C.S.A., tells of "An Effort to Rescue Jefferson

Davis. A subject that is engaging the attention of lawmakers in almost every state is treated by Franklin B. Locke, in "Railway Crossings in Europe and America, with pictures by Potthast, Fraser, Pape, and others. Ernest F. Fenollosa gives "An Outline of Japanese Art," and unique and unpublished examples are reproduced. The second of the "Seven Wonders of the World" is pictured by Andre Castaigne, his subject this month being the Pyramids. Ambassador Andrew D. White sketches the character of "A Statesman of Russia," Constantine Pobedonostzeff, Procurator General of the Holy Synod. Brander Matthews discusses "After-Dinner Oratory," and Mrs. Amelia Gere Mason has the first of two papers on "Club and Salon," criticising club-life for women in a friendly way. "What are the X-Rays?" by Prof. Trowbridge, of Harvard, and "The Mother City of Greater New York," by Mrs. Schuyler Van Rensselaer, are two articles on timely subjects. Fiction is represented by two character sketches—"The Canal-Dwellers," by Julia Schayer, and "At Seven Rivers," by Walter Juan Davis; "His First Race," another of David Gray's "Gallops," and a further instalment of Dr. Mitchell's serial, "The Adventures of Francois." The frontispiece is one of the most striking of Cole's wood engravings, "The Parson's Daughter," by Romney.

The May number of the Canadian Magazine sustains the character of this well-known publication. Among articles of historical interest is number 7 of "Makers of the Dominion of Canada" by Dr. J. G. Bourinot, and "The Anglican Church in Canada," by Thomas E. Champion. "Some Aspects of the Social Life of Canada" is a very thoughtful paper dealing with our social tendencies by Prof. Adam Shortt, Professor of Political Science at Queen's University. His article is very deservedly given the place of honor. A good budget of short stories and poetry, with comments on current events, help to make up a very interesting number.

"The Making of the Canadian West," is the title of a new contribution to Canadian history, by the Rev. R. G. MacBeth, M.A. This is the second appearance of the author before the Canadian reading public, and his pursuit of historical work is amply justified by the warm reception given to his first effort recently published under the title of the "Selkirk Settlers in Real Life." This was a description of the mode of life and surroundings of the early settlers in the region now known as the Province of Manitoba, and the story told by one who lived among them, was so life-like and charming that the reader longed to know more of the leading actors in this interesting drama of colonization. Hence the present book, which gives graphic sketches of the leading men who figured in the political and social life of the Selkirk settlement. To use the words of the author in his preface, he has simply gone back and lived through the past again, seeing the faces and hearing the voices of other days, and what he has seen he has written. The result is a most valuable contribution to Canadian history, and the work is embellished with portraits of some ninety individuals, more or less prominently associated with affairs in the North-West. The author's style is easy and unaffected, and his sketches have a life and force derived from personal experience and observation. The work is dedicated to Lord Strathcona, whose portrait appears as a frontispiece. The publisher is William Briggs, Toronto, a name which is invariably associated with good typography. We warmly commend this excellent book.

### FELTEN AND GUILLEAUME HEDDLES.

The makers of the "Favorite" shaft state that in the textile trades all shafts hitherto employed have various drawbacks, and fail to answer the requirements in some way or other. They have studied this matter very closely, in order to supply a shaft not only doing away with the defects, but also offering several advantages, and state that this object has been fully achieved in the "Favorite" shaft, which at once gained the favor of weavers. In conjunction with their patent cast steel heddles it forms the easiest working and most reliable and durable harness. The heddles will last ten or twelve times as long as the cotton or linen heddles, it is claimed, and the shafts are almost indestructible. They are made with one and two round carrying wires inside the wooden frame, and the heddles can be set as closely as any worsted heddles. The carrying wires are kept in position by clamps

and by small round supporting wires of high strain. The supporting wires are a trifle shorter than the heddles, and bear the greatest pull, so that in spite of the strain exerted on the shafts in weaving, the heddles can easily be shifted about where they are wanted, and they will return to their original position by themselves. The interstices between the heddles caused by the hooks of the supporting and carrying wires, are almost insignificant, whereas with other shafts of a similar kind, especially if mounted with ordinary heddles made of annealed wire, the intervening space is rather large, and therefore objectionable. Furthermore, the round supporting wires leave no marks in the cloth, as is often the case when flat wires are used, nor are the heddles impeded in their free movement on the carrying wires, the latter, as well as the eyes of the heddles, being round. It frequently happens with the old flat carrying wires, and heddles with flat eyes, that the heddles are stopped altogether through fluff from the thread accumulating at the eyes.

The number of heddles in use on a shaft can easily be reduced by shifting aside those not required, or the latter may be taken off altogether. For this purpose the carrying wires are connected to those of another shaft or to a loose wire by means of small tubes, which we supply with our shafts, and the heddles are then simply shifted over. They can afterwards easily be shifted back in bulk if wanted again, whereas it would take more time to put on every heddle singly.

The advantages of these shafts are briefly as stated by the manufacturers: I. The middle eyes of the heddles are all equi-distant from the shafts and uniform in position. II. The heddles always remain in their original position, and will not turn on their own axis and thereby cut the thread. III. The number of heddles on a shaft can be changed without trouble, in a very short time. IV. The eyes of the heddles will not clog, so that the heddles always move easily. V. "Favorite" shafts are simpler, lighter, more durable, and last, but not least, cheaper than other systems.

These patent cast-steel heddles can also be used on the old wooden shafts, and for tying on by varnished lines (in a manner which allows of changing the heddles separately and independently of each other) there is a small extra charge. The makers are Felton & Guillaume, Carlswerk, Mulheim-on-the-Rhine. Jack & Robertson, Montreal, are sole Canadian agents.

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## Foreign Textile Centres

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MANCHESTER.—It is pleasant to record that we have passed the late holiday season without any break in the steady and encouraging improvement in the trade. The change is a great relief from the long and monotonous depression, and every one will hope it may continue long enough to at least partially obliterate the latter memory. The Spanish-American imbroglio has continued to drag its weary length along, without having, as yet, at the moment of writing, resulted in an actual declaration of war. Matters, however, are steadily drifting in that direction, and any moment may bring news of some irretrievable step having been taken from which one or the other side cannot retreat. Of course, the United States is the aggressor, and Spain is resolved to recede no further in the way of concession, rightly calculating that, as the Jingo parties in the States are endeavoring to provoke war, nothing she could do would avail to avert it. This is a dignified attitude, and whether or not we agree with the charges of mis-government, brought against the European Power, we cannot but admire the manner in which she has repelled them, and expressed her determination to defend her interests. How the conflict, which almost seems inevitable, may affect the cotton trade of this country in respect of the supply of the raw material, remains to be seen. Happily, the present crop is practically delivered. In dealing with what remains there will be no difficulty, as, if necessary, it may be sent through Canadian ports, and having become British property before leaving, will run no risk. Beyond this there remains the extent to which the planting of the new crop

may be interfered with by the social disturbance resulting from a state of war. At the time of writing this letter, the market seems to have taken a serious view of the matter, as values have gone up fully 7 to 9 points under the excitement resulting from the threatening aspect.

LEEDS.—The finer weather has had a most stimulating effect on the Leeds clothing trade, and most of the leading factories are now very busy, and have orders in view to keep them employed up to Whitsuntide. All the engineering districts except South Wales are sending in very good orders for spring suits, and as agricultural prospects are better the home trade seems likely to improve. Very little improvement is reported from the heavy woolen districts, but some makers of serges and fancy suitings are fairly well employed on orders for quick delivery. In most of the districts there is, however, much complaining, and fears are expressed that the continued stress of bad trade may result in further trouble.

HUDDESFIELD.—In Huddersfield only the makers of the very best classes of goods are well employed, and with the exception of Canada, the shipping trade is very disappointing. The prospects of the makers of the art printed plushettes for upholstery purposes are good, and the season is beginning well.

BRADFORD.—The resumption of business, after the Easter holidays, has not been characterized by any improvement in the wool market here, and "on 'Change" the greatest amount of attention was devoted to discussions on the probable effect on the export trade of Bradford which would ensue on the outbreak of war between Spain and America. It was generally believed that as the exports of Bradford to the United States had already fallen to such a low ebb that any falling off which might take place would be fully compensated for by demands for certain classes of men's wear, and also that as the production of the American textile factories would be lessened by the withdrawal of some of the employees for the Army, that after the war this country would benefit by supplying the deficiency. It was not thought that any great difficulty would be experienced in getting ordinary textile exports across the ocean to the States, even if war broke out, but all shippers are hurrying off whatever goods on order they have ready for shipment. As the market had, to a certain extent, previously to the outbreak of the Cuban difficulty, been buoyed up with the hopes of a return of the American demand for fine merino wools, recent political developments have caused the tone of that department of the wool market to be rather less firm, but quotations are, up to the present, nominally unaltered. From the increased amount of active machinery amongst the combers of fine wool, it appears also that Bradford buyers must have secured a greater proportion of the fine wools sold at the recent London sales than was at first supposed, and, therefore, the local market is less confined. Crossbred wools, especially of the coarser descriptions, are hardly as good to sell, either in the form of wool or tops, and as, up to the present, there appears to be no improvement in the demand for two fold worsted yarns on export account, users of crossbred wools are expecting to be able to buy even better by waiting. English wools, especially of a non-lustrous order, are extremely quiet, and immediate business could only be effected by accepting a reduction in price. The recent sales of raw mohair in London made it evident that the market was rather quieter, but all the best of the hair which was then offered has now passed into consumers' hands at practically recently ruling rates. The demand for the home trade is quiet, but there is rather more inquiry for fine costume yarns and some special dress goods fancy yarns. As far as the middle classes are concerned, there can be no doubt that we are in for another season of cycling and cyclist attire. I hear nothing but praise from the weavers of Bradford covert coating proofed costume cloths, which are quite unaffected by either dust or wet, and being quite pure

and devoid of filling, retain a practically unchanged appearance through all weathers. As a matter of fact, these goods could not be properly shower-proofed if they contained any filling of a foreign substance in their composition. Checks in heavy-weight fabrics seem likely to be wanted for winter costumes, and some very stylish effects have been produced here in these goods, rather more tweedy in appearance than the summer costume cloths.

