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CANADIAN Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XX.

TORONTO AND MONTREAL, MARCH, 1903.

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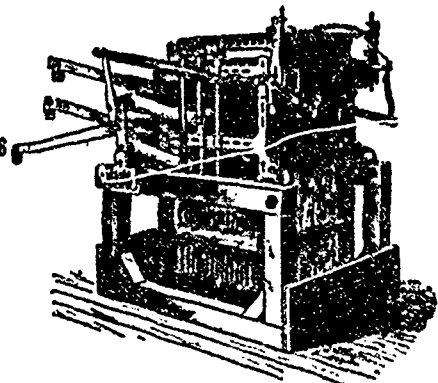
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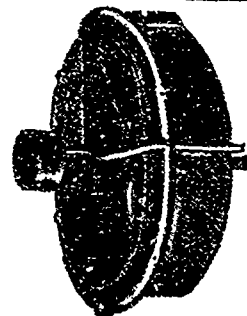
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Canadian Journal of Fabrics

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

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ECONOMY IN PRODUCTION

The Canadian Cordage Co. at Peterboro, which recently presented its shareholders with a very satisfactory first annual report, accompanied by a dividend, has demonstrated the great advantage which electric power possesses as a motive power for such works. Steam power usually costs about \$35 per horse power per annum, but this company has made

a contract for 440 electrical horse power, at the rate of \$10, thus saving \$25 per horse power, or in round numbers \$11,000 per annum. This is a large saving in one item. The company also estimates that the system which they have adopted for fire protection will save them about \$3,500 per year in insurance premiums on buildings, machinery and stock over that of the best equipped cordage factory in Canada of like capacity. The factory is built on the most modern lines of slow burning construction. There are fire-proof walls between each department connected by automatic fire-proof doors. The electric motors are installed outside the main walls and are surrounded by fire-proof material. The boiler for heating purposes is entirely isolated in a separate building. An automatic sprinkler system has also been installed. These arrangements give them a rate of premium of 50 cents on each hundred dollars from the regular insurance companies of Canada. The ordinary rate on cordage factories is \$4 for each \$100, and on cordage warehouses \$1.80 per annum for each \$100 of insurance. The company carries an insurance of \$35,000, which is more than they could afford if they had not the appliances referred to, so that the money expended on them is a good investment. Economy in production is half the battle in industrial pursuits, and the Canadian Cordage Co. shows its wisdom in securing cheap power and safe guards against fire.

FOOT AND MOUTH DISEASE IN MASSACHUSETTS

The wool market of Boston, the largest wool centre on the American continent, has been put in an awkward predicament by an order from the Bureau of Animal Industry prohibiting the shipment of wool from the State of Massachusetts. The order was issued as a precautionary measure against the spread of the foot and mouth disease in sheep and cattle which prevails in the New England States. The measure paralyzed the wool trade of Boston, and

there was "a great cry" because of the "little wool" affected. It was pointed out by the dealers that 99 per cent of the wool stored in Boston was grown outside of the state, and so the order was modified to the extent that wool could be shipped from such warehouses as contained no New England wool. This, however, only lifted the embargo in a few cases, as most dealers had a few pounds of New England wool in the same warehouse with heavy stocks of foreign and western wools; and hence the officials have been held up to the scorn of wool merchants whose operations have been stopped. But the wool dealers and the trade press should remember that there is more than one consideration besides the loss of profits to a few wool dealers. The public and the agricultural community are concerned in this matter, and it is better that some wool dealers lose a few sales than that the foot and mouth disease should be allowed to spread over the whole continent, to the great damage of the wool interests of both the United States and Canada.

WOOLEN AND COTTON CONDITIONS IN ENGLAND.

Late advices from England convey some interesting information respecting the condition of woolen and cotton manufacturing in that country. In the woolen trade employment continues good, and is better than a year ago. In the worsted trade it is good on the whole. Information respecting woolen and worsted factories employing about 30,000 women and girls shows that 93 per cent, were employed in factories giving full employment compared with 90 per cent. of those for whom returns were received in December, and 57 per cent. in January, 1902. Employment in the hosiery trade, although still good generally, shows a decline in Nottingham. Employment in the flax trade is fair in the spinning branch, and good in the weaving branch. In the jute trade it is good.

During the past month, employment in the spinning branch of the cotton trade continued good, and showed little change compared with a year ago. In the weaving branch employment was fairly good, and was better than in December and a year ago. Information respecting cotton factories employing about 93,000 women and girls shows that 92 per cent. of those in spinning mills were working in mills giving full employment during the whole month, compared with 94 per cent. during December and 93 per cent. a year ago. The corresponding percentage of full time for those employed in weaving factor-

ies was 85 per cent. during January, compared with 78 per cent. during December, and 75 per cent. a year ago.

TRADITIONS OF THE AMERICAN FATHERS.

The British people who rejoiced at the advent of the United States into the Philippines as a step that would insure that the government of those islands would be carried on solely in the interests of the governed, and that the "inalienable rights" of the Philipinos to "life," liberty and the pursuit of happiness would be respected are rather shocked to see how the traditions of 1776 have been carried out in their new political sphere. There is no tax on tea, but the manila hemp growers of the island are obliged to sell their products to United States merchants at 5 per cent. less than to others—the same thing in another form. The position is described as follows by "A Merchant" in a London paper: "In reference to the recent legislation in the United States, giving preference to Cuba sugar, etc., it may not be known generally that British trade with the Philippines has been practically captured by preferential treatment of the main export from these islands—namely, Manila hemp. Hitherto, the bulk of the business has been carried on via British merchants in London, Liverpool, etc. Last year, in order to divert the trade to the States, an export duty of, roughly, 5 p.c. was made law in the Philippines on hemp shipped to all other countries than the United States of America, the States themselves being exempt. As the purposes for which this fibre is used—rope, yarn, etc.—involve a simple process of manufacture, the above-named rate of duty is practically sufficient to kill both the trade of handling the fibre and the manufacture for Europe, etc., as regards Britain. About one million sterling of this produce, which in former years was shipped to Britain, was last year sent to the States direct from Manila. Not content with this, the Americans interested in the trade have swamped the producing market in those islands, or, at all events, they have managed to produce large supplies of the fibre in order to lower prices to the detriment of British firms, who are the parties chiefly interested in present stocks; meanwhile the negotiations between London and Washington drag their slow course. New Zealand hemp, not so strong as Manila, but a competitor against that fibre, is largely used in America, but Jonathan is as free in that market to buy and sell as any house. Free Trade or Fair Trade,

we have thrown away our weapons of offence, and America thanks us heartily for our invitations to trade in British colonies, while she shuts the Briton out of Cuba and the Philippines."

On which The Textile Mercury says: We should be glad to learn from any of the Free Trade zealots of the Manchester Chamber of Commerce how this question can be dealt with, effectively and satisfactorily, under our present Free Trade policy. By "satisfactorily" must be understood—with a result satisfactory to, the British rope-makers affected. It will hardly be a satisfactory reply on the part of the zealots to say of our rope-making industry what Cobden said of our silk manufacture—"Let it die!" We believe, however, that the country is in the mood to use that phrase in regard to irrational and hide-bound Free Trade.

PATENT LAW AMENDMENT REQUIRED.

We trust the present session of the Dominion Parliament will not be allowed to pass without the patent law being amended in the direction of doing away with an injustice which was brought to light in the case of *Power vs. Griffin*, recently decided in the Supreme Court, and which we referred to at the time. The Supreme Court holds that as a condition of preserving his patent rights a patentee is bound to manufacture the article in Canada within two years from the date of the issue of his patent, that the Commissioner of Patents may grant only one extension, that all extensions which have been granted beyond the first are invalid, and the court questions whether any extensions granted by an acting Deputy Commissioner are valid. This is no doubt a correct interpretation of the letter of the law, but it reverses the interpretations by the courts during the last twenty-five years, and it inflicts serious injury upon patentees who have relied upon those interpretations. Its effect must be to nullify a great number of Canadian patents.

In the past the Patent Office has taken a broad view and has exercised a wise discretion in the granting of extensions and has been upheld by the courts in so doing. Many inventions are patented for which in the nature of things there is no immediate or constant demand, and the spirit of the law is complied with when the patentee is prepared to meet the demand as it arises. The case seems to be one for prompt action by parliament, and the relief might well be made retroactive. Many textile patents are affected.

WILL WE HAVE MORE PROTECTION?

Parliament having assembled, Canadian manufacturers, of woolen and cotton goods more especially, are looking forward hopefully to the prospects of further protection to relieve them from the disability under which they labor under the terms of the present preferential tariff. The Canadian Manufacturers' Association is doing all it can to have the tariff amended, but what the intentions of the Government may be it is impossible to conjecture. In such matters no announcement can be made in advance, and what will be done cannot be known till the Budget Speech is delivered, which will probably happen before the next issue of The Journal.

A. F. Gault, president of the Canadian Cotton Co., evidently expects that some relief will be granted. Speaking of the subject recently he remarked: "The Manchester school have made a dead set for the Canadian market, and are accepting orders at figures below those they are quoting on the home market. One buyer, who has been here for some weeks past, has just gone back with orders for over \$100,000. The shirt trade here are taking advantage of the low quotations, and have ordered heavily on the British market. If some more protection is not accorded the cotton industry it is difficult to say what will happen. We employ thousands of hands, but we cannot go on competing against outside competition with cheaper labor than we have." Heretofore, according to Mr. Gault, the competition was chiefly felt in white cottons, but now the colored mills are also beginning to feel the strain. "I feel convinced," he says, "that Parliament will appreciate the situation, and take such steps as are necessary to conserve to Canada these industries, which have done so much in building up the trade of the country."

If Mr. Gault's anticipations are realized it will not be long before we will have to congratulate those engaged in the textile trades on their emancipation from the position they have occupied for some time, and which has so seriously handicapped them in a market which they should control. But we are not yet quite out of the woods.

—Liverpool and Manchester, hitherto deadly rivals in trade, have united to promote the growth of cotton within the British Empire, and are supporting the British Cotton Growing Association, which has commenced operations on the west coast of Africa, and will shortly do so in British East and Central Africa, the Soudan and the West Indies.

—The manufacturers of rubber goods in Canada are just as anxious for increased protection as those in other textile lines. The cost of producing this class of goods has increased considerably of late. The effect is felt in dividends. The rubber interests have combined, not to form an association, but to act in harmony in furthering their mutual interests. The disability of the rubber goods people arises however, not under the preferential tariff, but because Canada is made a slaughter market by the United States, which is done notwithstanding a 25 per cent. duty.

—Reports from the United States show that the outlook for woolen and worsted manufactures—particularly the latter—is not bright. There appears to be no domestic cause for this except that buyers, both retail and wholesale, are not placing the usual orders, and are taking advantage of any sign of weakness on the part of the manufacturer to break prices, and a general break in prices is what the United States manufacturers fear just now. But an external cause is operating to affect the situation, and that is that the U S imports of worsteds from Great Britain have increased from 1 670,000 yards in January, 1902, to 2,547,000 yards in January, 1903, and woolen imports from Great Britain increased from 256,700 yards in January, 1902, to 407,400 yards in January, 1903.

—Writers in the German textile papers are not pleased with the new German tariff, which, by increasing the duties on foodstuffs and other articles that must be imported to a greater or less extent, will raise the cost of living to skilled and unskilled workmen alike, and by forcing up the scale of wages will also force up the price of German goods. Thus Germany's foreign trade will be crippled at a time when the profits of that trade are most needed, and thus the prohibitively high tariff policy of that country is likely to prove the killing of the goose that laid the golden egg. Russia has just fixed her tariff laws so that she can retaliate upon Germany at any time, and this powerful nation's attitude makes Germany's tariff move a still more dangerous one for her own manufacturers.

—The Boston Journal of Commerce complains of another bill which is before the Massachusetts legislature, and which it thinks will interfere with textile manufacturing. The cotton manufacturers of the state—and the world—have been using some

materials which, if employed in excess, might tend to poison some persons, but the Journal alleges not in sufficient quantity to cause any harm. Take bichromate of potash for instance. It does not dispute the fact that a good stiff dose of that substance might injure the health of a person, but many of the mills have been using the material for over thirty years without any apparent ill effects. The bill proposes an investigation into the matter, with a prohibition of their use if they should be found injurious. We do not agree with our contemporary. The use of injurious materials should be prohibited, even if it causes some inconvenience. Less harmful materials can doubtless be found.

—A scheme is now being worked out between Russian cotton manufacturers and Chinese merchants at Newchwang to imitate United States cottons and put them on the Chinese market at lower prices than the genuine article could be sold for. The scheme is causing such concern in the United States among makers of goods for the China trade that the department of the Secretary of State is being implored to do something, if only to try to stop the imitation of United States trade marks on the goods. The question is not without interest to Canadian cotton manufacturers, who send to China large quantities of Canadian goods of the same class as sent by United States mills. We presume that as the United States trade is so much larger than that of Canada, the Canadian manufacturers can do as the little strawberry girl at the street corner—let her big sister do the shouting and then, when a sale is in sight join in with her "me too!"

—At the annual meeting of the Silk Association of Great Britain and Ireland, held last month, mention was made of the circumstance that Sir Thomas Wardle, the president, was about to visit India to study Indian silk culture on the spot. It is only about seven years ago that Sir Thomas directed attention to the remarkable qualities of samples of silk grown in Cashmere, and he succeeded in enlisting the interest of the Government of India with the result that while only a few years ago not a single cocoon was exported, now 200 bales were shipped, and at the present time 30,000 people are employed in the silk industry of Cashmere, the financial returns of the business being of a most satisfactory character. From such facts as these, and from what was said in last issue of the cotton growing business there are many opportunities of

extending the cultivation of raw materials for the textile trades in the various British colonies and dependencies.

—A pretty big aggregation is the American Woolen Co., a syndicate which was formed not long since with the ambition of getting control of the United States woolen industry. The syndicate obtained by lease or purchase 33 large woolen mills, and has had the good sense to stop at that achievement and, apparently to confine its ambition for the future chiefly to reorganizing and re-equipping the mills it has. Its success in this direction seems to bear out the arguments used in this Journal last month, that improved machinery and up-to-date managers stand first among the needs of woolen mills on this side of the ocean. The annual meeting of the company in question was held this month at Jersey City, when it was shown that since the syndicate was organized improved methods and machinery have been introduced to such an extent as to double the total capacity of the mills. Although the profits were not also doubled they were increased till the company has shown net profits for the year of \$3,227,667, and increased its dividends to \$4,611,076. The total production of the year was \$35,600,000, or over \$10,000,000 a year more than when the company acquired the mills. As an object lesson for Canadian mills we may mention that the company spent last year on new machinery and improvements no less than \$2,502,066, or a total since its organization of \$5,597,940. These improvements, to quote the language of the report, were considered necessary to insure a large output at the lowest cost of production. Among the improvements referred to is a new mill 700 feet long, with nine acres of floor space, and laid out for 1,000 looms capable of producing \$7,000,000 worth of goods a year. It speaks well for the management that while these costly improvements have been carried out the special claims of the company's preferred stock have been met right along, and the net earnings referred to have been paid; but it shows what can be done by keeping in the front in obtaining the best machinery and adopting the best methods.

DEGREASING WOOL—A VALUABLE WASTE SAVED BY DOING IT.

The process employed for degreasing wool is that of treating the wool in close digesters with the volatile solvents until a complete extraction is effected. One of the principal features of the process is the employment of compressed

gas as a forcing or motive power to circulate the solvent through the wool under treatment. It is used to press the liquid solvent out of the wool as well as to blow out of it such solvent as has not been removed by pressure. It is also used as a heat-carrying medium to the wool and as a solvent vapor-carrying medium from the wool. It is furthermore used as an atmosphere wherein to carry on the extracting operation, both for covering the solvents in the reservoirs and for taking the place of the solvent removed from any part of the apparatus, and thus prevents the ignition of the solvent vapors by any electric or other spark which might accidentally be communicated to it; and since the gas is always moved in a closed circuit, it prevents the loss of solvent vapors, and can be used repeatedly without limit. It may be explained that the gas referred to by the inventor is an inert gas, or one which does not form explosive compounds with the vapors of the solvent used or with atmospheric air.

The great importance and growing appreciation of the solvent process of cleaning wool and preparing it for dyeing and spinning permits of special and more extended observations. Scientists and technical experts, who have studied the wool fibre, are unanimous in the opinion that it should be freed from its fat by means of volatile solvents, and not by the use of soapy and alkaline solutions, as has been heretofore the universal practice. The earlier attempts to carry on the process of degreasing wool by means of volatile solvents were none of them successful from a commercial standpoint, although the rationality of the process was fully demonstrated in almost every instance by the superior condition of the wool thus treated. The problem was a very complex one to solve, requiring considerable mechanical engineering skill, knowledge of the wool fibre of chemistry, due regard for the healthfulness and safety of the operation, and the blending of all these requisites into a system, the result of which would show a saving which could be expressed in shillings and pence.

In 1895 a plant for treating wool by the solvent process was put in operation by the Arlington mills of Lawrence, Mass., and was the first plant of its kind in the world that was commercially and technically successful. This plant has the capacity of degreasing 50,000 pounds of wool every ten hours, and has been run to its full limit ever since it was started. After an experience of six years with the solvent process, the Arlington mills built a new plant to treat wool by this process which has the capacity of degreasing from 200,000 to 250,000 pounds of wool every ten hours. The saving effected by the solvent process to establishments that degrease and work their own wool for worsted purposes can be expressed in round numbers as averaging one penny per pound, figuring on the greasy wool. This saving is made in the cost of the soap, which is entirely dispensed with by the new process; in a greater yield of the wool fibre, since none of it is dissolved by soap and alkali, in a larger proportion of top to noil, because the wool, being free from any felting, cards and combs freely without breaking off the fibres or the making of nibs; in a larger production on cards, combs, drawing and spinning machinery; in the superior softness and appearance of the finished product; in the wool fat recovered, and in the potash recovered. The cost of the degreasing operation, including labor, solvent, power, interest, depreciation, etc., is, it is estimated, more than covered by the soap saved.

The average amount of fat taken out of such wools as are worked in the United States is 15 per cent. It is safe to

say that from \$2,000,000 to \$3,000,000 worth of wool fat and potash are run down the streams and wasted annually in this country. If this wool fat, instead of being wasted, were recovered, refined, or separated into its constituent parts, its value would increase at least fivefold, and its uses would multiply.—Boston Journal of Commerce.

Foreign Textile Centres

Belfast.—A good tone prevails throughout the market, and though there is still an absence of briskness, there is a steadily increasing trade passing. The spinning end is steady; orders continue to absorb the current production, leaving producers heavily foresold. Tow welts meet with a little more attention. Range of fine welts remain still flat; the manufacturing branch is well supported, and prices very firm, with upward tendency, though it is very difficult to get any advance. White goods for home markets move fairly well with increasing enquiry. Shipping orders keep coming in to a satisfactory extent, and prospects are very hopeful.

Dundee.—The jute market is again stronger, and the same is true of yarns. The manufacturers complain bitterly, as they say they cannot make any profit out of hessians, with yarn at present prices. The fact that the Indian mills are paying 10 per cent. and constantly extending is causing great anxiety regarding the future of the Scottish jute industry. There has been a little more doing in shipping yarns, so that good jute yarn is firm at 1s. 8d. for 8 lb. Flax is firmer. In linens a number of large Government orders have been placed. These have been taken chiefly by firms who are both spinners and weavers, and the orders, therefore, have not greatly influenced the yarn trade. Jute, twines and cords are a little dearer and are in good demand.

Kidderminster.—The steady demand for carpet continues, and, although there are complaints in a few quarters, mainly of the Brussels trade, most of the mills have enough to do, and a few are working overtime. Deliveries have been on a large scale, and the constant repeat orders go to show that retailers are not overstocked. The yarn market is the turn firmer, prices have been talked down, but the smallest enquiry shows that yarns, if not at the extreme quotations, are firm at a very substantial advance. Consumption locally is fair, and the demand for the Continent is good.

Leeds.—Considerable difficulty is experienced in obtaining business on spring account, and apart from the fact that orders were placed earlier than usual, owing to the advancing wool market and that demand was thereby anticipated to a considerable extent, the lull is in some measure ascribed to the hope of merchants that current terms will be modified to their advantage. Though competition on the part of manufacturers is becoming keener, there is no disposition as yet to make concessions. A good general business is being done from stock, tweeds, costume cloths, and coverts being in considerable request. Novelties in women's designs command a ready sale. The clothing factories are for the most part doing a brisk spring business. The export of ready made is on fairly satisfactory lines, especially to the Cape.

Leicester.—The deliveries in the yarn market are on a large scale, but the tone is less buoyant, and new contracts are

more difficult to book. A full season's business is being done in choice hosiery fabrics and fancy goods.

Manchester.—A sharp advance in cotton has had the effect of bringing business very largely to a standstill. All considerable offers were necessarily withdrawn, as it was perfectly useless endeavoring to place them. Those with whom they originated would not sufficiently improve them to afford even a basis of negotiation. With the good demand that has been running for some time, and the disappointing nature of the crop, both as regards quantity and quality, cotton has been placed in a strong position. This is just the opportunity the speculator seeks. He has helped up prices all he knew how. But how much of the advance is due to the natural forces, and how much to speculators' manipulation, it is impossible to say. Uncertainty quite paralyses business. Values have been very unstable, but the tendency is upwards.

Nottingham.—There has been a steady decrease in practically all branches of the hosiery trade since opening of this month. This falling off, usual at this time of the year, has no doubt been accentuated by prevailing high prices of all classes of yarns. To make matters worse from the manufacturers' point of view, there appeared to be a little weakness at the close of January sales, which really was not a true weakening of prices, inasmuch as it was a levelling down of high prices paid at November sales for wool which came out in such bad condition, due to the effects of the late drought that buyers were wrong in their calculation up to as much as 10 per cent. The market, however, seems to be recovering, and manufacturers are hopeful that matters will begin to improve now that prices seem to be approaching a fair steady basis. Some houses doing shipping business have been fairly well employed on cotton shirts and pants, but high prices are checking any expansion of business. There is a decreased demand for cashmere and merino goods. Special lines in plain black and openwork hose are in fair request, and a good demand for merino and cashmere half-hose exists. Embroidered silk hose in black, white and colors attracts little enquiry. Manufacturers of elastic goods report steady trade in this line.

Rochdale.—The flannel trade is quiet but steady on the improved feeling in the wool market, and manufacturers are more disposed to quote for the next season. Merchants, however, are reluctant to pay the full advance, and although manufacturers' intentions are not apparent, business is reported at a compromise. The tone is cheerful, and machinery is very well employed.

The Montreal Cotton Company, has had an excellent year, as shown at the last annual meeting, the profits amounting to \$200,000, which is equal to 14.28½ per cent. The following were elected directors for the ensuing year: A. F. Gault, Charles Garth, Jacques Grenier, Hon. J. K. Ward, S. H. Ewing, R. R. Stevenson and S. Finley. A. F. Gault was re-elected president, and Chas. Garth, vice-president.

Renfrew is talking of a knitting factory, to employ about 30 hands. The old Roberts factory can be had with the land for \$3,500, or the upper flat of the creamery building can be obtained at a cost of from \$2,000 to \$4,000. Mr. Williams, the promoter, proposes to move his plant, which he values at \$7,000, from Collingwood, and to manufacture hosiery and mitts, the plant being able to turn out \$35,000 worth of goods a year. The Renfrew papers are advertising for 40 girls for the factory.

OLD-TIME DYEING METHODS.

The study of history, and especially ancient history, together with old-time manners and customs, affords a special pleasure to many readers. The antiquarian derives a pleasure distinctly his own; and his enjoyment is, perhaps, greatly increased by the glamor of romance surrounding the robes of the past, and the interesting comparisons with present-day realities. Not alone the professional antiquarian or hobbyist, but every profession or trade may derive instruction as well as pleasure from the study of the works of their old-time predecessors. Take the art of dyeing.

This art has existed from time immemorial. In the dim vista of the past many of its secrets are hidden, but by historical enquiry much may be gathered of the old-time methods of dyers, who sought for "chromatic mysteries lurking in shrubs of their deserts, the vine leaves and blossoms," and the molluscs of the sea. It was no doubt the very important and honorable position of the dyers of those days, the secrets of whose calling were handed down from father to son, that necessitated our enlightenment being largely dependent upon natural inferences and the obvious recourse they had, even in those days, to the application of chemical principles—to-day the same as then. In the light of present-day methods, synthetic color-chemistry has made all things plain; but the art of the dyer of the Orient was "his secret and glory."

Imitation, and the desire to reproduce what Nature has afforded to fascinate the senses, are among the first yearnings of our intellectual nature. The tints of the rainbow, the hues of the flowers, the reflection and blending of the colors on earth and sky, pointed us to the first principles and rebuked all tendency to inharmonious blending. Nature supplied us with the first color materials, leaving to our intelligence their methods of application. Man, in his savage state (as instance the Maoris of New Zealand), decorated his body with decoctions of leaves, barks, flowers, roots, etc. Earth and mud containing iron and alumina gave a greater permanence.

But the evolution of dyeing was a natural process. Joseph, with his coat of many colors, lived in more advanced times. The Persians traced the earliest beginnings of the dyer's art to the Babylonians and Chaldeans, and the production of a bright glowing scarlet, or red, the famous Tyrian purple—the emblem of royalty—was "the secret and glory" of the Oriental dyer, and the excellence of his handiwork placed him in a higher position in the State than even the wealthy Arabian merchants.

Tyrian purple, discovered in Tyre about 1500 B.C., was obtained from the shellfish belonging to the Murex (genus of Marine, Gasteropods, class of Buckies, Cone shells and Cowries, but especially *M. trunculus* and *M. brandaris*), abundant on the Eastern Mediterranean. We generally date from the introduction of this coloring matter the beginning of the art of dyeing, though, probably, the employment of sheep's blood, from which a rich and permanent vermilion was obtained by some secret process, may be traced to still earlier times. So costly was Tyrian purple in the days of Augustus that one pound was sold for £36. In later times it was dyed in Tarsus and Alexandria, introduced into Phœnicia and Egypt by the Arabian merchants by way of the Persian Gulf. It is well to remember that in those ancient days white wool came from Syria and Arabia (Ezek. xxvii. 18), flax from Egypt, and silk from Persia. Among many of the lost arts in color production may be mentioned the

exquisite blue of old Persian tiles, illuminated manuscripts, and rugs. It was not indigo, though the first introduction of indigo cannot be even approximately fixed.