**ROCHDALE.**—Although the Yorkshire flannel trade is certainly better for the present, the past year has been a very unsatisfactory one, and some stoppages are reported in the Rochdale district. Blanket makers, although fairly well off for season's contracts for the home trade, are at present only indifferently employed, as they have not received any quantity of particulars for making and delivery. At present, although the improvement in the demand for all classes of goods for China and the East is only small, there are, however, distinct indications, as a settlement in reference to China is arrived at by the great Powers, that the native traders, who have in fear concealed their hoards of money, will at once begin to operate in the market to such an extent that a most rapid expansion of trade there will set in.

**KIDDERMINSTER.**—Business opened cheerfully after the holidays, and it appears likely that looms will be busy for some time to come. But it is to be feared that the present low range of carpet prices will not cover the expense of making so many odd lengths, sizes, and qualities of carpets. The improved consumption has helped the yarn trade, so far as deliveries are concerned, but new business is still very slow. Yarn is only bought where orders have run off, and then not in large amounts. Prices are firm at a low level. Some few spinners decline business at present rates, and few, if any, will accept the "throwing-away" offers that are made.

**NOTTINGHAM.**—This week there has been a good business done in fine yarns and in qualities suitable for curtains and nets, but there is now only a languid inquiry. Quotations are unaltered and fairly steady. Business is less active in merino and wool yarns, and prices are weaker. Bobbin nets, plain tuiles, and mosquito nets are in good request, and prices are firm. Spotted nets are in strong request, and quotations are higher. There is a fair amount of activity in the warehouses, though the shipping departments are adversely affected by the rumours of war. Business in the lace trade has now settled down, the pressure to get away the orders that had been received or held over during the holiday season being now relaxed. The disquieting state of affairs between the United States and Spain and the probable effect on trade are much discussed. It is hoped on all hands that peace may be preserved, for a war between these two countries would be likely to affect Nottingham trade very seriously, as they are both buyers of this city's products. Locally, it is pleasing to note, there is every prospect of the threatened labor dispute being amicably settled. The Lace Manufacturers' Association has agreed to recognize the Auxiliary Lace Trades' Society, and a conference between representatives of both sides will be shortly held for the purpose of discussing the scale of prices which shall in the future be in force in the trade. Fancy millinery laces show no new departures for current styles. Oriental laces, Valenciennes of various classes, and imitations of real Torchon, are all, more or less, in vogue in the chief centres of fashion at home and abroad. Common Bretonne, Brabant, and Maltese are moving for assortments and making-up purposes. Good quantities of heavy dress laces are also selling in white, butter, and two-tone. Fine silk Chantilly laces are only meeting with a moderate inquiry. All silk laces, in fact, show no tendency upwards, but rather the reverse. Bobbin nets, Mechlin tuiles, mosquito and corset nets still keep firm at the highest quotations. Orders for these goods are placed in advance, and stocks do not accumulate. Although the aggregate falls much below some seasons, there is a moderate busi-

ness passing in Paris, Paisley, and hat nets. Spotted nets have met with more inquiry, and prices in some instances have been increased. There are many hands unemployed in the making-up departments, and continued fine weather is needed to give a filip to this branch of the trade. More inquiries have been made lately for plain, fancy, and chenille spotted veiling, but in these goods the competition is very severe. Both for the home trade and for export a large business is being done in lace curtains, window blinds, and toilets. No particularly startling novelties have been brought out lately in lace curtains, but current goods are so varied as to please the most exacting. Vittages and lambrequins are evidently going out of favor so far as this market is concerned, although foreign manufacturers are still producing them at lower prices than would be remunerative to local manufacturers. The state of the hosiery trade is becoming serious, as may be gathered from the fact that the Board of Trade Returns, for the first three months of this year, show a falling off of nearly £86,000, as compared with the corresponding period of 1896. Wool and mixed hosiery, in comparison with March, 1897, decreased by £19,770. Of course, this shrinkage is spread over several districts, but it shows the parlous state of the trade, and how seriously Nottingham, in common with other hosiery manufacturing centres, must be affected by the depression. So far as the trade here is concerned, cotton stockings and socks continue low in price, and orders are not placed with any freedom. Merino and fine cashmere stockings, in black and tan brown, are selling at steady prices. There is not a sufficiency of orders to keep all machinery fully employed in the production of larger goods in merino, cashmere, and natural wool.

**SOUTH OF SCOTLAND.**—A quiet business is being done in wool. The demand is limited for all qualities, and although supplies are light, there is no improvement in prices. It is expected that the new clip will be one of the best for a number of years, as the season has been exceptionally favorable. Spinners have moderate employment. The cloth trade is quiet.

**DUNDEE.**—The quality of the jute being landed here continues to prove very unsatisfactory, and some arbitrations have taken place. In the case of some of them, the jute has been invoiced back, while in others allowances have been made. Several arbitrations have also been settled in London.

**BELFAST.**—The outlook is certainly far from satisfactory at the moment. There is next to nothing doing in yarns, buying being strictly of a sorting-up character. Prices are notably unaltered, but there is no telling what concession might be made for an order of any magnitude. Brown power and hand loom goods have come in for a moderate amount of attention, and the recent turnover would figure out to an average amount. Tow goods are selling slowly, but unions are steadily stiffening in price and demand well maintained. Damasks are in brisk request, and fine sets of handkerchiefs are receiving fair amount of attention. Piece cambrics are going regularly into consumption, and now that producers have gone on three-quarter time, these goods will maintain their position. Home demand for white goods has been of fair amount, though devoid of anything in the nature of speculative feature. The shirt and collar factories are absorbing considerable quantities of linens, and the demand seems likely to extend. Tailoring goods are also moving off fairly well at full rates. Export trade is not making much headway.

**LYONS.**—Contrary to expectations, there has been increased activity in the Lyons market during the week. Inquiries were more numerous; all grades were included, but transactions were confined to purchases for immediate requirements. Old contracts are nearly completed, and stocks in the hands of the manufacturers appear exhausted, so that purchases at regular intervals will become necessary with a good many within a short time. Prices have been affected by this change in the position. The downward movement has not made further pro-

gress, and, though no advance can be reported, the regained firmness indicates the better feeling. Ordering business for Fall is still in abeyance, but the conviction is gaining that an increased demand for goods will bring a number of the mills into the market, and that their purchases will not only lift prices upward to the former level, but will lead to an actual advance. Disquieting rumors, regarding the prospects of the coming crop, were circulated a few days ago, when news of frost in the Cevennes, which had damaged the mulberry trees, reached here. The market is well used to these reports, which recur nearly every season, but increased importance is attached thereto at the present time, when stocks are known to be unprecedentedly low. It has been particularly noticed that all grades of greiges figured in larger quantities in statistics issued by the conditioning house for the week, and that Italian products were especially represented by a greater number than for some time. The increased number of deals in thrown silk, especially organzines, also attract attention, and the demand therefor emanates not only from the mills, but also from spinners whose stocks are exhausted. Some purchases were made here for Swiss and Italian account. Chinese grades have been more active, while Japans remain in the same position.

MILAN.—Transactions were restricted lately on account of the uncertainty of the political situation, coupled with the natural quiet following the Easter holidays. The mills have received some new orders, and, as their supply is nearly exhausted, they are forced to renew purchases, but the prices which they are prepared to pay are generally considered too low by the dealers, the majority of the deals for this reason were not concluded. The demand exists, however, and will lead to transactions within a very short time. A more active business was done in good weaving greiges, for which the prices asked by the dealers were paid. The opinion prevails that but for the unsatisfactory political relations between the United States and Spain, an active demand would be witnessed, and that with the disappearance of this cause, business will resume its former activity. There was more demand for Canton grades, which obtained a slight advance, while Chinas and Japans showed no change. More interest was displayed in cocoons, especially for best grades, which brought full prices, medium grades were inactive. Turin reports a better feeling in trade. There is more demand, the mills making numerous inquiries. The renewal of more extensive buying seems, however, delayed by political considerations, but the intention evidently exists to make provisions against surprises during the crop season. Some transactions have taken place at satisfactory prices, and the week closes with a decidedly better tone. There is no change in the quotations.

ZURICH.—There has been a very fair demand these last few days for all grades, and it is quite manifest that but for the disturbed political situation, a satisfactory trade would develop. It is natural, under existing circumstances, that trade should be cautious, and that purchases in every case are confined to covering immediate requirements. At the same time it is gratifying to note that prices are so well maintained. Good Italian silks have lost but little, despite the prolonged absence of any active demand, and Asiatic grades are improving again. Best grades of Japan filatures have slightly advanced in price and only Japan trams appear neglected. There is no perceptible change in the position of manufactured goods. The mills are still busy, but new orders are not arriving as freely as might be desired. Wholesale houses are delaying purchases pending a decided turn in the political situation, which is beginning to cause increasing uneasiness. The present year had so far been exceptionally good on account of the liberal orders from America, in fact, the volume of trade with the United States showed a considerable increase over late years. Impending developments are, therefore, watched with the greatest interest as likely to affect the industry very seriously. The same sentiment exists in Basle, where American orders for ribbons have

lately played quite an important role. It is feared that this industry also will feel the effects of the depression in trade. The fashion unmistakably continues to favor local fabrics, but a material falling off in the demand appears probable. Reports regarding the development of the retail trade are, however, generally good, and there are no signs that the orders from home markets, although somewhat delayed, will not be quite up to expectations.

CRELFELD.—Business in wholesale houses has considerably slackened. Less demand was experienced from retailers, as trade in the stores before the holidays was disappointing in consequence of the unseasonable weather. Millinery goods were first affected, but a falling off was also felt with regard to cloak-making materials, in this branch the hopes entertained at the start of the season will not be realized. Even taffetas and cotton-back merveilleux are no longer in such heavy demand, and the business appears confined to the orders from the country, while in Berlin the season is already considered as closed. Only block goods are still actively sought. Leading houses, however, are busy with their preparations for Fall, and orders are beginning to arrive at the mills. To all appearances their activity will continue uninterrupted, and the usual slack period of Summer months will not be felt. From other manufacturing centres, especially Lyons and Zurich, come reports that the trade has been unfavorably affected by the political outlook, and that the ordering season is unusually delayed, but as far as this district is concerned, no ill effects are manifest, and the condition of the home market remains favorable. Orders for staple lines are satisfactory, they indicate confidence in a good season, with a healthy demand and clean stocks. Regarding tendencies of fashion no reliable information can be gathered, except a general impression that, despite the unquestionably cautious preparations for velvets, pile fabrics will be in greater demand than last year. The demand for stripes in silks is becoming stronger, and in these lines ombres are gaining in favor. Warp prints also are receiving more attention, and are principally produced in taffetas, which retain their leading position as the fashionable textures. Moires will again be fashionable for the coming season, and moire velours will continue to hold a prominent place. The cloak trade is sampling fancy styles more freely, matelasses are in the lead, but their success depends upon the public favor, which they will find later on. Velours du Nord are also well thought of, and fair sized contracts for these have been placed. The greatest activity reigns in the mills producing necktie silks. This branch occupies an exceptionally favorable position. Orders from the home market, as well as from foreign countries, are larger and more numerous than for some time.

### A TRUE SYSTEM OF YARN COUNTS.\*

BY MATTHEW BLAIR, ESQ., OF GLASGOW

Of all the muddles and confusion of our non-decimal system perhaps that of yarn counts is the very worst. If you study them, you wonder how we the largest manufacturing nation in the world, have been able to get along at all. The amount of useless calculation is extraordinary. It is clear that all the methods of count in use have been created by spinners exclusively for their own convenience, and with hardly any consideration for the wants of the manufacturer. Hence has arisen this confused mass of systems of reckoning counts. As a proof that they have in general been created by the workmen for their own use, it is to be observed that none of them are "decimal," and not one of them can be conveniently used except for yarn of a thickness somewhat near to the particular kind which the spinner who invented the count was usually spinning. The Yorkshire woolen spinner, for instance, uses the "skein" system. He has a little reel by his spinning frame on which he winds a small quantity from time to time, as the spinning goes on, and finds

\*From the *Kilting's Circular*.

low many yards weigh one dram. This is very easy for him, and is a type of the way in which all our counts have been created. No consideration was given to simplify the manufacturers' calculations as against other yarns. The spinner simply reeled a bit, large or small, just as suited himself, and from that made his count. Hence we have skeins of all imaginable lengths, and recls of all circumferences. The worsted spinner makes a skein of 560 rounds on a 30-inch reel, and bases his count on that. The cotton spinner uses the same number of rounds, but on a reel of 54 inches. The linen spinner makes 120 rounds on a reel of 90 inches. The silk throwster makes a skein of 500 yards, if it is Tussah silk, but if it is China silk he makes a skein of 1,000, 1,500 and 2,000 yards, and counts are made up based on each one of these systems. The Italian throwster reels in all sorts of ways up to 10,000 yards in a hank, but makes up his count on none of them. We make test skeins of 400 French ells (now an obsolete measure), and weigh it by deniers—also a weight no longer in use, and yet all Europe deals in thrown silk in this antiquated system—a system that has no regard whatever for the convenience of the manufacturer. In the sewing machine silk trade of Leek, the skeins are of all imaginable lengths: 260, 266, 273, 288, 300, and 500 yards are common, and they are weighed by 50 many drams to the skein. In some districts in Scotland the skein is 240, in others 300 yards, and it is weighed by the "stone." But the stone is of no uniform weight, it evidently arose from a stone set aside by the unanimous consent of the villagers to be their standard weight. Hence we have stones of 12, 14, 24, and 28 lbs. in use in various districts of the country.

Nor are things any better on the Continent. Although 1,000 metres to the kilo is the rule in many parts of France, Roubaix counts by 700 metres, Amiens by 710 metres, and Rheims by 1,000 metres for carded yarns, but always one-third less for combed yarns. Sewing silks are counted by grammes in skeins of 234 metres, while in the tram and organzine trades the "metric" system has never been adopted at all. In America the skeins range from 50 to 1,600 yards, and are calculated by the pound. The systems, in fact, are endless. They were all created for the spinners' convenience, with no regard whatever for the manufacturer. Not one of them is based on any uniform or sound principle applicable to all thicknesses of thread. They are all bad, root and branch. The calculations of manufacturers are in no way aided by these complicated counts. Where goods are made from one material only, the case is not so very bad, although needlessly intricate; but where several different classes of yarn are used in the same cloth, the labor to the manufacturer is greatly increased. In some tapestry fabrics, as many as seven different classes of yarn are used, all calculated on different scales, thus:

Cotton.....	840 yards scale.
Wool.....	560 " "
Spun Silk (but different from cotton).....	840 " "
Organzine Silk.....	Denier scale.
Tram Silk.....	Dram scale.
Tussah Silk.....	500 yards scale.
Linen.....	Belfast scale.

To calculate the lengths, weights, and value of the quantities of the foregoing in a piece of cloth is a serious task, open to many errors, and it adds sensibly to the cost of production. It might all be simplified by a rational and uniform system of counts. Here, then, the question naturally arises: What is "count?" What are its uses? And what idea does a spinner or a manufacturer intend to express by count? Count is the relationship of length to weight. In all cases it means a certain length of thread in a certain weight. It does not show the actual thickness of the thread, that is the province of "gauge." Rigid substances, like wire, are distinguished by gauge, which is the size of a hole through which the wire will run. But elastic materials, like wool and cotton, are not adapted to be distinguished from each other by means of "gauge." For them count is necessary. Count being made up

from the two factors of length and weight, it follows that if we change one factor we change the count, although we may not change the yarn. If, for instance, a woollen yarn in the ordinary only state measures 1,000 yards to the lb., but when scoured that length weighs only 12 ounces, it is evident that we have altered one of the factors of count. The substance remains the same, but the count is different. It requires now 1,333 yards to weigh 1 lb. On the other hand, if we dye it 20 oz. dye, as we can do with silks, we likewise change one of the factors, and therefore change the count. In place of 1,000 yards to 1 lb., it will now take only 800 yards to weigh that amount. The use of count to the manufacturer is to let him see the length of thread he will get for his money. He requires this to enable him to calculate his warp and his weft quantities; but he also requires to know the weight of cloth that will be produced. He may buy yarns by length or by weight, but in either case he will require to know the length as well as the weight. Hence count is the relationship of length to weight.

What now are the principles of a true system of yarn counts? (1st.) It must be decimal. It is high time all our weights and measures were made decimal. We are almost alone in Europe in clinging to the present antiquated and confusing systems. And now that by our School Boards the decimal system is being taught to the rising generation, and nearly all scientific calculations are already conducted in it, we must get the counts of yarns into line with the improvements of the age. Our manufacturers would find it a vast facility in all their calculations. At present not one of the counts in use is based on the decimal system. (2nd.) The system must show on the face of it the facts which the manufacturer requires to know. These are the length in a given weight. None of the present systems do this. It certainly can be arrived at by a series of calculations, but a true system of counts should show it at a glance. (3rd.) It must be equally convenient for the spinner as for the manufacturer, and express what each of them requires to know. The decimal count of yards to the pound is just as convenient for the spinner as the rule-of-thumb methods that many of them now employ, and it is intelligible to every person, which cannot be said of the present systems. (4th.) It must be adapted to all classes of yarns, of whatever thickness. None of the present systems are capable of being used in this way. It would, for instance, be inconvenient to express a coarse carpet yarn in the Italian scale of deniers, or even in the cotton scale, or a fine raw silk in the Manchester scale of drams, or in the Yorkshire "skein" system. (5th.) It must be adapted to any number of folds, and to yarns of different thicknesses twisted together, and to eccentric, loop, and knot twists. None of the present systems are adapted to these peculiar yarns. A true system of counts should always indicate the length of the completed thread. (6th.) It must be written in a way that leaves no risk of a mistake. Here, again, all the present systems are at fault. There is no rule or custom of the trade at present to decide whether 3-5 means three five-fold, or five three-fold. Cotton spinners might take one view and silk spinners the other; and if the yarn were of a thread of cotton and a thread of silk twisted together, no one could tell which system it should follow. Litigation has arisen out of this peculiarity. In a true system of counts the number of folds should always be placed after the count, and this established as a principle.

The decimal system of counts which I proposed to the Silk Association is the only one that complies with these six necessary conditions of a true system of yarn counts. It is expressed in the following three propositions: (1.) The decimal count is based on the number of thousands of yards to the pound, thus number ten means 10,000 yards to the lb. (2.) The decimal count always means the length of the completed thread, whatever may be the number of folds. (3.) In writing the count the number of folds should always be put after the counts, thus 5-3 will mean 5,000 yards to the lb. of completed

thread of three folds. Let us see by some examples that we clearly understand the "decimal" count. Thus 10's would measure 10,000 yards per lb. If another yarn were only one-thousandth part thicker it could be written  $9^{000}$ . If it were one-thousandth part finer it would be written  $10^{001}$ . If a yarn were so coarse as 1 yard to a lb. it would be written  $0^{001}$ . Again, the very finest silk counts about 600 cotton size, this would be 504 decimal, because there are 504,000 yards in 1 lb. of such silk. By contrast take a very thick carpet yarn of 34 yards to the ounce. This count cannot be expressed at all in the cotton scale, but it is quite easy to express it accurately in the "decimal" scale, 34 yards to the ounce is 554 yards to the lb., and would be written  $0^{544}$ .