The ancient Egyptians used indigo madder, and saffron, though these were probably introduced by the Arabian and Greek merchants. Pliny's account dates their employment at least 1,000 B.C. The earliest examples are, of course, to be found in mummy cloths and bindings. These cloths are of wonderful texture and durability, and measure as much as 8 ft. by 4 ft. The older cloths were colored with saffron, but the Greeks introduced more gaudy hues. For a long time these cloths were supposed to be cotton; but it has been proved beyond doubt that they are linen made from the Egyptian flax, of which material were also made towels, awnings, and sail-cloth.

Another old dyestuff employed by the Oriental dyer (now supplanted by Mexican cochineal), was Kermes, a variety of coccus insect found upon oak trees about the Mediterranean, and said to be even more permanent than cochineal, but less brilliant. In combination with madder, it produces scarlet, cherry, and various shades of pink. But even these antiquated dyers must move with the times, though slowly, and now the basis for reds are Campeche wood and Brazil wood.

Archil, or Orchil, obtained from various lichens found upon the rocks near the sea, and produced by putrefaction and fermentation, was largely used for dyeing silks in Persia. Its coloring matter is orcein, and the finest qualities are now derived from the "Archil plant" (*Rocella tinctoria* and *fuciformis*), found in the Cape Verde Islands, the Canaries, and Levant. The Greek and Roman dyers made great headway up to the fifth century of our era, though much was lost during the succeeding centuries of barbarism. But Italy did not suffer so much from the troubles of the "dark ages," and rapid strides were made upon the revival of trade in the thirteenth century, when Oriental products were imported in large quantities.

It was at this stage in the development of dyeing in Europe (1429), that the first book on dyeing was published at Venice by a Florentine, named Rucellai, entitled, "Mariogola dell'Arte de Tintori," in which the method of dyeing purple Archil dye "from certain lichens from Asia Minor" was given as new discovery. [From these lichens are also obtained cudbear and litmus—but this brings us to a more modern aspect of the subject.

To return to earlier times, the other vegetable coloring matters used were Persian berries for yellows, which though indigenous to Asia Minor, thrived better in Persia, and produced fuller shades. They also had then, as now, turmeric, the extract of the East Indian root curcuma, and from saffron and sumac roots. The identity of this color is easily determined by the application of an alkaline solution, which turns it brown. Greens were produced with indigo and yellows. With buckthorn (or rhamnis) Chinese greens are obtained; and with turmeric and Persian berries intermediate shades, both bright and dull. Browns were produced with madder over indigo, and deep Persian blues from indigo over pure madder. These processes are followed to-day. The old-fashioned mordants, before the use of borax, tartar, or copperas, etc., was known, were valencia, pomegranate rinds, sumac, divi-divi, and barks.

But all these vegetable coloring matters did not exhaust the list of decoctions that the dyer of the Orient included in his hereditary recipes, for he also extracted wonderful chromatic virtues from ivy, myrtle, vine and mulberry leaves, myrabolams, laurel, angelica berries, artichokes, thistles,

capers, etc. Mumford, in his valuable work on "Oriental Rugs," says that the "reds most common in Persian carpets are produced by combining alum water, grape juice, and a decoction of madder, and drying in a moderate sun. The flowers of madder are steeped, and the liquid fermented to secure extraordinary shades of color." He also mentions the method of producing popular shades of violet. The dyer starts with an equal proportion of milk and water, then madder is added in certain quantities, and, lastly, the whole converted by sour grape juice.

There is no doubt that the wonderfully bright, solid and lasting shades obtained by the old-time and by the present day Eastern dyers are not only attributable to the exclusive use of vegetable dyestuffs and mordants, but also to the genius of the dyer, unhampered by chemical formulae or the exigencies of competition, that are apt to breed carelessness through haste and inattention to those apparently small matters that some people attribute as the secret of genius. Time, atmosphere, light, water, and the inborn appreciation of the beauties of harmonious color tints that were ever about him, were the Oriental dyer's heritage.

Modern methods and German anilines, however, threaten to supplant the old-time natural products even in Persian dye houses, and has done so to a great extent in India. The punishment in Persia for using anilines was to have the right hand cut off; and the mandate of the present Shah, promulgated on January 1st, 1900, against their use, with pains and penalties of confiscation, fine and imprisonment, are signs of the times. But such laws are certain to lapse into desuetude with the onward march of synthetic color-chemistry that has already given us synthetic alizarin and synthetic indigo.--D. M. Young, in the Textile Journal.

THE CARE OF SHUTTLES.

Shuttles should receive as much if not more attention than any other part of a loom, for upon them to a great extent depends a good production. Production is not only what the manufacturer wants, but also helps to keep the weaver in good spirits, as good production means the work running good, and the right kind of shuttles with the right kind of care can do as much toward this as any other part of a loom. Shuttles are not always selected to do the work they were made for. Sometimes the buyer will get a job lot of shuttles quite cheap from some mill that has shut down and thinks he has struck a bargain, but if they are not adapted for the work they are put on, although they may seem to be running all right, it will be at a greater expense than if the inexperienced buyer had bought the right kind in the first place and paid the regular price. The first cost is not everything. A shuttle that will give good results in a 30-inch loom will prove unsatisfactory in a 40-inch loom. Shuttles for print looms should not be over 13 in. long, about 1 1/2 in. wide, and 1 3/8 in. deep and weigh about 7 oz. For a 40 in. loom a shuttle should be about 14 in. long, 1 3/4 in. wide and 1 1/2 in. deep and weigh about 8 1/2 oz. For wide sheeting looms the shuttle should be at least 17 in. long, 2 in. wide and deep and weigh about 16 ounces. The shuttle box should be long enough to allow a good easy pick, which will do its part toward making the life of the shuttle longer. When the shuttles are matched they should be of an equal weight, as a light and heavy shuttle running in the same loom will make lots of trouble for weaver and fixer until the fault is remedied. At the same time the production is falling behind. The power that will drive the heavy shuttle

into the box all right will not be sufficient for the light one, and the result is the loom keeps "knocking off." Then, again, if power enough is put on the light one to drive that into the box, when the heavy one is put in it will rebound. Then the fixer to get over this evil will tighten up the box, which will give more friction and destroys the life of the shuttle. Just enough power to get the shuttle into the box is all that is required. Shuttles should balance in their centres, which require the ends to be of equal weight. The blow of the picker should be short and quick, the higher the speed of the loom the greater the necessity for a quick pick. A shuttle should travel in a straight line from box to box, as other than this will cause it to wear and thereby damage the warp yarn.--R. T. in Fibre and Fabric.

HOW TO BLEACH KNIT GOODS.

One of the hardest problems which confront the bleacher of knit goods is to find a suitable agent to produce a satisfactory white without damaging the goods. The requirements are very difficult. By far the larger quantity of knit goods is made of mixtures of animal and vegetable fibres, such as wool, cotton, silk or linen, and the task of the bleacher is to find a process which will allow the bleaching of the fabric in one operation. Three ways are open to him, and the purpose of this article is to point out the safest and most satisfactory, if not the cheapest.

If we take for example an extreme case, say a mixture of 90 per cent. cotton and 10 per cent. wool; the first way, that of bleaching with chloride of lime will suggest itself, but on further thought it will be apparent the wool will suffer in strength and color. In other words, the lime bleach is not applicable to wool mixtures. If we reverse the proposition and take a fabric composed of 90 per cent. wool and 10 per cent. cotton the sulphuring naturally occurs to us for bleaching such material. Again, however, second thought makes us hesitate, because we know that sulphuric acid (oil vitriol), the resultant of sulphur smoke or the bisulphite bath, is the deadly enemy of cotton fibre; that is to say the goods may be slowly carbonized by the action of acid remaining in the fibres. Moreover, the consumer is asking that the disagreeable smell of the sulphur treatment be avoided, and furthermore that the color of the goods he buys remains for a reasonable length of time as it looked when he bought the goods. We all know that this is impossible where sulphurous acid in any of its forms is employed. The white will gradually again turn yellow; the dyeings will become streaky, due to decomposition of the coloring matter by the uneliminated acid; the goods have been tendered, inappreciably at first, but very apparently later on by the disintegration of the cotton fibre due to the acid.

In both of the above cases the bleacher will then consider the third way open to him, that of peroxide bleaching, and will find that this oxidizing of the coloring matter in the fibres of the goods can in no possible way—at least so Hummel, Sansone and other authorities tell us—be injured by the treatment. As to smell, none can remain since there is none to start with.

Regarding permanency of color by the peroxide process, the goods are bleached through the agency of oxygen which combines with the coloring matter to form soluble compounds, which are washed out in the subsequent rinsings; thus the color base is absolutely removed, and no "yellowing" with age can possibly take place, since no by-products of the bleaching process remain in the fabric. Any delicate

ment to which it has been dyed must necessarily be permanent, if the dyes used were good. Thus it would appear that in the third way, the bleaching with peroxide of sodium, practically all objections of the former processes are overcome, with the additional advantages of reliability, permanency and satisfaction.—Hosiery Trade Journal.

CARDING ENGINES—SOME POINTS REGARDING THE CLOTHING.

In all carding machines the fineness of the card clothing is graduated throughout, beginning with the coarsest in the first cylinders where the wires have to withstand the pull of large lumps or locks of wool and becoming gradually finer as the wool gets better opened out, when the wires have only to withstand the pull of a few individual fibres. This graduation of the fineness causes the whole of the clothing to wear out at about an even rate, so that by the time the clothing of the first cylinders is worn out or worn down so far as to be useless most of the other cylinders will also require the clothing renewed, and by regulating the strength of the wire and the fineness of the clothing according to the position of the machine and therefore according to the nature of the work it has to do, this object can be fairly well attained. The life of a set of card clothing depends so much upon individual conditions that it is difficult to give an average, but with reasonable care it should last from six to eight years, and under very favorable conditions ten years, but a great deal depends upon the evenness of temperature of the carding room and its freedom from damp, and also upon the care with which the various rollers and cylinders are ground, for the temper of the wire can easily be spoilt in the grinding operation. If the wire is too hard in the first place, it is very brittle, and when ground for the first time the wire will break off and drop out to a considerable extent, and in such a case the whole card usually has to be reclothed.

Care should be exercised in the card room that no droppings, from condensation of moisture on the roof, should be allowed to fall on the cards (especially when standing), because such drops will be certain to affect the clothing by causing it to rust, and in fine clothing the wires are so very thin that a very small amount of rust eats right through the wire and causes it to break off, and the small bald spots sometimes seen on the card cylinders are usually caused by such droppings of water from the roof.

For the first lick-in a fairly strong wire is generally required, and the usual round wire from which most of the ordinary card clothing is made is not found to be so successful in coarse counts (say below 60s 6s), as it is not strong enough for the work it has to do, and it is, therefore, often replaced by "diamond point clothing," which is made from wire which is a long oval or double convex in section instead of round, and with fairly sharp edges at the ends of the oval, and this is so placed in the clothing that the long section of the wire is in a line with the direction of revolution with the cylinder, and it is therefore much stronger in the direction of its work than the round wire, for the same weight of wire, and when it is ground at an angle the top surface or point produced is a much elongated oval terminating in a fairly sharp and strong point, which obtains a much better hold upon the wool than the ordinary chisel point on the round with clothing. In order to get a still stiffer clothing for the first lickers-in and dividers, this double convex wire (diamond point) is often inserted in leather fillet foundation instead of rubber, and some carders

much prefer this class of clothing to that of Garnett wire; but this is one of the questions upon which much difference of opinion exists, and which depends largely upon the individual fancy of the card managers. The main advantage of Garnett wire (apart from its strength) seems to be in the question of burring, because, owing to the difficulty of the burrs penetrating into the Garnett wire clothing they lie more upon the surface, and are therefore more easily knocked off by the burring rollers; but, on the other hand, the wire does not obtain the same hold upon the wool that diamond point wire does, and therefore more wool is taken off with the burrs, thus producing a greater waste of wool with this method of burring. With the diamond point wire less wool is taken off, but at the same time the burrs cannot be got out so well, as they tend to get down between the wires more than they do in the case of Garnett wire, thus missing the beating blades of the burring rollers, therefore the wool is not as free from burrs. The objection to the Garnett wire is that it tends to fill or choke up with grease and dirt, etc., and the hardheads (small yellow seeds which are very prevalent in some wools) are liable to become embedded in the teeth, and as they are as hard as wood or dried peas, they take a great deal of removing when they get wedged in. Another great disadvantage is caused by there being no method of sharpening it, and when it gets too blunt to work properly it has to be replaced.