Now, how could such a system of "decimal" counts come into practical use? I do not propose that spinners should abandon the counts to which they have so long been accustomed. Let them go in their own way as long as they find it suits their convenience. All I ask is that they should remember the convenience of other people, and thus they can do by marking on their bundles, besides their own count, the equivalent "decimal" count. The merchants and manufacturers would soon find the benefit of it, and in time would prefer yarns marked in this way. For instance, if a manufacturer had to make a warp 100 yards long and 1,000 ends of a 44-dernier silk, the mark 44 deniers does not show him the length in a lb., which is what he wants to know; but if they were marked "equivalent 100 decimal" he would see at a glance that 1 lb. of 44-dernier silk contained 100,000 yards, the quantity for his warp. Again, if he were going to use a 2-54 botany. The mark 54 does not show to him quickly what length of thread he has to deal with; but if it was marked the equivalent "decimal count 15's" he would know it contained 15,000 yards of finished thread per lb., and he could speedily make up the weight required, and so on in all the calculations of warp and weft. However many different sorts of yarn the manufacturer used, if he had the decimal count of each, he could make up his calculations with an ease and accuracy that would be quite refreshing compared with the present complicated and unsatisfactory system.

Reforms of this nature cannot be introduced in a hurry. Time must be given to allow them to be properly understood. They must be explained and discussed, for every proposed alteration is not necessarily an improvement.

There may be reasons against my proposals, which I have not adequately considered. It has been suggested, for instance, that it would be better to adopt the French metric system at once. Now I cannot take this view. It would be no benefit to our manufacturers, only, indeed, a cause of further confusion unless we at the same time adopted metres and kilogrammes in all our calculations. What we want, in order to save time, is not a new unit of calculation, but to use decimally the units that we at present possess. Besides, the "metric system" is not a satisfactory method for folded yarn. 200-2 "metric" means that the single thread runs 200,000 metres to the kilogramme, and is doubled to a length of 100,000 metres. This is clear enough when all the strands are of the same yarn, but the "metric" system, seeing it always counts by the single thread, has no way of expressing the count of a yarn twisted from two or more yarns of different thicknesses, or where one thread is wrapped round the other, as eccentric, loop, or knop yarns. A system which is not applicable to all sorts of yarns, without making awkward exceptions, should not be adopted.

Fire broke out in the spinning department of the Dominion Cotton Co.'s mill, at Halifax, N.S., May 6th. The fire is supposed to have originated from friction in one of the mules and soon spread through the flat. The automatic sprinklers did good work, however, and the efforts of the city fire brigade confined the fire to the flat where it originated. The damage was chiefly from water.

## SUBSTITUTES FOR NATURAL INDIGO IN WOOL DYEING, AND THE ARTIFICIAL INDIGO.\*

Owing to the great number of natural and artificial dyestuffs which are on the market, and owing to the almost daily increase of new products, it is no easy task for the dyer to select such dyestuffs as are most suitable for his purpose. He is urged by the maker of colors and the dealer, as well as by his colleagues, to make experiments with all kinds of dyestuffs, and mordanting agents, which are supposed to offer advantages in the one or the other direction, over the colors and mordants that he already may be using. It is quite impossible for the dyer who has his daily work to attend to, to test everything that is offered him, and therefore he must restrict himself to such trials as appear to him of the most importance for the time being. As a rule the dyer does not like to make any change as long as everything goes smoothly, and perhaps he is not wrong in being somewhat careful in that direction, unless conspicuous advantages are seemingly offered by the change. But it is not an everyday occurrence that things go smoothly. In view of the ever-increasing demands which are put upon the dyer, through the greater improvements and perfection in the manufacture of goods, as well as the growing competition amongst the dyers themselves, he is frequently compelled to substitute dyestuffs and methods of dyeing which may have satisfied in the past. In the Turkey-red dyeing, for instance, madder had to give way to alizarin red. In wool dyeing, alizarin colors have pushed out to a very great extent the wood colors. Take logwood, for example; it can now only hold its own against the much superior alizarin black and other fast black dyestuffs, where cheapness of price necessitates its use and where fastness to light is not of the greatest importance and not particularly required. Even the most important natural dyestuff, indigo, has considerably lost ground in wool dyeing, and is now frequently substituted by the cheaper and cleaner alizarin blue and anthracene blue. In cotton dyeing the substantive dyestuffs and the indoin blue and others have gained ground at the expense of indigo.

Now, in dyeing, as well as in every branch of commerce and science, progress is inevitable. Though a thing may be good, still it always must succumb in the struggle with something better. Whenever a new product is brought into the market, the color-makers issue directions for its application and give full particulars as to its properties, in order to acquaint the user with its nature. These directions are intended to give the dyer a hint as to what he may expect from the new products. Of course it must be left to practical men to adapt them to their particular requirements, for which they are wanted for the time being. This point is one of the chief tasks of the practical dyer, and is not less important than the exact matching of shades. The color-makers know just as well as the dyers that if worked under different conditions after the same method, different results will and must arise. They cannot, therefore, give any guarantee that their processes will produce good results in dyeing, obtained by working after their given directions, the less so seeing that they have no guarantee that the directions will be properly adhered to. The words, "without guarantee," on the pattern cards and directions, do not refer to the dyestuff itself, as is frequently presumed, for the maker will guarantee the standard quality of the product.

An allowance was claimed from the color-maker because naphthol yellow, which a dyer had used for military cloth, had bled. This yellow had never been recommended by the maker to be used for cloth which required to be fast to washing and water. Before chemical research succeeded in making dyestuffs artificially, there was only one coloring matter to produce blue shades on wool which were fast to light and milling. This was indigo, and its application in the vat has been known since ancient times. The coal-tar color industry has produced, during

\*Abstract of a paper read before the Bradford and District Foreman Dyers' Guild, by Alfred Schmidt.

the last decades, quite a number of new colors, which were recommended as substitutes for indigo. Part of them have proved to be real substitutes, while others have not fulfilled what was expected of them. Recently science has even succeeded in making from coal tar the blue dyestuff which is contained in indigo and called indigotine. Of all the other blue coal-tar coloring matters, only those can be looked upon as real substitutes for indigo, which belong to the class of the mordant colors generally known as alizarin colors. With the whole of these, the coloring matter is not fixed as such, but a metallic, chiefly a chrome, compound called color lake is produced on the fiber, and it all depends upon the resisting power of this lake to acid, light, alkalis, etc., whether the resultant colors are fast or not. Amongst the blue mordant colors some must be excluded, which cannot claim to be considered real substitutes for indigo, such as gallein, gallocyanine, or alizarin purple, etc. These and similar colors may be good enough in many cases for the purposes required, but real indigo substitutes they are not. They are the various brands of alizarin blue and anthracene blue. But first of all I think it best to deal with the new product, synthetical indigo. This cannot be looked upon as a substitute, seeing that it is of the same constitution as indigo itself.

Wool, as well as cotton and silk, can be dyed with it in any vat used for indigo, and it cannot be detected even by analysis, whether the natural or the artificially made indigo has been used. It consequently would be to the dyer a question of price only, which of the two to employ, did not the artificial indigo possess any other advantages overbalancing the natural. It is a well-known fact that natural indigo varies in strength and purity, and that the price, owing to the good or bad crops, is subject to great fluctuations. These fluctuations make it a difficult matter for the dyer to choose the most favorable moment for buying, and the varied and changing quality of the indigo often curtails the possibility of making the right selection in the quality.

The indigo pure, on the other hand, is delivered in a uniform quality of a standard strength. Fluctuations, such as with the natural indigo, are therefore excluded. The paste has, besides, the advantage that it is sold in the ground state, thus saving grinding and being always ready for use. Different kinds of natural indigo are in the market, for instance, Java, containing from 70 to 80 per cent. indigotin, Bengal, testing 60 to 70 per cent., Oudh, Guatemala, 50 to 55 per cent., Kurpah, from 30 to 55 per cent., and even qualities below 30 per cent. In the face of such differences, it is extremely difficult, and in fact almost impossible to judge the exact coloring strength by appearance of the article or by breaking it. In analyzing, it has been found that lots sold as one quality of indigo vary in themselves, and even samples, drawn from the same chest, have been proved to differ as much as 7 to 8 per cent. in indigotine, though by appearance it was scarcely distinguishable. Chemical analysis, therefore, when buying natural indigo, is only of value if one is quite certain that the sample represents the average bulk. Furthermore, it must be borne in mind, that the methods of indigo analysis adopted in practice do not always give reliable results. For some time indigotine has been extracted from natural indigo, and this product brought into the market under the name of refined indigo. Of course it is also subject to the same fluctuations in price as natural indigo itself. Efforts have also been made in India and other countries to obtain a more uniform quality in the manufacture, but it appears that the experiments have not been successful, for the qualities which are sold in the market still differ just as much as ever.

Summing up the dyer has, when using pure indigo, a uniform quality which, as a paste, is ready for use, and which can also compete in price with the best obtained from the indigo plant. He does not, therefore, run the risk of a wrong speculation in buying, and knows exactly what he is buying. He need not wait for the moment which he considers best for mak-

ing his purchases, and he can obtain the indigo pure in any quantity, from the smallest to the largest, at any time according to his requirements. I need not go into details as regards the dyeing of indigo pure, there being no difference from natural indigo in this respect. For dyeing and printing cotton and silk, indigo pure, of course, can be used, exactly the same as natural

### COTTON.

Cotton has exercised an important influence upon the commerce of the world and on the destinies of nations since the time when Herodotus told his countrymen how the "wild shrubs" of India produced "wool in beauty and excellence surpassing that of sheep," from which the inhabitants provided themselves raiment. Nearly two thousand years more elapsed, however, before the cotton manufacture was introduced into Europe, for it is not until about 1430 that we hear of its being carried on in a small way in Germany, whence it spread to the Low Countries and other parts of the Continent, and was finally brought into England by Belgian refugees, who settled in Lancashire in the later years of Queen Elizabeth's reign (about 1585), and fifty years afterwards it appears that Manchester had already become distinguished for the manufacture of cotton fabrics. In those easy-going days, a reputation of this kind was, it would seem, not so difficult to attain as it is now, and, on closer inquiry it is discovered that most of the fabrics then produced were of a mixed description, the warp being of worsted or linen and the weft only of cotton. The commencement of the cotton industry, as we know it, dates, however, more than a century later still, and resulted from the varied and mechanical contrivances which finally abolished the spinning-wheel and the handloom in favor of more productive machinery. In 1786 one pound of cotton yarn, containing one hundred hanks to the pound was worth 38s.; in 1807 the same description of yarn could be purchased for 6s. 9d.; in 1829 for 3s. 6d.; in 1858 for 2s. 6d.; and in 1890 for 2s. Towards the latter end of the last century a wedding dress of white calico was known to have been purchased at the rate of six shillings a yard. What would the draper be told who should ask that price for calico to-day? Of course, this cheapness has not been altogether the direct result of machinery, though it has indirectly. In 1787 raw cotton was obtained exclusively from the countries bordering the Mediterranean and the islands of the West Indies, with a very small contribution from India; the chief supply is now obtained from the United States, and cotton, which in 1800 averaged 2s. 2d. per pound is now sold for less than one-fourth the price.

When observing the manufacture of cotton our attention is first directed to the receiving warehouse, where are immense piles of cotton in bales, just as delivered from the docks. Those big bundles are from Egypt, and contain the long stapled brown cotton used for the spinning of the finer ranges of yarns. The smaller, iron-bound bales in the stacks beyond are from New Orleans or Charleston. The cotton from these places is white, and a much shorter staple (medium-class goods are made chiefly from American cotton), while on the opposite side a small pile of diminutive, closely packed bales are from the East Indies. We are next introduced to the mixing-room, to see the very first operation in the manufacture of cotton. To mix the various imports in their raw state, according to the quality of the yarn desired, is a most important detail, and one requiring the utmost care in carrying out. The iron bound bales are opened with a strong hatchet, and the tightly-pressed layers of cotton from several bales are shaken out, the one with the other, until a heap as large, though not so compact, as a haystack has been built. Several such stacks are being reared simultaneously in the mixing-room, each one for the production of a different character of cloth. The cotton is then pulled by handfuls from the side of the stack, the object being to secure in this preliminary process as even and uniform a blending of the different imports as is possible. It is astonishing how much dirt and rubbish is eliminated from cotton during the cleansing processes. Indeed, one is sometimes forced to the conclusion that sand and stones have been placed in the bales with the dishonest intention of adding to the weight, because it will be remembered that cotton must necessarily undergo a severe primary operation before being packed into bales, in order to separate the fiber from the seed.

The cotton, as pulled from the sides of the stack, is placed upon an

automatic carrier of revolving lattice-work, which conveys it between feeding rollers into a scarifing machine, called an opener." From thence it is passed through what is termed the "porcupine" that is, a cylinder containing arms, which revolve at the rate of two thousand per minute. It is next drawn through a long pneumatic tube, the draught for which is created by a powerful exhaust fan; and the dirt and seed falling from the light fleece as it flies along are lodged in cells fitted for the purpose. From the tube the cotton is deposited on the perforated table of a revolving cylinder, technically called a scutcher, where it is again scratched to pieces, beaten and blown about, and finally is passed out of the cylinder between two heavy rollers consolidated like a very wide continuous sheet of wadding winding itself on a large roll. This is called a lap. Five of these rolls are next placed so that the laps, one upon the other, may be rolled through what is known as the finishing scutcher, where it is again severely knocked about and discharged, also from this machine, not only in one lap, but that much finer than the former. Hitherto all the processes have been for the purpose of securing a thorough cleansing and a thorough blending of the cotton. Indeed, we might almost say that every fiber, though in a sense amalgamated the one with the other, is now distinct from its neighbor, but as yet it is perfect only in these respects. The next thing is to weigh the laps, to be sure they contain just the required quantity for the count of yarn it is designed to make. And now we come to the second stage of the manufacture, "the carding," to see which we must go into the next department. There are two kinds of carding engines, but the aim is the same in both, that is, to effect a further cleansing of the fleece and draw the fibers in a parallel position, with the result that as the cotton issues from the carding engine it assumes the form of a soft white rope, being the first approach to anything in the shape of yarn. The process of carding is as follows: The roll of continuous fleece, just as taken from the finishing scutcher, is placed in bearings at the back of the carding engine, and the end—that is the beginning—of the lap, entering between the feed rollers, it slowly uncoils as it is carried into the jaws of a strong wire-covered revolving roller called the "taker in" there to be torn again into fragments. It may now be said that the cotton is quite freed from all foreign substances; the much attenuated fleece escapes from this torture into a large cylinder, which is fitted with a series of large and small rollers arranged to revolve in opposite directions and at various speeds, and these being covered with fine wire teeth and accurately set, effectually comb the cotton as it revolved between them and the surface of the cylinder. Finally, it is taken from the cylinder by another wire-covered roller called "the doffer." A lively little automatic comb scientifically strips the doffer as it revolves and delivers the cotton, now a delicate film, into a tube, from whence, converging to a point, it passes between two heavy consolidating rollers, and issuing therefrom in what is technically known as a "sliver" (that is, a fleecy continuous strand), coils itself by an ingenious arrangement in a tall can conveniently placed to receive it. There is no more important process in the manufacture of cotton than is performed by the carding engine, it has to complete the work of purifying, places all the fibers in parallel order, and finally—as before mentioned—draws the wide lap of cotton into a sliver. We are now fairly on our way. We have seen how the matted cotton as imported is mixed, cleaned, and gradually converted into a strand; herefrom we commence and follow up the various processes of actually spinning, respectively known as "drawing," "doubling," and "twisting." The work of attenuating the sliver and bringing the fibers parallel is accomplished in the "drawing frame" by a system of detaining and delivery rollers. In the drawing-frame, for instance, are four rows of rollers working in pairs, six cans of sliver as brought from the carding engines are placed at the end of the frame and fed into the rollers, and from the fact that the finishing rollers are adjusted to revolve six times faster than the taking in rollers, the six slivers—becoming united on the way—are reduced to the size of one of the original, and this is made to coil itself in the can as before. Six of these cans are taken to the end of another drawing frame, and the process is repeated precisely as the last, a third time the six cans are run through the frame, when the yarn becomes perfectly even, regular, and is reduced to the required thickness. It is calculated that the coil issued from the third drawing-frame contains within itself a portion of 216 of the

original sliver taken from the carding engine. A most important thing in connection with the process is that the frames must not be allowed to work even for a moment with one or more of the slivers broken, otherwise the count of the yarn would become irregular, and to avoid all risk of this, valuable mechanical appliances have been devised.

Up to this time the cotton has been drawn into a small smooth strand; the next process is to further attenuate it, and finally to twist it. For this purpose six cans of sliver from the last drawing frames are taken to the end of what is termed the "slubbing frame," which, so far as the system of rollers is concerned, is in every respect similar to the drawing frame, only that the cotton as it issues from the rollers is wound upon bobbins, which are arranged at the head of the machine. This is done by a spindle and flyer, which travels at the rate of six hundred revolutions a minute, by this operation the sliver is strengthened by receiving its first twist, and the fibers thus secured will not readily come apart. The bobbins are then taken to what is called the "intermediate frame," the purpose of this is to further strengthen the thread by winding the contents of two bobbins on to one. The next succeeding operation performed by the roving frame is very similar, two bobbins from the last machine being wound into one smaller bobbin; indeed, the mechanism of these fly frames are all alike, the object being to double, attenuate, twist and perfectly equalize the thread, and gradually bring it into the proper condition for spinning. The bobbins of thread from the roving frame—which, by the way, in their united doublings contain portions of 864 of the original sliver—are now quite ready for the spinner. But before proceeding further, the yarn is tested by being weighed, etc., to see if in a given number of yards the result is in accordance with the count, which has to be spun—the count means the number of hanks to a pound weight of yarn. For instance, if sixties be required—that is, sixty hanks to the pound—it will reach 840 yards, the number increasing with the fineness of the yarn to be spun, and it may be interesting to know that one pound of sixties yarn measures 28½ miles. But to return, the bobbins as wound from the roving frame when full, assume the shape of a cone; this is accomplished by an exceedingly clever arrangement in the fly-frame, certain wheels being made to work with differential movements to produce the necessary compensating results. The cotton at this stage is now ready to be converted into yarn, and for that purpose the bobbins are taken into the spinning room.

The very mention of spinning conjures up before one's vision interesting incidents and anecdotes, for the relation of which a whole volume should be devoted. Sufficient for this article if we say that the machinery used in the present day for spinning cotton is so complex in character that a description of it would not be understood by an unscientific reader. There are several kinds of spinning machines. Mule spinning was the invention of Samuel Crompton. Cotton as all the world knows, was in olden times spun by means of a distaff and spindle. An improvement upon this was the spinning wheel with flyer attached to the spindle. At the end of the eighteenth century, the story goes, that an illiterate workingman at Blackburn, named Hargreaves, was watching his wife at work, when her spinning wheel fell over, the spindle in consequence assuming an upright position. Hargreaves in a moment was struck with an idea that it was possible to mount spindles for the arrangement of a number of bobbins side by side in one frame, the yarn from all of which might be rolled off simultaneously as the machine moved backwards and forwards like a carriage on wheels. The idea thus conceived he carried out, and christened the machine "Jenny," after his wife. The "water frame" or "throstle" was invented by Sir Richard Arkwright, who at one time kept a barber's shop at Bolton, in a cellar, over which a sign humorously informed the passers by that the subterranean barber shaved for a penny. The principle of Arkwright's invention was to spin or draw out the cotton to the required fineness by the use of rollers. This machine, though considerably improved in detail, is essentially the same in principle as when originally invented. It is used for the spinning of yarn required for the manufacture of heavy goods. Crompton's invention was the combination of Arkwright's principle of spinning by rollers with Hargreaves' moving carriage, hence the name of mule was given to this hybrid machine. In the number and variability of its actions, the admirable harmony and ease with which all the parts work together, and the excellent



results, it is little to be wondered at that the spinning mule has been called one of the greatest triumphs of mechanical genius that has ever been achieved, and to watch the automatic perfection of the numberless intricate motions, all harmoniously working together as the machinery advances and recedes, is to marvel at man's inventive faculty—and yet a pair of mules with over 2,000 spindles at work is easily managed by one man with the assistance of a couple of boys.