The bend or knee in the wire of ordinary card clothing must be carefully regulated, as well as the angle at which the wire is inserted in the foundation, both of which points affect the strength of the clothing and the suitability for its work. The English card clothing makers usually place the knee or bend from one-half to two-thirds of the way down from the point; whereas the Continental makers have the bend from one-third to halfway down, making the latter type of clothing softer than the former, that is, slightly less stiff for the same gauges of wire, etc. The point of the wire should be approximately vertically over the place at which it emerges from the foundation material. The angle at which the bend is made will affect the keenness of the clothing in catching the wool, as the greater the angle, the greater the degree of point presented to the wool. A double bend in the wire has been tried with the object of removing the strain from the foundation material to a considerable extent, but it has not been found advantageous; and a perfectly straight wire set slightly at an angle through the foundation has been used successfully for the fancy, but has not been generally adopted. The length and stiffness of the wires is varied according to the class of material to be dealt with, but it can be taken as a general axiom that the shorter the material the stiffer the card clothing must be, thus the card wires for woolen and mungo are set in leather foundations and have comparatively little spring, and the spaces between the wires are filled up with short oily fibre to the extent of about half of their depth, thereby still further tending to reduce their springiness.—Textile Recorder.

WARP AND WEFT AND THEIR RELATION TO CLOTH

Anyone at all conversant with the art and science of cloth manufacture must before now have seen what an important part warp and weft play in the production of the woven article. These are days of ingenuity and skill in the weaving shed, but I have never yet come across a man who has been able to alter very much the surface effect of a cloth by the various manipulations of warp and weft which de-

signers and loom timers are accustomed to. Warp and weft are the two leading commodities of every weave loom, hence a few notes about warp and weft in their relation to cloth production will be of interest.

At no time in the history of the world has there been a greater variety of textile fabric produced than there is being produced to-day, and probably there never was a greater demand for more variety, and for something fresh. In many instances this demand for something new has been met by the manufacturer reviving some of the classes of cloth that were in great demand 50 or 60 years ago, such as lappets, etc. In many and varied ways the enterprising manufacturer (as distinguished from the old-fashioned one) seizes hold of every new idea and tries to find out the effect on the market, and in this way China grass (rhea), and a variety of other fibrous plants have been tried, both singly and in conjunction with older established fibres, and now a process known as mercerizing, in which the yarn or cloth is saturated with a solution of caustic soda or other alkali, and quickly rinsed with water, is being somewhat extensively practised. This process not only greatly strengthens the yarn or fabric treated, but imparts a silky appearance to cotton, and also in the case of dyed or colored goods improves their lustre. One inventor has actually produced a somewhat serviceable fibre from gelatine.

Now it is obvious that when the manufacturer or designer wishes to produce a fabric of a particular class he must have a good idea as to the quality, counts, color, and other peculiarities of the yarn and weft that will be most suitable for his purpose. Notwithstanding this fact very novel effects have frequently been produced by experimenting, and sometimes by accident. Upon one occasion two half sets of cards, each for a different pattern, were connected with a double-cylinder jacquard loom, and as the mistake was not discovered till the piece was woven, the man in charge was blamed. The enterprising salesman, however, saw something in the cloth, had it bleached and finished, and gave it a striking name, and introduced it as the latest out, the consequence being a number of large orders. However, accidents are not to be relied upon as being an effectual means of procuring orders, and great care and a considerable amount of experience are generally required to produce a salable article.

One of the chief considerations is the relative counts of warp and weft, and the proportion of each as regards amount, or, in other words, the number of ends and picks per inch. The standard plain cloths are those in which the ends and picks per inch (on the counter) are equal, and in which the diameters of warp and weft threads are equal, and in which the spaces between the threads are equal to the diameter of the threads. The above is not claimed to be the best cloth that is woven, but is simply given as the standard in regard to which other cloths may be considered. Now, if we increase the number of picks in the above cloth, the number of ends being the same, the spaces between the picks will be reduced in size, and the weft will be more apparent than the warp threads, which is therefore said to predominate over the warp. From this we see that the material which is required to be shown up must be greatest in amount; this should also be the better as regards quality, etc. Some classes of cloth have either the warp or weft threads completely hidden, owing partially to the wave of the fabrics, and partially to the amount of one material being much greater than the other.

A twill, owing to its weave, is capable of containing more material than a plain cloth, and as the intersections of warp with weft are fewer than in a plain cloth, any difference there may be in the relative amount of warp or weft is more easily

perceived. A satin is a warp-faced fabric, whilst a sateen is weft-faced. In the former the warp predominates greatly over the weft, which is completely hidden, whilst in sateens of the better class the weft is most in evidence. To improve the quality of any description of cloth, we must use finer material, and more of it; thus if a cloth is made of 60 ends and picks per inch, and we wish to improve it by weaving 80 ends and picks per inch, unless we use finer yarn and weft we shall have a bulkier cloth and a more expensive one, but not one which may be considered as improved in quality.—By a Lancashire Weaver.

A WOOL-SCOURING MACHINE IN AUSTRALIA.

Baynes Bros. are wool scourers at Brisbane, Australia, and have recently set up a new wool-scouring machine. A reporter for the Queensland Grazier visited their establishment and wrote up the following experience: Messrs. Baynes Bros. have installed a four-bowl wool-scouring machine at their works at Belmont. With their old plant they held the palm as wool scourers in Queensland, but it consumed a fearful lot of water and teased the wool and ran up a big wages bill. Water they had in plenty; there was an inexhaustible supply of it in Doughboy creek, on which their works were situated; at least it was considered inexhaustible; but early in the year the pump interviewed the management and said: There's no water in the creek, and I am a mechanical Othello, my occupation's gone, and the works had to stop until it rained—and it wouldn't rain. Tom Stoddart manages the scour for Baynes Bros., an old trusted servant, who has been with the firm twenty years, and the enforced idleness caused him to fret until it looked as if he was destined for an early grave. He declared doing nothing made him footsore, and that he was ashamed to come into town; he seemed to have the idea that he was the cause of the drought, and if something hadn't happened he would have wasted away to a shadow. Then Baynes Bros. made a great move; they imported the latest wool-washing machine in the world with four bowls, and their engineer set it up from the plans. This machine consumes the minimum of water, but it requires some, and Doughboy creek was still a sandy gully. One and a quarter miles away was a spring, and they laid down a two-inch pipe and got the water, and I went out last week to see the new plant in action. The machine is on the walk-in and walk-out principle; dirty wool is fed into one end, and it comes out clean, bright, scoured wool at the other. The machine stands 109 feet over all. The wool goes up the carrier into bowl No. 1; this is an iron tank, 32 feet 6 inches long and about 3 feet wide, and is filled with scouring fluid. The end of the tank is fitted with a powerful turbine pump, which goes 800 revolutions per minute, and ejects a series of streams on the dry wool; then the eccentric agitators, of which there are 37, with 14 teeth in each, lift it along through the fluid and the motion is gentle. One could take an annual bath in bowl No. 1 with advantage, only those teeth would be very inconvenient. There is a perforated false bottom in the bowl made of copper, and jets of water are continually forced through. These teeth are copper and fluted like a bayonet so as to absolutely cause no injury to the fibre. At the end of the bowl the wool goes up a carrier through a set of metal rollers (brass), and into bowl No. 2, where the process is repeated with a different temperature and fresh water, and so on in each bowl until it walks out at the far end of No. 4 clean and white like snow and almost dry. Here it goes on a huge sheet spread on a wide trolley, which runs up a tram-

to the bleaching green. The process is so gentle that the staple is intact, and two fleeces of different qualities will travel through the four bowls, be agitated with the wildness of forks, and then come out intact. I saw Tom Stoddart (with my own eyes), grab two bundles of distinct qualities of wool and grumble that it had been badly classed, and the two qualities were not intermingled. What does he scour with. He says it's soap. I make it myself, says he, and he points to a tub from which he ladles it out with a shovel. It looks like Turkish lolly, and I expect the troops in Macedonia are eating something like it just now. This machine is capable of turning out 100 bales in twenty-four hours, allowing the boys time for lunch and tiffin, and that means that wool buyers who purchase at the Brisbane sales can have their wool scoured and shipped in a few days. You should see Tom Stoddart now with his machine; he's like a society lady with the latest Paris hat, or a major domo in a new uniform, or a juvenile with a lolly stick the size of a rolling pin. This machine is fitted with transmitters, and by their aid the water in No. 4 bowl can be transferred to No. 1 and heated to the right temperature in transit, or it can be transmitted to any of the bowls. See the saving this represents in scouring material, fuel and steam. It's a great machine, and an expert who was doing an independent quiz, said to me: I have seen all the wool-scouring machines in Australia, and this machine is the best of them all. On the green (which is as brown as a berry just now), the great sheets are spread out, and gangs of men toss the snowy fleeces to the breeze, and when dry and bleached the corners of the sheets are gathered up and look like a bundle containing 45 weeks' washing. Then a small gang hoists them on their shoulders and away to the baling room.—Fibre and Fabric.

A NEW LOOSE-REED MOTION FOR LOOMS.

This is an invention by which the shock due to the impact of the reed frame upon the supporting-batten is obviated. This shock is extremely racking to looms and causes them to rapidly deteriorate. The crank on the shaft imparts to the swinging batten the usual positive forward-and-backward motion. The reed, however, in its entirety does not fully partake of the forward motion of the batten, but as the batten moves forward is retracted by a cam which swings the reed on its pivot. When the crank is on a dead-centre and the batten is in its farthest forward beating-up position, the roller drops off the high portion of the cam on to a lower portion and the reed is snapped sharply forward by a spring which has been put under tension by the retraction of the reed. This forward motion of the reed beats up the thread.

THE WORLD'S FUR MARKET.

Leipzig, over in Germany, famous as an ancient university town, is also the fur market of the world. In one way or another nearly the whole fur trade of the world centres there. Even the big market of London is really only a feeder for Leipzig, far more than one-half the furs bought in London are sent on to the German city, where they are again sold to the merchants, who offer them to the consumers. Furs reach Leipzig from all the strange parts of the world, some of which are hardly known to white men except by name. The Alaskan Indians and Esquimaux, Canadian half-breed trappers, Siberian hunters and Australian bush dwellers all work indirectly for the German merchant. Their catches may go through many hands, but they

finally reach Leipzig. The primitive hunters of China and Indo-China, who kill their small fur-bearing game with pointed bamboos and catch it in pitfalls, as they did centuries ago, Tartars and Arabs, Abyssinians and Zulus, all are working for Leipzig. The greatest quantity of furs comes from Bokhara, in Turkestan, which produces almost one million of the beautiful astrachan skins every year. These skins are shipped in a raw state by caravan and over mountains and deserts, through lands where Darius and Alexander fought across the Caspian Sea to Russia. There a railway takes them to the big city of Nijni Novgorod, where most of the skins are dressed and finished. Then they go to Leipzig to be sold. Russia and Siberia send almost all the sable skins that are taken in their immense hunting grounds to Leipzig. Two millions of squirrel skins are shipped to it each year from Russia alone. Thirty thousand foxes and one million lambs are killed annually to supply the demand of the Leipzig fur traders.—New York Commercial.

LESSONS FOR MILL HANDS.

PREPARED BY A COMMITTEE OF THE CANADIAN ASSOCIATION OF STATIONARY ENGINEERS.

Involution is the process of multiplying any number by itself several times. The product is called a power of the number. In order to show how many times the number is to be used, we write a small figure to the right and a little above the number, as 2^2 , this small number is called an exponent. It shows to what power the number is to be raised, as $2 \times 2 \times 2 = 8$. The second power of a number is called its square, $2 \times 2 = 4$; the third power is called the cube, thus $2 \times 2 \times 2 = 8$; $3^2 = 3 \times 3 = 9$, the square or second power of 3; $3^3 = 3 \times 3 \times 3 = 27$, the cube or third power of 3; $3^4 = 3 \times 3 \times 3 \times 3 = 81$, the fourth power of 3; $3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$, the fifth power of 3.

Evolution is the reverse of involution: it is the process of finding the number when some power of the number is given; one of the equal factors which make up a number is called a root of that number. If a certain number is used twice as a factor, in order to produce another number, then the number first mentioned is the square root of the second. If the first number is used three times as a factor it is the cube root of the second number. If used five times it is the fifth root. Thus, 2 is the square root of 4 (for $2 \times 2 = 4$), it is also the cube root of 8, as $2 \times 2 \times 2 = 8$, and the fifth root of 32, as $2 \times 2 \times 2 \times 2 \times 2 = 32$.

The radical sign $\sqrt{\quad}$ placed before a number shows that some root of it is to be taken, which root is shown by the index, which is a small figure placed above and to the left of the radical sign. When no index is written the radical sign then means that the square root is to be taken. The square root of 25 is 5, because $5 \times 5 = 25$.

$$\sqrt{25} = 5 \text{ for } 5 \times 5 = 25.$$

$$\sqrt[3]{27} = 3 \text{ for } 3 \times 3 \times 3 = 27.$$

$$\sqrt[4]{81} = 3 \text{ for } 3 \times 3 \times 3 \times 3 = 81.$$

$$\sqrt[5]{32} = 2 \text{ for } 2 \times 2 \times 2 \times 2 \times 2 = 32.$$

From the study of evolution we learn that if a number is used twice as a factor to produce another number it is called the square root of the number, thus $5 \times 5 = 25$; we call 5 the square root of 25. A number squared may produce as product one or two numbers, as $3 \times 3 = 9$, $5 \times 5 = 25$. While a two figure number squared may have from two to four numbers, thus, $10^2 = 100$, $25^2 = 625$, $99^2 = 9,801$ and $1,000^2 = 1,000,000$, from this we see that, if a numerical ex-

pression be separated into periods of two places each, beginning with the units figure, the number of periods will be the same as the number of figures in the square root. In cases where there are an odd number of figures the left hand period will only contain one figure. Thus to find how many figures there are in the square root of 625 we point it off, beginning with the first two figures to the right, 6.25, and as there are two periods there will be two figures in the square root, or take the figure 36, it has one period and one figure in its square root; again, take 34, 42, 71, 64, and there will be four figures in its square root or 22, 34, 51 would have three figures in its square root.

The best way to explain the process of finding the square root of any number is by example. Find the square root of 256. We first divide it into periods of two figures commencing at the units point, to find the number of figures in the root. Thus, 2.56, first find the greatest number whose square is equal to or less than 2:

256(16)	The number in this case must be 1, since
1	$1^2 = 1$, and $2^2 = 4$, as this is greater than 2 we
—	cannot use it; we then place the square of 1
156	under the 2 and subtract; now bring down the
20	next period, 56, this makes 156 as our new
6	dividend. We then double our part of the root
—	already found, and after annexing a cipher we
156	place this number to the left, and use it as our
26	trial divisor. We find 20 is our trial divisor, 20 is contained
—	in 156 6 times; we now put the 6 in our quotient, and also add
	it to our divisor, making the correct divisor 26; and 26 into
	156 just goes 6 times.

Now 20 will go into 156 7 times, but when we add the 7 to our 20, making the divisor 27, we find it will not go 7 times into 156; consequently 7 cannot be used. Another example, find the square root of 185761:

1857.61(431)	First point off the number into periods
80 16	of two figures each, we find the largest
3 —	number whose square is equal to or less
— 257	than 18, this is 4, so we square the 4 and
83 249	put the number 16 under the 18, also put-
860 —	ting the 4 into the quotient; after sub-
1 861	tracting we bring down the next period; this
— 861	gives us 257 as our next dividend; we now
861 —	double the part of the root already found,
	4, and annex a cipher, this gives us 80 as a first trial divisor;
	and by trial we find 80 is contained 3 times in 257, so we add
	3 to the 80, making 83 the correct divisor; 3 times 83 is 249,
	this we place under the 257 and subtract as before; we now
	have 3 as the second figure in the root, and by bringing down
	the last period we have 861 for our new dividend; we then
	double the part of the root already found, 43, and add a cipher,
	making it 860, as our first trial divisor; 860 is contained in
	861 once, so we add one to the trial divisor, giving us 861
	as the true divisor; this goes once, so we put 1 in the quo-
	tient for the root, and the answer is 431; as there is no re-
	mainder we do not carry the process any farther.

In case the number is a decimal and a whole number, or a decimal number, point off into periods of two figures each, commencing at the decimal point; for example, find the square root of 18465.3720, we mark this off into periods thus, 184.65.37.20, and proceed as before, extracting the root of the decimal the same as a whole number. Placing the decimal point in the root after the last period of the whole number has been brought down. Now find the greatest number whose square is contained in the left hand period. This will be the first figure of the root; subtract the square of this number from the left hand period, and bring down the

next period to form the remainder of the new dividend, double the part of the root already found, and after adding a cipher place it on the left for a trial divisor. Ascertain how many times this divisor is contained in the dividend, and write it as the next figure in the root, then add the number just placed in the root to the trial divisor, and multiply the new divisor by the last figure in the root, subtract this product from the dividends; to the remainder bring down the next period for a new dividend. Double the part of the root already found, annex a cipher and use the result as a trial divisor. Continue the operation until all the periods are used.

MOHAIR.

There are four things in the manufacture of which domestic mohair is principally used. These are plushes, braids, dress goods and linings for men's wear. The manufacture of plush yarn is comparatively easy, and simple, but the manufacture of braid yarn is most difficult. Until within recent years braid yarn was all imported from England. At present braids are not in much demand and consequently no great amount of mohair is used in them.

Fortunately, for our domestic industry, a new use for mohair appeared in the requirements of the felt maker who were making ladies' hats. These called for large amounts of mohair, which gave a great impetus to the mohair industry. This had never happened before, and as the hat manufacturers' season was short, they did not have time to import the foreign mohair, and as a result of this great stimulus to the demand, domestic mohair for the time being sold for considerably more than its intrinsic value. The increased demand was reflected in every little dealer looking around after it, and a rapid and substantial advance which forced the price to a level which made the yarn actually higher than that made from foreign mohair. Thus, domestic mohair, previous to this new demand, had been selling at from 18 to 25 cents per pound, but under the influence of the increased consumption, mohair, which had been selling at 25 cents, advanced to 38 cents. A fair quotation for this grade to-day is 30 cents on this market. Three-quarters of the whole clip of the country is at present consigned to two prominent New York houses. Some of the mohair grown is sold direct to the few manufacturers who use mohair, who allow the owners what they consider it to be worth.

A bad feature about our domestic mohair is that it is not put up in as proper a manner as the foreign, all grades being jumbled together. Domestic mohair is not adapted to making the best goods, although we have seen just as nice domestic mohair as foreign mohair, but only in exceptional cases, where one can pick out of a clip a few fleeces from full-blooded goats. The trouble with our growers is that they do not keep their breeds up; consequently, much of their mohair closely approaches the hair of the common goat. Domestic mohair has more kemp or dead hair, which does not take the dye. It contains 15 per cent. more of this kemp than the foreign mohair. Another drawback is that, whereas, foreign mohair has a full year's growth, many domestic growers shear their goats twice a year. This applies more particularly to southern growers. The mohair should be of full year's growth, to render it most valuable, but in Texas, for instance, the growers claim that they cannot grow it the whole year, as it begins to fall off before the end of that time. Turkish mohair contains little or no short wool.

Foreign mohair is bought according to the district from which it comes. For instance, there is Gherida, Castamboul

and Beybazar mohair, each district having its own characteristic. Thus one district produces a very long staple, perhaps 12 inches long; while another district produces a finer hair, the length of which may be, perhaps, not more than nine inches. The finer mohair is the shorter mohair. As a rule the finest mohair comes from the district which produces a length of about nine inches. We have known the foreign mohair to spin as high as 60s count, or from 30,000 to 40,000 yards to the pound; whereas, the finest of our domestic mohair would probably not spin higher than a 40s count, or about 20,000 yards to the pound.

A foreign mohair fleece contains eight different sorts, spinning from 60s down to 24s. A domestic mohair fleece, on the other hand, while containing, perhaps, as many qualities, is coarser spinning, say, from 40s down to 10s, and a large proportion of it is only suitable for carpets, very low woollens or blankets. The number of sorts which a manufacturer makes depends on what class of good he is going to manufacture. One reason why the domestic mohair comes to the market in such a comparatively poor condition, is that our clip is very largely made up of very small individual clips, some of them not running any larger than 25 pounds, while others may run up to 500 pounds. This is due to the fact that the flocks of this country are still very small in size as a rule. The merchant might make this mohair more salable by grading it, although very few, if any, in the mohair trade understand the art of grading it as the manufacturers want it, and the manufacturers are naturally indisposed to acquaint them with the knowledge, which is, of course, a part of their "stock in trade." If this mohair was graded, the grades would be known as 1s, 2s, 3s and 4s, these numbers indicating degrees of fineness. Thus, 1s would indicate 10s; 2s would indicate 20s; 3s would indicate 30s, and 4s would indicate 40s count. The best of our mohair is not more than three-quarters blooded, while the foreign is full blooded. One of our leading manufacturers, who has manipulated more of the domestic mohair than any other concern, tells us that he always buys at a price which is on a basis of 33 per cent. below that of the foreign, and this brings the domestic stuff about on a par with the foreign as to value, when made into yarn. The finest grades come from Texas, some of it spinning as high as 40s. The longest and coarsest comes from Oregon and California. The Oregon is worth more than any other mohair grown in this country, on account of its great length, as they are able, in Oregon, to grow it a full year before shearing it. In mohair length and lustre count more with the manufacturer than degrees of fineness. In Oregon the goats are shorn only in the spring, while in Texas they are shorn in the spring and in the fall. In Oregon the average yield per goat is four pounds. In Texas it is only two and one-fourth pounds.

The uses of mohair it is believed, will always remain limited. It is the belief that it cannot be used extensively in the manufacture of men's clothing on account of its hard, wiry character. One obstacle to the successful use of mohair in men's clothing is the fact that however small the amount of the mohair is used with the wool, there will always be a certain percentage of dead hair in the mohair which will not take the dye. If some of our enterprising chemists could invent something which would enable this dead hair to take the dye, or if an invention could be produced which would separate the dead hair from the mohair, it would mean a great deal for the mohair industry.

Our domestic growers are improving the quality of their clips every year by importations of new blood and more care-

ful attention to the business generally, and experts are of the opinion that the size of the domestic clip will continue to increase from now on. At present the domestic clip is only about 1,250,000 pounds, but this total represents very largely the increase of very recent years. Only a short time ago it was less than 100,000 pounds. The clip of the Cape is now about 7,500,000 pounds, or nearly that of Turkey itself, whose clip is 8,500,000 pounds.

SMALLWARE WEAVING.

In the making of the various narrow fabrics, there is probably as much variety as in the making of cloth, from the coarse jute webs used for halters and horse clothing to the fine silk jacquard-wove ribbons covering a wide range. One advantage which the narrow-fabric maker has over the maker of cloth is his ability to use his ground shuttle for figuring purposes. This is illustrated by the well known star effect, in which the ground weft catches in succession two figure threads from each side, draws them to the centre, and ties them there. Variations of this method are widely used, and make some very effective lines in these fabrics.

Effects like those made on swivel looms are made in this class of goods by extra banks of shuttles, which are used up to as high as four banks. These banks or tiers of shuttles can be called at will by a box motion, or may be indicated by the jacquard. By forming two sheds and driving two sets of shuttles at once through their respective sheds, another wide range of pattern and effect can be made. This machine is known as the overshot loom. Both sets of shuttles may be driven every pick or in any combination that the designer needs.

One of the most essential things in this branch of weaving is having good edges. The edges or selvages are a most important factor in the general appearance of the fabric, so care must be used in setting the time of the harness and shuttle motions to effect this. The lever weight and levers used on the warp beams, and which automatically take up the warp let back by the weaver, are finely adapted for this use, besides doing away with the dead pull from the warp beam. A recent modification enables the same principle to be applied to a spool of any size, which may hold only a single thread; it is also used to take the place of a slackener for leno threads, and does away entirely with that clumsy mechanism.

In former years the fancy head motion was largely used for making the more intricate patterns, but lately it has been succeeded by the dobbie head, by means of which a greater speed can be maintained. Within the last year or two a specially heavy pattern dobbie has been placed on the market, which is specially adapted for this kind of loom.

Jacquard machines are used to make the elaborate figure designs, as also for label and name-web weaving. These latter branches of the business have now grown to considerable proportions. At first the rise and fall single-lift machines were used; the latest tendency is toward the double lift, open-shed machine.

In making quills for the shuttles, a recent improvement has been the cone-wound form, without flanges. This has almost doubled the quantity of yarn that could be wound in the small space available, and is a considerable factor in increasing production. One of the modern devices for cam-driven healds is to attach a system of metal rod connectors to the underside of the heald frames. By this means a positive connection is made, and by the turning of the cams

the healds are pushed up and pulled down according to the design. This enables the loom to be built without any top arch, leaving all the space above the harness clear for light, and doing away with all top rigging. The adjustment is secured by means of set screws, and as all the connections are of metal, it is not affected by weather conditions.

Another device largely used is the take-up motion for putting in any number of picks, which is gradually superseding the old system of push fingers and gears. The sharp competition characteristic of all industrial life to-day has forced the makers of this line of fabrics to the extreme limit of practicability in their machinery. There are several methods by which increased production has been secured.

Circular shuttles are now quite generally used. These shuttles, instead of running back and forth on a straight line, work on the arc of a circle and enable many more strands to be woven in the same width of loom, the gain being 15 per cent. and upward. The disadvantages are the increased cost of the loom and the decreased life of the lay parts.

Another method used is to weave two strands in one reed space, one above the other. There are several makes of looms built on this plan, which practically double the capacity of a loom, and on certain lines of goods are an unqualified success, special heddles, reed, etc., being used. The difficulty is the complication of the weaving, making greater skill necessary on the part of the operator. In spite of these things, however, the loom has quite a good range of usefulness, and on some lines is superior to any machine in use. Textile Manufacturer.

BATIK—WHAT IT MEANS.

The term batik may frequently be seen in connection with decoration work now-a-days. It is the name given to a method of applying design to textile fabrics much practiced in Holland, though really of ancient Oriental origin, having been a characteristic handicraft among the natives of Java for centuries. The work is of no little difficulty, demanding the exercise of much skill and patience. The first step is to transfer the artist's designs to some white material—silk, satin, velvet, linen, as the case may be. This is done by a special process which involves absolute fidelity to the originals. The lines of the designs are traced over with an instrument which is filled for the purpose with warm wax, the greatest care being necessary in order to make the wax run smoothly on to the material without spotting. The background is then filled in, also with warm wax, the same process being repeated for each color used, if more than two are introduced. After this, the material is steeped in a color bath, and the wax removed by another special process, repeated baths bringing out the peculiar colors of the batiks. The whole is the result of long and anxious experiment, for at each stage some difficulty has to be surmounted, that, for instance, of removing the wax from the material without injuring it, or of obtaining the various nuances of color which lend the work one of its greatest charms. These difficulties have now, however, been satisfactorily overcome, and color schemes are produced of the highest decorative value. Vivid orange, pale sea green, delicate grays, and apricots play their part as backgrounds upon which the designs are traced in black, red, or blue, often with a delicate marble-like veining, forming a kind of subordinate design to the endlessly varied curves and circles, which blend into a style of ornamentation at once original and artistic. The effect must not be confounded with that of the Oriental decoration for curtains,

etc., in which the wax is left to form the design in a kind of relief, for in batik the medium is removed after having been made to produce the color required. Where, in a somewhat sombre room, the relief of a strong color effect is desired, a batiked carpet, portiere, hangings, or piano cover may be well called into requisition to strike a brilliant note of color, while the work is equally effective in smaller articles, such as fire screens, cushions and book covers.