Spinning is the final process in the actual manufacture of the thread, and the operation, briefly described, is as follows: The roving bobbins are arranged in creels at the back of the mule, and as the carriage moves away outward it draws with it the yarn at a rate that causes the bobbins to make 10,000 revolutions a minute, this motion also unites two threads into one, and at the same time imparts a twist to the strand. When the carriage reaches the goal it momentarily makes a slight reverse movement called "lacking off"—this is most essential, as it prevents any irregularity in the twist—and then receding altogether the yarn winds itself at a uniform rate on smaller spindles, which when full are called "cops." Yarn for making warp has a harder twist given to it during spinning. The warp of cloth consists of the threads which run the entire length of the piece to be woven, the weft is limited to the width. The cops of thread as they leave the mules are quite ready to put into the shuttles, but those intended for the warp are rewound for convenience on large bobbins, by means of a winding frame. These bobbins are placed on spindles in a triangular frame, technically termed a creel, and from this are wound side by side with uniform tension on to a large wooden roller with iron flanges called a warper's beam, each thread on its way passing through the teeth of a long comb, and thence through separate eyelets to keep them distinct and parallel. This frame also possesses an automatic arrangement for instantly stopping the machine, should even a single thread out of the five or six hundred happen to break. Five or more warper's beams when filled form a set, and these taken in hand by men called slashers are placed in the bearing of a large frame for the purpose of winding the threads on to one roller, the latter being the "weaver's beam," and the threads thus accumulated form the warp. In connection with this process is a trough containing a bath of size through this the warp passes on its way to the weaver's beam in order to stiffen the threads, this to enable it the better to withstand the friction of weaving. Coming out of the size, the warp follows on through rollers to get rid of the superfluous moisture, and thence over steam heated cylinders, so that it may be quickly dried. The weaver's beam is taken into the "drawing in" room for the warp to be adjusted to healds and reeds, a process performed by two girls. One passes each thread of the warp in its turn through the suspended heald, and the girl on the other side of the frame takes the thread as it is pushed towards her and places it between the wires of a small frame, called a reed. The object of this operation is that the threads may be kept perfectly regular, and to form a space through which the shuttle that carries the weft across the loom has to travel. The weaver's beam fitted complete with warp, heald and reed, is now ready to take into the weaving shed.

#### FABRIC ITEMS.

Hardy & Co., Kingston, Ont., lost seriously by fire in their dry goods store recently. Loss about \$17,000.

John Murphy's departmental store, St. Catharines, Ont., was damaged to the extent of \$2,000 on April 29th by fire.

Joseph Herron, one of the best known merchant tailors in Hamilton, Ont., died recently there, after having been ill about a week from pneumonia. He was 67 years of age.

McDonald, Hanrahan & Co., Sydney, C. B., dry goods and general, have assigned to C. D. Jones, St. John, N. B. Liabilities about \$15,000, assets nominally \$28,000.

The Ottawa Journal says that J. H. Doherty, insolvent dry goods merchant, Wellington street, in that city, has been sent to jail for three months for contempt of court. Doherty refused to obey an order of Justice Street requiring him to place his property in the hands of the assignee to be disposed of.

At a meeting of the creditors of Ridley & Co., clothiers, of London, held April 11th a statement was presented showing liabilities, \$12,906, and assets, \$4,452. An offer of 50 cents on the dollar was refused. The chief creditor is the firm of Lailey, Watson & Co., of Toronto, who have a claim of \$3,000.

J. Rosenbloom & Co. have resumed their old business in Sherbrooke, Que. A collision took place between two G.T.R. trains, and the result was that part of the wreck caught fire. The clothing and gents' furnishing stock that was being shipped from Cornwall, Ont., to Sherbrooke was among that burned. The loss was between \$9,000 and \$10,000, fully insured.

Recently Judge McDougall handed out judgment in the suit of Charles J. Jackson, linen manufacturer, Falkland, Scotland, against Nicholas Rooney, merchant, Toronto, which was tried some time ago. The plaintiff was given judgment for the full amount, \$383.52, with interest at 5 per cent. since October 4, 1896. The defence in the case was that the goods were not delivered at the right time and not according to contract.

## 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.

F. M. Leyden, formerly of Almonte, Ont., is now boss finisher in the Perth Woolen Co.'s mill.

The Empire Carpet Co., St. Catharines, Ont., has recently placed a 50 h.p. boiler and 30 h.p. engine in its factory.

A proposition is before the people of Guelph, to establish a tannery, capital, \$50,000, to be floated by local capital.

M. F. Mooney, St. John, has arranged for British capital to build a large pulp mill at Mispec, N. B. The product will be shipped from St. John.

Supplementary letters patent have been issued whereby the capital stock of the Corticelli Silk Company, limited, is increased from \$60,000 to \$125,000.

Andre Cushing has succeeded in forming his company to carry on the manufacture of pulp in St. John, N. B., and the erection of the mill near his saw mill will begin at once.

Fifteen upholsterers in the employ of Snyder, Koos & Co., furniture manufacturers, Waterloo, Ont., who are members of the union, went out on strike recently. They were taken back on the understanding that the factory is to be a non-union shop.

The Publishers of the "Canadian Journal of Fabrics" will give one year's subscription FREE to the first three subscribers who forward to the Toronto office, 62 Church Street, perfect copies of the issue of January, 1897.

# Wool Washers

## Dryers and Carbonizers

# KITSON

## MACHINE CO.

LOWELL, MASS.

The effort to establish a woolen mill at Sussex, N.B., by public subscription is still being made. A two set mill is proposed.

A mill to manufacture tissue paper is to be started in Ottawa by two employees of E. B. Eddy. About \$60,000 will be spent in fitting up the mill.

Chas. King & Sons, tanners, Whitby, Ont., have been voted a loan of \$10,000 by the town council to open up their tannery, which has been closed for some time.

John Bain, formerly of the Elora, Ont., woolen mills, intends to leave Elora very soon and live in Toronto. His son is conducting the business in the woolen mill at present.

Harvey & Co., St. John's, Nfld. (E. F. Harvey and A. J. Harvey), have 120 men employed in their Black River pulp mill. The pulp will be loaded on board steamers from the mill.

The Branston Woolen Factory at Way's Mills, Que., which was burned to the ground some time ago, has been rebuilt and new machinery put in, and is again at work. A. H. Dyson is manager.

There is said to be no truth in the report that a large cotton mill is to be built in Ottawa. J. R. Booth and other capitalists, who were mentioned in connection with the scheme, say that there is no foundation for the report.

F. B. Rollinson, late manager of the Glen Tay, Ont., Woolen Mills, before leaving to assume the duties of superintendent of the Paton Manufacturing Co., Sherbrooke, Que., was presented by the employees under him with an address and a gold-headed cane of polished ebony.

David Cornish, sr., head finisher at the Waterloo, Ont., woolen mills, was surprised at his residence one night recently, by the employees of the mill over whom he has charge. During the evening an address was read, and Mr. Cornish was presented with a chair and stool as a token of the esteem in which he is held by his men.

Things are booming in Valleyfield, Que., just now, as a satisfactory arrangement has been made with the Montreal Cotton Company. The town has bought the waterworks of the company. There are 300 men already at work on the new addition to the cotton mills, and Louis Simpson, the general manager, has gone to England to purchase the machinery with which to furnish it.

The Auburn Woolen Mills are inside the corporation of Peterboro, and are therefore entitled to fire protection, but the Waterworks Company objecting to running a pipe across the river, the Auburn Company provided their own protection. Now the council has decided to pay the company \$50 per annum in lieu of its expenditure, and will increase the amount to \$100 if another hydrant is put in. This treatment contrasts very strongly with that meted out to manufacturing interests in many municipalities.

The Consumers' Cordage Co. entered a peculiar plea in an action brought recently against them by Bannerman Bros. for rent due on a cordage mill at Lachute. They claim that they leased the mill in order to create a monopoly in the cordage business and the twine business, and that, therefore, the lease was null and void, there was no obligation between the parties. Judge Gill held, that while a monopoly had been created for a time, Bannerman Bros. were not parties, and judgment was given against the cordage company.

E. L. Graft has opened a carpet weaving factory, Galt, Ont.

C. Turnbull & Co., Galt, Ont., have their new factory under contract.

A. R. Burrows, carpet and chenille manufacturers, New Hamburg, Ont., has assigned to Robt. McKim.

The Ottawa, Ont., Rag Co. was burned out April 29. The loss was in the neighborhood of \$10,000.

J. E. Rae, late of Hodge's Mill, Corawall, Ont., is the new proprietor of the Lancaster, Ont., woolen mill.

The R. Forbes Co., Hespeler, Ont., is building a new dry-room. The new addition will be a two-story building, 70 x 68 feet.

The establishment of Edward Merner's felt factory in New Hamburg, Ont., has brought several new families into the village.

John Wallace, Beeton, Ont., has recently built an addition, 28 x 26, and put in a 95 horse-power engine and boiler. About 25 hands are now employed.

The city of Ottawa desires to secure the Kingston mills of the Dominion Cotton Company, which has been refused the \$50,000 bonus asked from the latter city.

Thos. Cronkhite, of the Wisawasa, Ont., woolen mills, is at Thessalon, Ont., where he will superintend the building operations connected with the firm's new mill there.

Jas. Skene, Pennfield, N.B., whose woolen mill was burned down some time ago, intends rebuilding at an early date, when he will resume the custom business interrupted by the fire.

The steam laundry in connection with the penitentiary, Stoney Mountain, Man., took fire, and the entire building and contents were destroyed May 2nd. The fire is supposed to have started from the smokestack.

Walter Hill, son of the popular designer of the Rosamond Woolen Co., Almonte, Ont., has taken a position as designer in the woolen mill, at Campbellford, Ont. He had been assistant to his father to some time.