ELECTRIC WOOL PULLING.

A New Method of Treatment for Skin Wools.

The great bulk of the wool supply for textile purposes is obtained by annually shearing the sheep in countries where they are reared, but there has always been a considerable trade in wools taken from the skins of slaughtered sheep, and known as skin wools or slipe, and during the last few years this particular section has had an enormous impetus in consequence of the great growth of the frozen mutton trade in New Zealand, Australia, and South America especially. Whereas only 400 carcasses of mutton were imported in 1880, and only three-quarters of a million in 1885, there were nearly 3,000,000 imported in 1890, while last year these figures had increased to about 7,000,000 carcasses, several vessels having been specially built for this particular trade only. The skins of these animals, with the wool still attached, are arti-

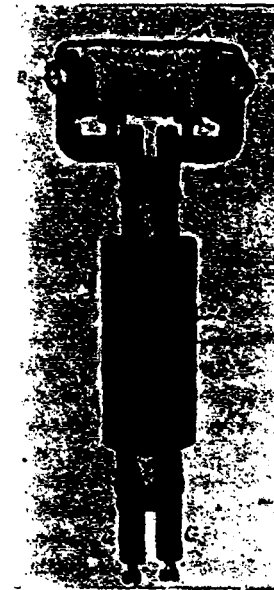


Fig. 1.

ficially dried (by heat), then made up into bales and sent largely to this country to be sold to the fellmongers and tanners for making into leather.

Ten years ago there came into England to be sold through the brokers in London something like 20,000 bales of dried sheepskins. In 1900 this number had increased to 43,990 bales, of an average weight of about 5½ cwt. each, while last year there were no less than 53,810 bales including 27,600 from Australia, 4,020 Putna Arenas and Falkland Isles, 820 River Plate, and 21,310 Cape, and it is computed that at least double the above quantities come direct to the fellmongers, and of these latter no accurate figures are obtainable, but as each bale contains about 50 skins, some idea will be obtained of the extent of the trade in skin wools.

The fellmonger has of necessity to remove the wool

from the skin or pelt before the latter can be tanned, and he adopts one of two systems of detaching the wool, namely, liming or sweating. In the liming process the skin is steeped in water until thoroughly softened, and is then drained off and the flesh side of the skin coated with a quick-lime paste, another skin similarly treated being placed on this with the limed sides together, and so a stack is built up of these pairs of skins and left until the lime has eaten into the skin sufficiently to decompose or dissolve the roots of the wool fibres, allowing the wool to be readily pulled out by the roots. This operation may occupy a few days or several weeks, but when the skins are ready for dewooling, they are passed through water to get rid of the lime, as far as possible, and then placed on a convex beam and the wool rubbed off by means of a curved wooden blade with two handles. The wool so removed from the skin is usually more or less loaded with dry lime, which renders the washing operation one of great difficulty, and the wool handles more harshly and looks dead or dull, and spins worse than wool of a similar quality sheared from the live sheep in the usual manner.

The sweating method of removing the wool has been largely used in America, and also at Mazmet, in France, the skins being thoroughly soaked or washed in water, and then hung up in a hot moist chamber until a slight decomposition is set up in the skin, causing the wool to become loose, when it can be removed as previously described. This method has a distinct advantage so far as the wool is concerned, as no lime is used for thus removing the wool, but very often chemicals are added to the soaking waters to assist the decomposition, which do not improve either the skin or the wool, and the pelts are not so perfect on account of the partial decomposition which takes place, and which has

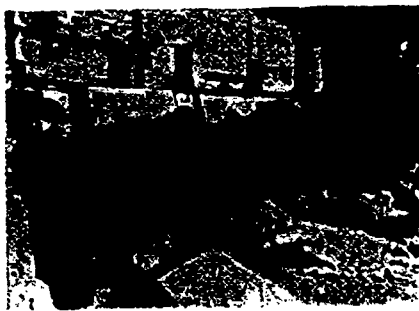


Fig. 2.

to be checked immediately after the removal of the wool by placing it in lime to prevent the slipping of the grain. Another disadvantage of this operation is the inconvenience of handling the wet skins and wool, the latter of which must be dried, and must be again washed by the spinner or top maker in the ordinary manner before it can be converted into yarn, thus making a double washing and drying operation instead of one, as when sheared wool is dealt with.

The skin wool taken off by either of these methods is always considered inferior to a similar wool shorn in the ordinary manner, and usually fetches from 1d. to 1½d. per lb. less in the wool market. Skin wools are, however, in considerable demand by practically all top-makers, as they afford a ready means of cheapening a top without the introduction of a coarser fibre, by mixing a proportion of slipe or skin with the ordinary wool of a similar class.

It has, however, been left to the ingenuity of a Bradford lady (Mrs. S. L. Johnson), to bring out a process for remov-

ing the wool from the pelt without the objections previously mentioned in reference to skin wools, and a strong syndicate has been formed to acquire and work these patents, which have now got far beyond the experimental stage, and are being worked successfully on a commercial basis. This lady accidentally discovered how easy it was for a red-hot curling pin to remove a portion of hair with which it comes into contact, and the idea struck her that a similar operation might be utilized in removing wool from skins, and the experiment was carried out on a skin, in the first place with a primitive red-hot hair pin. The idea was gradually developed, and the process has far exceeded the original expectations of the inventor in its successful application.

The implement which is used is shown in Fig. 1, and it consists of a flat wire A, stretched between two terminals of an electric circuit, and resting or bearing against a groove in a piece of talc or soapstone D, which can be pressed up close to the wire by means of the two screws E, E. The wire is a secret composition, but consists largely of platinum, and as the electric current passes through it is raised to a dull red or orange heat. Each of the terminals are split, and the wire is placed between the two portions and clamped by means of the two screws B, B, thus holding the wire firmly

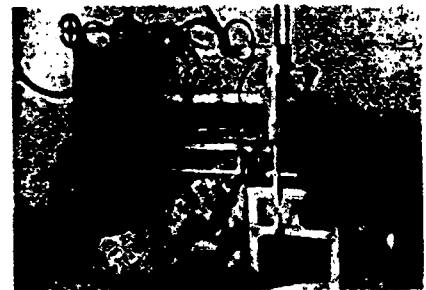


Fig. 3.

in electric contact and rendering the replacing of the wire an easy operation. The terminals are carried in an insulated vulcanite holder C, which is ventilated throughout to keep it as cool as possible, and the ends G of the machine or "electric cauterie" are then coupled by means of flexible cables to resistance boxes arranged on the wall of the room, as will be seen in Fig. 2. The resistance boxes enable the operator to regulate the heat of the platinum wire according to the class of wool being operated upon, as a greater heat is required for coarser wools.

For dealing with the imported dry skins, they are fastened up flat on a board placed nearly vertical against a wall, and the operator (usually a girl), takes the machine in hand, as seen in Fig. 2, and grasping the wool at the top of the fleece, draws the red hot wire across the wool close to the skin, instantly severing its connection with it, the movement being sufficiently rapid to prevent any scorching of either wool or pelt. This portion of wool then hangs down, and a fresh grasp is taken on the next portion below, and the implement again drawn across with a combined downward and cross stroke, and so on until the whole of the wool is removed. The pelt or bare skin is then removed and replaced by a fresh skin, and so the operation goes forward, each skin being dewooled on an average in about five or six minutes.

The advantages gained are many, one being that the wool is taken off in a complete fleece, just the same as sheared fleeces, rendering the operation of sorting much easier than

when dealing with skin wools taken off by the fellmonger, in which case they are usually much broken up into small pieces. Perhaps the greatest advantage is, that no lime is used, or any deterioration of the pelt necessary, and therefore the wool is practically in the same condition as when shorn from the live animal—in fact, the inventors claim that it is better, owing to the cauterizing of the end of the wool in removing it from the pelt, but such a statement must be taken cum grano salis. However, there is no deterioration of the wool, and this therefore is a great gain upon previous methods of production of skin wools. There is no appreciable scorching in the severing from the skin, and the operation needs to be seen to realize how closely such fleeces resemble ordinary sheared fleeces.

Another advantage is, that the wool in its natural greasy state can be treated in the same manner as sheared wool in the washing operations, and the grease and potash compounds of the wool yolk can be readily recovered, whereas it is destroyed or washed out in the liming operations, where the wool is detached by the fellmongers. The wool can also be obtained (apart from its superior condition), at a much cheaper rate than by the liming or sweating process, and should therefore yield a handsome return even if sold at the usual market price of skin wools, but the advantages of this new system are so obvious that some Bradford spinners are now buying this skin wool and paying practically the same price as for sheared wool, while other spinners are buying the bales of skins in the London markets and having them dewooled by the Electric Wool Pulling Syndicate, and selling the pelts direct to the tanners, thus dispensing with the services of the fellmonger entirely for their supply of skin wools.

The pelts or skins after dewooling are of course no worse for the production of leather than they were before, and the roots of the wool have to be extracted in the ordinary manner by liming previous to tanning, but the skins are now sent direct to the tanner, instead of the fellmonger, and they are only passed through lime once, whereas the tanner usually finds it necessary to put them in lime again after receiving skins from the fellmonger, which have been dewooled by lime, thus causing a double liming operation and a consequent reduction of value of the leather. A distinct advantage is gained in having the skin without the wool in the liming operation, as they occupy infinitely less room and are much lighter to handle when wet, and the tanner is not bothered by any considerations of careful treatment in stripping and drying the wool, as the fellmonger was, for the remaining fibres in the skin are of no value.

But it is not only in dealing with dry skins that the new system has its advantages, as a machine has been designed (Fig. 3), for dealing with the green or fresh skins immediately after their removal from the carcase. For this operation the skin is stretched over a slowly-revolving wooden drum with the wool outside, and a number of these electric knives, containing the red-hot wires, are carried in a swing frame (seen in Fig. 3), which is given a combined horizontal and vertical motion by means of cams, which causes the wires to come down close to the skin on the drum with a sideways motion and to again rise clear of the wool for a fresh stroke, each of which detaches a layer of wool right across the skin, the framework of electric knives, of course, extending the full width of the machine. The wool is drawn away from the electric cauterics as fast as it is detached by a series of combs, which have a backward and forward clawing motion, thus holding the wool tight while the severing

from the skin takes place, this being a necessary condition both on the machine and in the hand process, for if the wool were not drawn tight the red-hot wire would simply lay it down flat on the skin and burn it badly. It is for this reason that a limit to the usefulness of these inventions has been found, for it is not possible to take the wool off from skins where it is less than one-half inch in length, as the operator cannot get hold of the wool without being burned, and it does not pay to dewool skins in this manner if the wool is shorter than one inch, it being found more economical to detach such wools by the liming or sweating process. There are, however, only a very small percentage of skins which have wools of this short length.

The machine for green skins, as now constructed, is capable of dewooling 600 to 800 skins per week at barely one-third the cost of removing the wool by the usual methods of liming and sweating.

The platinum wires gradually wear out in use and are readily replaced, and it is found that the finer the wool the greater wear there is in the wire, and this is supposed to be on account of the somewhat different character of the wool yolk in fine greasy merinos, as compared with that in cross-bred and longer wools. In the former it partakes more of a waxy nature, which when melted by the hot wire seems to eat into it and cause more wear. It is found that a wire will last in good order for dewooling two or three times as many crossbred skins as compared with fine merinos.

WEAVING WITHOUT A SHUTTLE CARRYING A BOBBIN OR COP OF WEEF.

An invention of great importance to manufacturers has recently been brought about by which the weft is drawn from a supply placed outside the warp. By this method, the bobbin may be of any desired size and new bobbins may be connected during the operation of the loom. According to the invention, the weft thread is caused at each shifting of the warp or shed-formation, to be inserted, in the form of a loop, into the warp or warps from a bobbin outside the warp. This may be effected, for example, by means of a thread carrier, adapted, whenever such a loop is inserted, to move to and fro transversely of the warp, taking with it the doubled weft thread during its motion in one direction, but, preferably, sliding, during its motion in the opposite direction, along the last formed half of the inserted weft thread loop. The thread carrier, which is preferably in the form of a shuttle, provided with suitable guides, may also be in the form of a rod or the like, arranged adjacent to the warp, and operating in a manner similar to that of the needle of a sewing machine. When the thread carrier is adapted to slide continuously along the thread, the loop must, during the return of the thread carrier along the last formed half of the loop, be held fast at the side of the warp, which is opposite to that at which the insertion occurs. This may be effected in various ways. If the thread loop does not require to be fixed at the former side of the warp, there may be used for this purpose a needle or pin, adapted to engage the loop at that edge of the warp before the return of the thread carrier, and to remain in engagement with the loop during the return movement of the carrier. If, however, the thread loop has to be permanently fixed, this may be effected by means of a suitable shuttle working in a rectilinear or curved path and adapted to draw a thread through each of the loops after the manner of a sewing machine, or by winding the loops between two threads running in the

direction of the warp. On the opposite side of the warp, the edge will become fixed, owing to the shifting of the warp. The employment of special binding devices may, however, be dispensed with by using two or more threads working alternately from opposite sides of the warp. Under these circumstances, it is necessary, in case the thread carrier is adapted to slide continuously on the weft thread, to provide, on both sides of the warp, holding devices, such as those referred to. For weaving in various colors, several thread carriers, working from one or both sides of the warp, are preferably employed. The method described enables bobbins of any desired size to be used. Such bobbins may, if wound on the cross winding method, be strengthened and sized and dyed, so as to enable the weft thread to be inserted into the warp when damp, which will cause the binding to become taster and the fabric stiff, even if no special dressing or finishing process be employed. The sizing or dyeing of the weft thread may also be effected by causing it to pass, after leaving the bobbin, through a receptacle filled with size or dye and placed either without or within the body of the thread cutter. Superfluous size or dye may be squeezed out of the thread by means of a pair of small rollers made of suitable material, as India rubber. The shuttle may also, if desired, be employed as a receptacle for the size or dye.

NEW METHOD OF ORNAMMENTING FABRICS.

A new English invention relates to the production of patterns on woolen fabrics, the surface of which consists entirely or partially of vegetable fibres, such as, for instance, woolen felts, provided with a thin layer of vegetable fibres, such as cotton, linen, jute, ramie, etc. The process is based in the main on the carbonizing process, which serves to destroy vegetable matter woven into material for the purpose of producing patterns according as the fibre is acidified or de-acidified. In carrying out the process part of the acidified surface of the material is de-acidified, according to the pattern, before the burning stage of the process of carbonizing is reached. The parts which are to form the design are protected by the application of an alkaline liquid, whereupon the non-protected parts of the vegetable fibre or fibre layers are destroyed by carbonizing, leaving the protected parts of the fibre remaining to form a pattern. Various arrangements can, of course, be used for applying the alkaline liquid; if, for instance, longitudinal and cross lines are to be produced, a thread or threads, saturated in alkaline liquid, can be pressed on for a moment in the longitudinal and transverse directions, or disks, fluted or otherwise, and supplied with alkaline liquid, can be caused to run over the material under pressure in the said directions. Any other pattern can be produced by passing a roller, provided with the desired design and continuously supplied with alkaline liquid, under pressure over the material. Instead of using a design roller, any other printing process can be used, such as printing planographic forms or blocks and the like.—Upholstery Trade Review.

BELT SLIPPERS.

The ordinary loose pulley on a countershaft is the simplest device known to mechanics for the purpose of stopping a machine when it is no longer needed. When properly proportioned and given reasonable care it works well and proves durable. Its use makes it necessary to provide some means for shifting the belt from one pulley to the other as occasion requires.

The most common device for this purpose is a wooden bar, sliding in suitable guides, with two vertical pins fastened in it, one on each side of the belt, and a lever within easy reach of the machine operator.

If this lever is cared for by an intelligent man, who understands his business, it is an easy matter to keep it adjusted so that it will move hard enough to hold it wherever it is left, yet allow it to move easy enough to avoid inconvenience. This is quite different, however, from having a score or two of them in a shop where they are operated by boys who neither know nor care how to take care of them, and only remember to denounce them as nuisances and lose time by holding them in place, when the force of gravity moves the lever where it is not wanted. This action causes the belt to run partly on the tight pulley when the machine is idle, where it causes disagreeable squeaking and heats the pulley.

One plan for overcoming this objection is to attach a small rope to either end of the sliding bar, pass it over a pulley and let it hang within easy reach of the operator. A pull on one of these ropes runs the belt from loose to tight pulley, and a pull on the other runs it back again.

While this is better than a lever, it calls for two ropes, which is not as convenient as it might be. To overcome this objection, a slipper has been brought into use in which only one rope is used. If a belt is on its loose pulley and it is desired to start the machine, a pull on the rope runs the belt on the tight pulley and locks the slipper so that the vibration of belt cannot jar it off again. When the machine is to be stopped, a pull on the same rope unlocks the slipper and moves it into position for the loose pulley, after which it is automatically locked, as before.

The mechanism used to bring about these results is not complicated, and as it is entirely enclosed in a cast-iron box, it cannot be deranged from outside sources, nor clogged with dust and dirt. Such devices do much towards eliminating the petty annoyances which interfere with good work.—Textile Excelsior.

THE OLDHAM COTTON SPINNING TRADE.

Oldham has long had a world-wide reputation as the principal centre of the English cotton spinning industry. That it deserves its fame none will question who becomes acquainted with the fact that in the town and immediate neighborhood there are over 12,000,000 spindles, out of a total of about 47,000,000 in this country. Naturally enough, those engaged in the industry are divided into two classes—the employers and the employed. Up to 1870 the former consisted entirely of individuals or private partnership firms. Then set in the era of joint-stock cotton spinning companies, the movement being further stimulated by the enactment of the Limited Liability Acts. From 1870 onwards new company mills began to rise "like mushrooms," while existing private firms were transformed into joint-stock companies under the influence of the new movement, until few were left, and there are to-day only a small number surviving in "the Oldham district." They linger on in other localities in Lancashire, but are now of comparatively little importance; for the old order has completely changed.

The new order that has come into existence has brought into the business new men, new manners, and new methods; the transformation indeed has been of the most radical character. The new system of spinning became an "El Dorado," and hard-headed, shrewd working-men, who had made money out of early investments therein, soon became con-

spicuous as company promoters, directors, and managers of new mills. They invaded the Manchester Exchange, where they soon broke down the custom of the wearing of silk hats, theretofore de rigueur. Naturally there was some decadence of formal manners; comparative refinement was superseded by rough vigour, combined, however, with sterling ability and commercial aptitude. The new men soon showed they had come to stay, and have long been the dominant factors "on the boards," where the silk hat is now vastly outnumbered by the felt. All this has naturally brought about a modification of the relationships between employers and employed. The new men who have assumed the conduct of Lancashire's great industry are regarded by the operatives as in no great degree their superiors in social position. The result is the development of a feeling of equality and independence which has quite destroyed those sentiments of deference and respect that in the first half of last century were still entertained by the workman for his employer. To-day, very emphatically, the working man regards himself as being "as good as his master," and the self-assertion has been admitted.

This change in the social relationship of the two parties has modified the industrial relationship. The new conductors of the trade, with their widening experience, have got more knowledge of the requirements of the commercial side of the business, and this has compelled them to adopt what the operatives regard as sterner views in the discipline and management of the mills, which in turn have begotten a degree of friction not conducive to harmonious working. The conductors of the mills have seen the necessity of insisting upon them; the operatives have affirmed that they were being unjustly imposed upon. These conflicting sentiments prevailed for a considerable time, indeed throughout the whole of the occupancy of the secretaryship of the Operatives' Association by the late James Mawdsley. Naturally it was a diminishing quantity, but it has not even yet entirely disappeared.

The condition thus indicated is shown by the report of the Oldham Master Cotton Spinners' Association, just issued. Annual reports form a useful branch of literature; in connection with industrial and social movements, they are what mile-stones are on public highways—showing the progress that has been made, and the distance yet to travel before the journey's end is attained. The end sought by the employers in the cotton trade is the establishment of a thoroughly equitable, sound, and reliable working arrangement with their operatives, which shall do justice to both and wrong to neither. But more than this is required; these ends must be attained with such clearness and decision that even ignorance cannot call them in question for more disputes probably arise from the misconceptions originating more or less in ignorance, than spring from the actual material of differences. In order to watch and protect their separate interests, the employers on the one side, and the operatives on the other, have organized their respective unions each organization (so successfully have they been engineered), including practically all the members of the trades for which they were designed. When it is considered that employers owning 12,000,000 spindles (representing a capital investment of probably £15,000,000), form one organization, while those of the operatives include probably 50,000 members, it becomes obvious that there is plenty of area in which friction can arise. To overcome this, requires on the part of the negotiators technical expertness, commercial knowledge, and a disposition to recognize the fact

that where each side can advance sound claims the most equitable settlements must be reached by compromise. To these qualities must be added diplomatic tact, mutual respect, and an honest disposition to arrive at just conclusions. In view of the statements made in the report under notice it can hardly be assumed that these sentiments have been regarded by both parties concerned as fully as they might have been. The report says: "The wages and other disputes among the various branches of workpeople included in the Brooklands Agreement, dealt with during the year, have amounted to 147. The General Committee met forty-nine times, and the sub-committees, local and federation, have met 125 times. These do not include the daily sittings of the Short Time Committee." These figures show a vast amount of work on the part of the members of the committees for the common good, and it is difficult not to believe that were more care given at the outset to the consideration of supposed grievances, many of them would never reach the committees at all. Let us take for instance the complaints that arise from so-called bad material, regarding which the report says there has been an unusually large number during the past year. Both the operatives and their officials should carefully bear in mind that a cotton crop is made up of many grades of the article, carefully classified and assorted in price to meet the requirements of the different classes of spinners. Spinners producing given ranges of counts of yarns cannot go up $\frac{1}{4}$ d. per lb. to meet complaints, because there would be no chance of their getting the additional price in the market; and the spinner does not go down upon his quality a like amount, because if he did so he would quickly destroy his connection. It should be clear, therefore, that cases of this kind must arise from the accidental admixture of inferior bales with the proper quality; or otherwise, as sometimes occurs, of false packing in the bales; but in either case these soon get through. There are at other times, owing to defective crops, scarcities of the grades required, and lower grades are then "classed up." The spinner, however, must keep his quality right, and has to buy the higher grades and trust to Providence for getting a return for his enhanced outlay. Owing to the rapidly increasing competition of America, some of the most useful grades used in Oldham are being drawn more upon by American mills. It is, therefore, not always a question of buying what one desires; the spinner must sometimes take what he can get, and this may be a little off his average quality. Before complaints of bad quality are seriously entertained by either the workmen's or the employers' officials, special consideration should be given to them.

There is another class of misunderstandings to which we think the best sentiments are not always brought. These are of the nature of the dispute that has arisen from inability to agree upon the amount of wages to be paid for certain machines in the blowing room, where improvements diminishing the amount of labor required have been introduced. Thus a fine large mill has been stopped for twenty weeks, resulting in a loss of many thousands of pounds to both employers and employed—and all because an equitable agreement cannot be arrived at between the parties. The amount separating the two parties is now only 5s. per week. For the sake of peace the employers largely advanced their offer, bringing it up from 42s. per week to 50s.—beyond which they could not go, in justice to the trade and in maintenance of its right to modify the expenditure in wages on the introduction of new machinery. This dispute has shown a serious want of just appreciation of the conditions and cir-

stances of the trade. Actions of which this is a typical example will do much to retard, if not to prevent, the introduction of improved machinery everywhere, as such is only introduced by a desire on the part of employers to keep themselves in the best form to meet the everywhere growing competition.—Textile Mercury, Manchester.

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 a dividend an improved paper.

About one hundred hands are now employed in the Ogdensburg silk mill.

The Aberdeen woolen mill at Lanark was closed last month for repairs to the waterwheel.

The Corticelli Silk Co. of St. Johns, Que., have been put to much inconvenience from a shortage of coal.

Thos. Logan, of Renfrew, has been in Boston looking after machinery for proposed enlargement of his woolen mills.

The Perth felt mill is running overtime to fill a number of large orders. The company has recently added some new machinery, and their business is bound to grow.

The Cornwall canal will be unwatered for repairs from March 15 to May 1, and the cotton mills will have to fall back on steam. The Toronto paper mills will be compelled to shut down.

Guthrie & Guthrie, of Guelph, acting for Thomas Traplin, of Hespeler, who was seriously injured in the Upper Mill last fall, have issued a writ against the Canada Woolen Co. for \$5,000.

Bancroft, Ont., is likely to have a woolen mill, Mrs. Reid, of Combermere, being likely to secure a lease of the old woolen mills property. If satisfactory arrangements are made, up to date machinery will be installed.

The R. Forbes Co., of Hespeler, are putting up a building 180 x 100, of stone and brick, as an addition to their mills to enable them to keep pace with their orders for woolen goods. It is expected that they will require about 125 more hands.

The Renfrew town council has agreed to lend the company which proposes to establish a knitting factory there a sum not exceeding \$5,000, provided the ratepayers are willing. I. E. Pedlow, a merchant of the town, is the chief promoter.

The Hudson Bay Knitting Company is reconstructing the old Waverley hotel building at Montreal, as a factory. The stone front is in excellent condition, and will be left standing. The remainder of the building is to be rebuilt. When completed it will be four stories high, with a basement.

The overseers and second-hands of the Dominion Cotton Mills at Magog, held their annual supper at the Fairview hotel recently. It was presided over by J. H. Hindle, the ancient and popular superintendent, and all who took part enjoyed themselves thoroughly.