The foundation walls for the big brick building that the Lang Tanning Co. is erecting in Berlin, Ont., are finished. It is 280 feet long, and when it is completed, which is to be early in June, it will be the largest single building in Berlin, and a fine addition to the already large and imposing group.

D. K. McLaren, manufacturer and mill furnisher, has opened a branch of his extensive business in Galt, Ont., in addition to the Montreal and Toronto establishments which are maintained by this enterprising firm. In noting the opening of the Galt branch in our last issue, we inadvertently stated the name of the firm incorrectly. R. W. M. McLaren is in charge of the Galt branch.

With the exception of Joseph Williams & Co., whose financial difficulties are referred to in another paragraph, the textile mills of Glen Williams are quite busy. Sykes & Ainley are running full force, and Joseph Beaumont is working up to full capacity on hosiery and wool hating. Thomas Board, glove manufacturer, has turned out many thousands of pairs of blondyke mitts—a thick knitted mitt covered with strong leather—and is still very busy on these and other lines. George D. Ross & Co., Montreal and Toronto, are selling agents for the two last named firms.

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The capital of the Laurentide Pulp Company, Ltd., has been increased from \$900,000 to \$1,200,000 by supplementary letters patent. Win Chisholm, Halifax, has a property at Dartmouth, N.S., which he is promoting a company to utilize as the site of a pulp mill. The site has excellent shipping facilities, pure water and abundance of the raw material.

D. K. McLaren, Montreal, Toronto and Galt, has opened a factory at 16 Victoria Square, Montreal, manufacture of English oak belting; only genuine stock will be handled. The Temple Electric Co. has installed the plant by which the machinery will be run.

The town council of Markham, Ont., has passed a by-law exempting the woolen mill from all taxes, except school rates, for a period of nine years, and also remitted last year's taxes which were unpaid. The conditions are that the mill is to employ at least 35 hands for eight months in the year.

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### CHEMICALS AND DYESTUFFS.

The demand for chemicals and dyestuffs is fairly brisk, and spring arrivals, although not unusually heavy, are well up to the mark. Some lines are firmer owing to demand from the United States. Sulphur, chlorate of potash, sulphate of copper and cocoanut oil are higher. The following are current quotations in Montreal —

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

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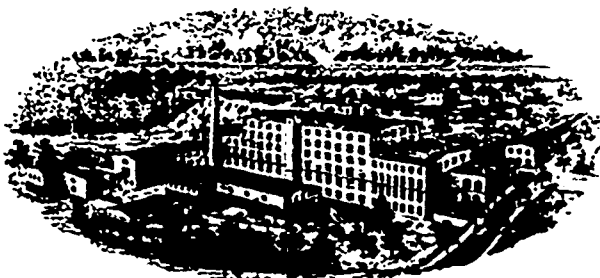
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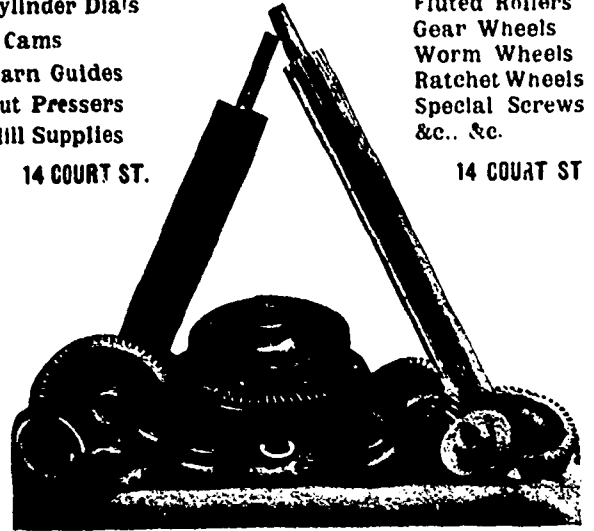
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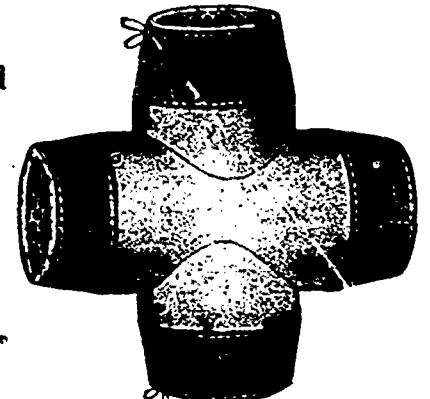


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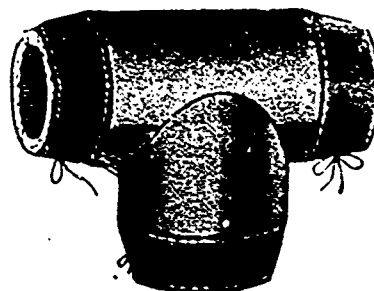
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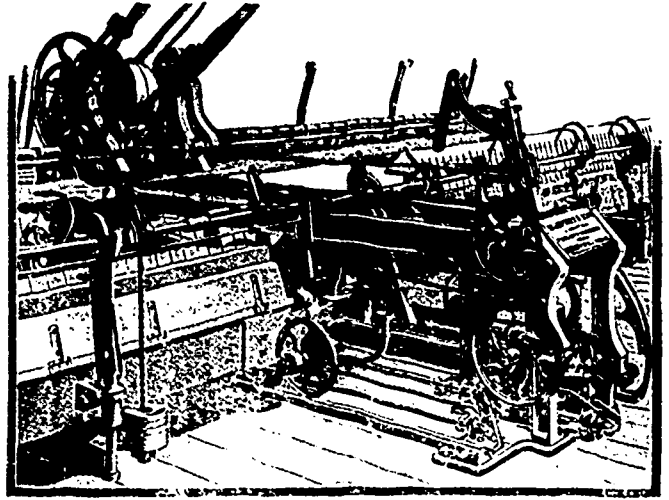
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quired in the various branches of trade —

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

**Carding or Fulling Mills:** Name, address;  
capacity, date established, and whether  
steam, water or electric power.

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

**Sail, Tent and Awning Factories; Uphol-  
stery, Wall Paper and Window Shade Fac-  
tories; Rubber, Oil Clothing, Felt, and  
Miscellaneous Factories in Textile Fab-  
rics:** Name, address, date established;  
steam, water or electric power, descrip-  
tion of goods made, and selling agents,  
if any.

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

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

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

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

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

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

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

**Wholesale Dealers:** Name, address and  
line of business; specifying whether deal-  
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FRASER BUILDING, MONTREAL, CANADA

—An important event in the wool trade of Boston, U.S.A., is the proposed transfer of a portion of the business to South Boston. The Boston Wharf Company is building a series of warehouses, which, when completed, will cover an area of 450 feet front, 58 to 139 feet deep, and will cost about \$675,000. The buildings will be nine stories in height on the highest side, and because of the extra high studding used in wool warehouses, will be the full limit of the law, 125 feet. The steel frame fireproof construction will be unusually heavy, about 6,600 piles, each about 40 feet in length, being required for the foundations, which will be of block granite. The company also expects to build a nine-story office building, in which to conduct its own business, and may make it a centre for the wool trade, perhaps a wool exchange. The warehouses will be situated across the channel, opposite the new south terminal, and they have been leased to five prominent wool houses.

—The last report of Capt. Constantine, of the Yukon detachment of the North-West Mounted Police, contains the following recommendations to the Government, which are of interest to the textile manufacturers. He wants for winter service blue mackinaw suits, shoulder straps and regimental buttons, red fox Yukon caps, and for summer, brown duck stable clothes, lined, as heretofore, cowboy hat, laced red leather boots high above ankle, with waterproof tongue, one pair hip gum boots per year, and four pair of best Canadian moccasins, with a good supply of socks and stockings. A good supply of specially strong moccasing is much required. The outside price for moccasins is high, ranging up to \$8.50 for an inferior class of goods, and very scarce at this price. Up to this year the Mounted Police have been able to purchase a pair of native fur boots for each man, but owing to the increased demand it is now found impossible to obtain them, as parties coming up the river buy them from the natives faster than they can be made.

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Cottonades,	Zephyrs,
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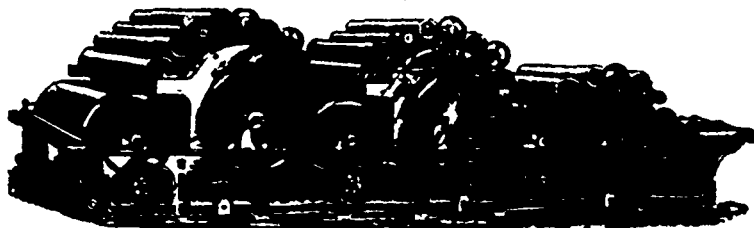
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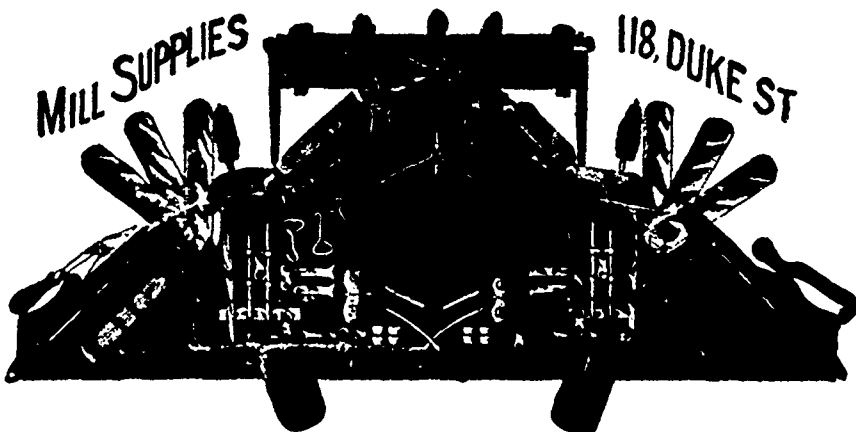
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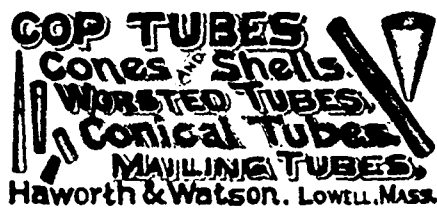
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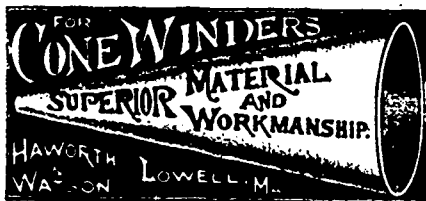
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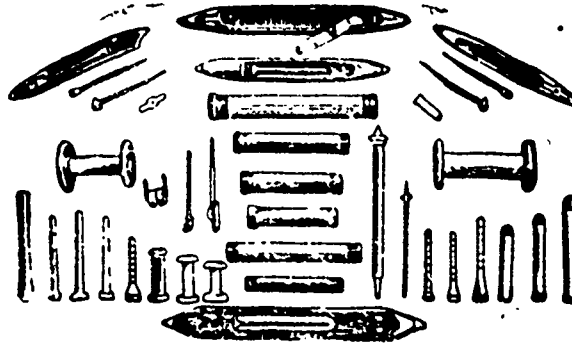


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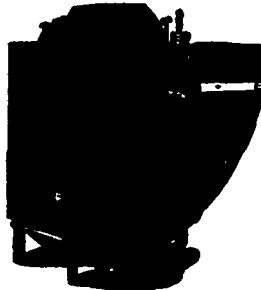
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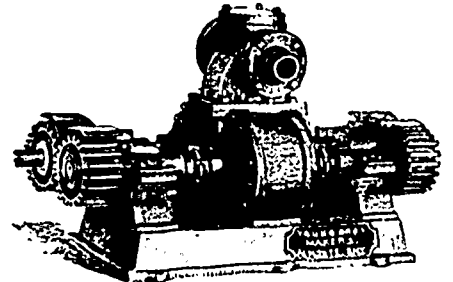
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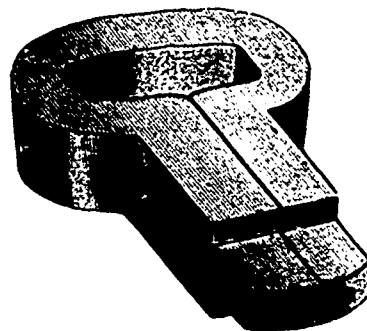
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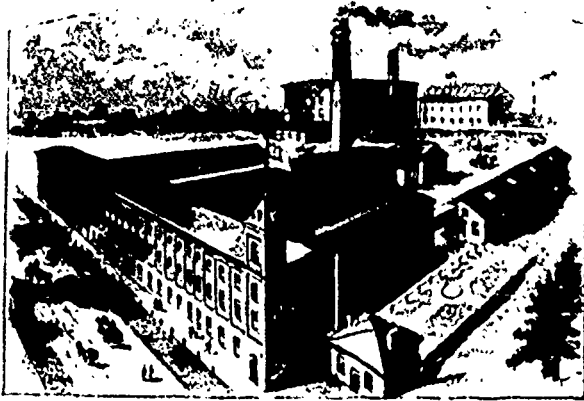
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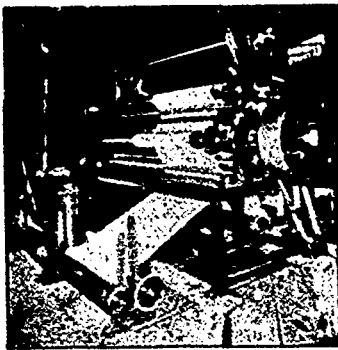
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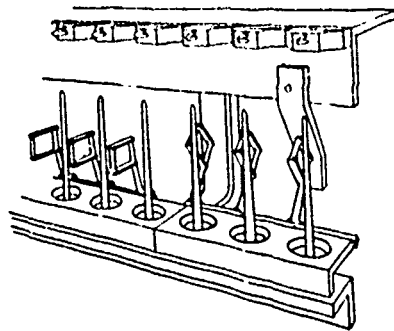
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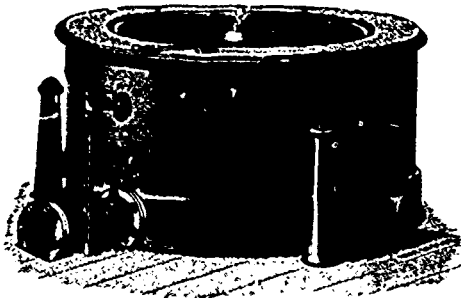
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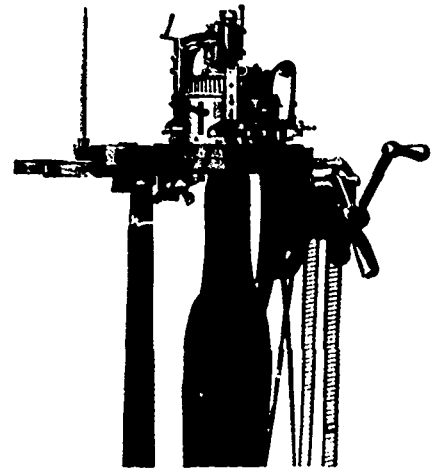
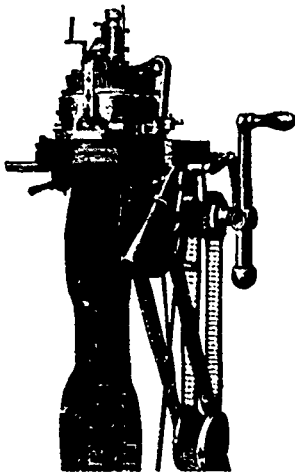
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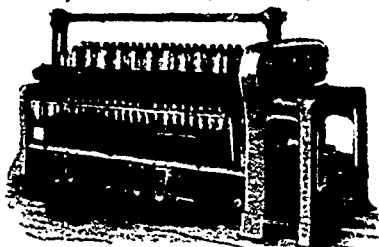
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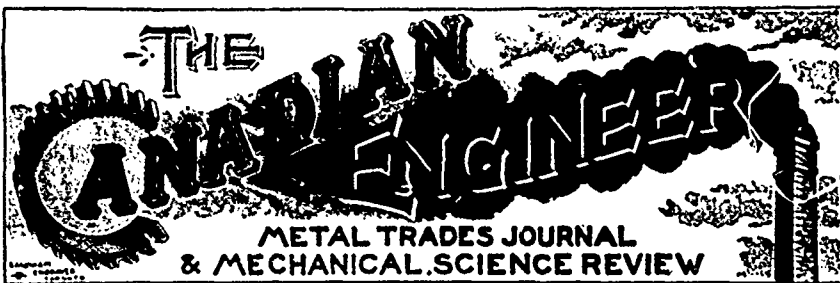
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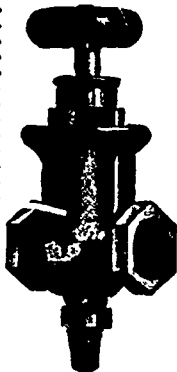
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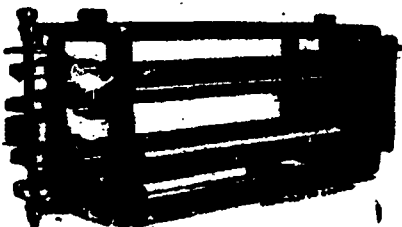
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**Good's Patent Combined Hackling  
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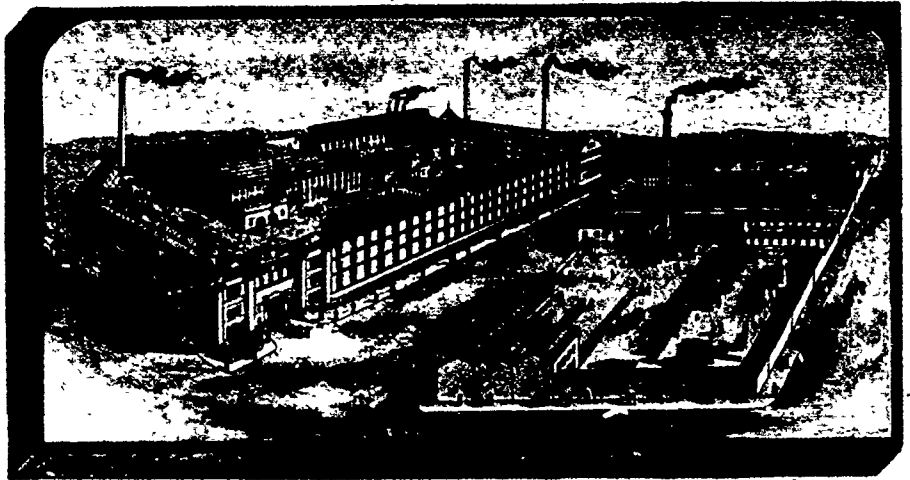
**Patent Automatic Spinning Frames  
Improved Laying Machines**

and other special machinery for the  
manufacture of Rope Yarns.

ALSO OF

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

Council Medal, London, 1851. Grand Medal  
Paris, 1867. Prize Medal, Moscow 1872. Diploma  
of Honor, Vienna, 1873. Highest Award, Phila  
delphia, 1876. Gold Medal, Paris, 1875. Highest  
Award (Medal), Melbourne, 1880.



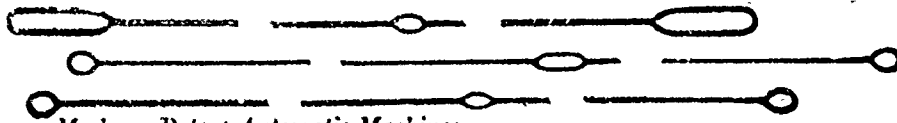
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