The Berlin Rubber Co. will erect a new warehouse this spring. The Star Whitewear Co. will either add another story to their factory or erect an addition. The W. G. & R. Co. is considering plans to increase the capacity of their shirt and collar factory, and will likely erect a large addition. The Lang Tanning Co. will also build a large addition.

The matting factory carried on at Cobourg for many years by the late Wm. Mitchell has been sold by the executor to Sam Clark, J.P.P., John Dick and A. J. Armstrong.

John Lewis, who as mentioned in the last issue of The Journal of Fabrics is about to start a shoddy mill at Berlin, has purchased the plant of Bicker & Son at Stratford, and will move it to Berlin.

Very little damage was done by the recent flood at Cornwall. The heavy belting in the Colored Cotton Mills having been soaked in the water had to be shipped to Montreal to be repaired. The Stormont mill suffered little. At the Cornwall Manufacturing Co.'s woolen mill, the water forced up the flooring in the dyehouse, and upset a lot of dyestuffs, but the damage was light.

Commencing March 1 the hour for beginning work in the morning at R. Forbes & Co.'s woolen mills, at Hespeler, was changed from 6.30 to 7 o'clock. The mills employ over 400 hands, a third of whom are on piece work. The day workers will receive the same wages as formerly, and the three hours a week concession is much appreciated. The Canada Woolen Mills will probably follow suit, and also the Preston mills and the Penman mills at Paris.

The Riverdale Woolen Mills, owned by D. Graham, Sons & Co., at Inglewood, Ont., were totally destroyed by fire, February 27. The origin of the fire, which started at 4 o'clock p.m., is unknown, but it is supposed to have commenced in the picker room. When first noticed the whole room was ablaze, and the man who ran the picker had his face and hair burned in getting out. The flames spread so rapidly that in less than an hour nothing but the walls were left. The loss is estimated at \$20,000, and the building and machinery were insured for \$9,000. There is also \$3,000 on the stock in the Royal. The mill was established in 1841, had both water and steam power, contained two sets manufacturing cards, 1 custom card, 520 spindles, 15 knitting machines, 15 sewing machines and manufactured shirts, drawers and hosiery yarns.

The annual meeting of the Canadian Cordage Co. was held at Peterboro on March 2. The directors' report was very satisfactory. It stated that \$400,000 of stock had been subscribed, on which \$342,632.25 had been paid. A bonus of \$4,500 had been received from Peterboro, with which 2¼ acres of land had been purchased, and the assessment fixed at \$4,500, thus virtually giving exemption on their buildings and plant. The buildings, which are all of brick and one story high, have already been described in The Journal of Fabrics. The motive power of the machinery is electricity, a contract having been made with the Otonabee Power Co. for 500-h.p. at \$10 per h.p. per annum. Electricity will also be used for lighting and possibly for heating. The property is insured for \$350,000. The factory has a capacity of ten tons of binder twine, eight tons of rope and two and a half tons of lath yarn per day. By combining the business of manufacturing binder twine, rope and cordage the greatest efficiency, flexibility and economy is obtained in the operations, and the output in any one line can be substantially increased by lessening the output in some other line. The profits down to February 7th, 1903, were \$12,288.06, of which \$11,225.44 was appropriated to pay a dividend of 5 per cent., and \$1,062.62 was carried forward to profit and loss. The dividend will be paid May 1. There are some 4,000 shareholders. The old board of directors, namely Adam Hall, John Lang, M.P., Thomas Blezard, John A. Bennett and J. S. Latimer, were re-elected.

Advocates of more protection for cotton say that if it was given the mills would soon employ 3,000 more hands.

J. W. Cartledge has been improving his knitting factory at Guelph. He has put in a new 80-h.p. boiler and a 60-foot smoke-stack.

T. S. Bowles, formerly boss carder in the cotton mill at Milltown, N.B., has been appointed overseer of carding in the Attawaugan mills, Connecticut.

The Granby Rubber Company is getting the lumber ready for repairing the upper dam. It will be raised to high water level and considerably increase their power.

At the Stormont cotton mills, Cornwall, Arthur Bades is superintendent; W. V. Boyd, designer; W. H. McDonald, carder; Robert Keenan, weaver; Walter True, finisher; Jos. Kirkey, dyer; Walter Crites, dresser.

The employees of the Montreal Cotton Co.'s mill at Valleyfield have been feeling uneasy, says an exchange, because of a report that they will be asked to sign a paper releasing the company from responsibility in case of accident.

A factory for the manufacture of whitewear goods is to be established by the T. Eaton Co., of Toronto, at Oshawa, the town having voted a land and cash bonus. The vote stood 495 for and 42 against. A large solid brick building will be erected, and 300 hands employed.

Tenders are being asked for a very large addition to the Guelph Carpet Mills. The company is going into the manufacture of tapestries as well as Brussels, Wiltons, wools and union. A new three story warehouse of brick or stone is to be erected. It will be 175 by 40 feet. The capacity of the industry will be more than doubled by the erection of a one story, 114 by 57 feet, weaving room. It will have saw-tooth glass roof, similar to the present weaving room.

Weavers and others employed in the St. Croix cotton mill at Milltown, N.B., to the number of 300, went on strike on March 13. This is the culmination of a series of troubles between the owners of this mill and the employees. Recently the superintendent, a New Brunswicker, was dismissed, and outsiders replaced certain foremen. Strong feeling in the town led to the replacement of some of the old members, but the friction continued, and when a new schedule of prices was posted all employees in two of the largest rooms went out. Probably the other two hundred will follow.

The 32nd annual general meeting of the shareholders of the Rosamond Woolen Co. was held at Almonte, when the following officers were elected: President and managing director, B. Rosamond, M.P.; vice-president, Lord Mount-Stephen; secretary-treasurer, James Rosamond; the same directors as last year were also elected. On the same day the 21st annual general meeting of the shareholders of the Almonte Knitting Co. was held, when the following officers were elected: President, Right Hon. Lord Strathcona, C.G.M.G.; vice-president, B. Rosamond, M.P.; managing director, J. M. Rosamond; directors, Lord Mount-Stephen, Robert Mackay, John Turnbull, William Thoburn and Jonathan Hodgson.

After being on strike over three weeks the cutters and trimmers who were on strike at the time of our last issue in the clothing factories of W. R. Johnston & Co., Lailey, Watson and Bond, Chalcraft & Co., and Northway & Son, went back to work. The terms agreed on were half an hour a day now, and the other half on November 1st; recognition of the union, and no discrimination against employees who took an active part in the strike; the apprentice ques-

tion to be settled within two weeks. The men asked that not more than one apprentice be appointed every three years for every ten journeymen. Including the pressers, who joined the cutters two weeks after the strike, there were 150 men on strike. A strike of the journeymen tailors of Toronto is now on, the cause being a demand for a ten per cent. advance in wages.

The old woolen mill, one of the landmarks of Elmira, Ont., has been removed. The Signet thus gives its history: The building was erected in the year 1855 and was then looked upon as the forerunner of a great business boom, which to a great extent it proved to be. Below the weather boarding a large bill was found pasted to the wall. This bears the date of May 10th, 1856, and announces that the subscribers to the company were then ready to proceed with custom work. During a number of years the firm of Winger & Weaver did an extensive business, later Henry and J. B. Winger conducted the factory, doing custom work and manufacturing tweeds and blankets. About seven years ago the factory was converted into a felt shoe factory, and lately it was sold to Eby & Klinck, who sold the older portion to Jos. Stange. It has now been moved to the latter's farm, where it will serve the purpose of a barn.

Business Notes.

In staple dry goods there is considerable activity, and prices rule firm.

Dunlap, Cook & Co., furriers, have fitted up a handsome new shop in St. John, N.B.

The Stanley Mills Departmental Store Co., of Hamilton, will, it is rumored, open a branch in Winnipeg.

The large carpet and house furnishing store of A. F. Bannfield, Winnipeg, was seriously damaged by fire last month.

The directors of the Montreal Cotton Company have declared a dividend of 2½ per cent. for the past quarter payable 16th March.

Bromley & Co., manufacturers of tents, mattresses, etc., Winnipeg, have been obliged to seek enlarged premises for their business.

The spring millinery openings took place in Toronto the first week of March, and attracted an unusually large attendance of buyers. Sales were large.

The Granby Rubber Co. is one of the heaviest creditors of G. E. Baldwin, last manufacturer, who has assigned. There will be very little in the estate for the creditors.

Moses Silver, clothier, Brockville, is removing to Montreal, where he will engage in the manufacture of furs, in partnership with his brother. His business will, however, be continued in Brockville.

D. C. Gillis, haberdasher, Halifax, whose affairs have been in the assignee's hands for several months, is offering his creditors 20 cents on the dollar. Sutherland Bros., in the same line, at Sydney, N.S., are offering 50 cents, cash.

An English manufacturer of silk handkerchiefs, mufflers, neckwear, etc., is desirous of doing business with Canadian houses importing these lines. A Bradford firm has asked for the addresses of Canadian importers of wool or tops made from English wool. The names may be learned by enquiry of the publisher of the Journal of Fabrics.

Sterling & Waller, wholesale dealers in clothing, men's furnishings, etc., Winnipeg, have moved to larger premises.

T. Woodbridge & Co., Toronto, manufacturers of harness, horse-blankets, carriage rugs and robes, fur driving coats, etc., has removed to more commodious premises.

George A. Nolan, clothing dealer, Trenton, Ont., whose premises were destroyed by fire recently, has offered to compromise with his creditors at 50 cents in the dollar.

Louis Lazarus and Mrs. Wolf Grudinger, doing business at Huntingdon, under the style of the British-Canadian Clothing Co., have made an abandonment of their estate.

The Montreal firm of Rathbone, McNeil & Co., in business since 1900, as jobbers of headwear in a small way, have been obliged to suspend, and are estimated to owe about \$10,000.

W. H. Buck, dry goods dealer of Truro, N.S., writes his creditors proposing a settlement at 50 cents on the dollar. He shows liabilities of \$13,700, with nominal assets of \$1,000 more.

A Canadian house asks for the addresses of makers of heavy jute cloth such as is used in the manufacture of brattice cloth. Should this come under the eye of any such manufacturer the address of the firm alluded to can be obtained from *The Journal of Fabrics*.

The executors of the estate of the late Archibald McIntyre, president of the Standard Shirt Co., who left an estate worth about \$500,000, had a judgment recorded against them last June by Mrs. R. A. Ptolemy, of Hamilton, his daughter. They appealed, but the appeal has just been dismissed. There are eight heirs.

George Margolius, formerly a traveller for a leading waterproof clothing house, who began business in Montreal as a jobber in dry goods and clothing last spring, reported an absentee, has been arrested in Chicago. His affairs are in charge of an assignee. Liabilities considerable, assets small. He will fight extradition. After leaving he wrote to some of his creditors saying he had hesitated between flight and suicide, and had decided on the former, as he did not see that his death would make his creditors any the richer, and if he lived, he might some day be in a position to satisfy their claims. Among the creditors are the Canadian Underwear Co., Montreal, \$2,130; Max Margolius, New York, \$1,531; Suckling & Co., Toronto, about \$1,000; Canada Woolen Mills Co., Toronto, \$730; A. E. Rae & Co., Toronto, \$144, besides many Montreal firms.

The following companies have been incorporated: Green-shields Limited, particulars elsewhere.—Dominion Linen Mills, capital \$250,000, Toronto, C. McEachren, D. Grimston, W. B. Hill, Geo. Stevenson and A. A. Hood.—Geo. H. Hees Son & Co., window blind manufacturers, capital \$400,000, Toronto, G. H. Hees, S. S. Hees, H. L. Hees, R. W. Hees, Son & Co., window blind manufacturers, capital, \$100,000.—Kendrys Limited, capital \$40,000, Toronto, to carry on a millinery, mantle and fancy dry goods business, J. N. McKendry, Elizabeth McKendry, Sara Lackie, Arthur C. Rogers and John L. Thorne.—The G. A. Thorpe and Maddock Manufacturing Co., capital \$100,000, Toronto, to manufacture clothing and to acquire the business of the present Thorpe & Maddock Co., G. A. Thorpe, H. E. Maddock, E. Peacock, of Toronto, H. E. Boomer, of London, and J. L. Saperston, of Buffalo.—The Harvey Quilting Co., capital \$40,000, Toronto, B. F. Harvey, A. G. Malcolm, J. C. Douglas, Wm. MacMillan and Geo. Eakins.

The annual general meeting of the Paton Manufacturing Co., Sherbrooke, one of the oldest and most important woolen industries in Canada, was held at Montreal, February 25th, when the usual statements were presented, and were considered satisfactory. The following directors were elected: Lord Strathcona and Mount Royal, G.C.M.G.; Hon. M. H. Cochrane, Hon. Robert Mackay, D. Forbes Angus, Robert Brodie, George Hyde, G. M. Loy, M.P.; Robert Reford and John Turnbull. At a subsequent meeting of the board, John Turnbull was elected president and managing director, and Hon. M. H. Cochrane, vice-president.

FABRIC ITEMS.

* The European houses are preparing for the largest lace season on record.

G. E. Armstrong, of Perth, has invented and patented a new skirt binding known as the cut wing. It is said to be absolutely unfrayable and dirtproof.

The contract for making the Toronto firemen's clothing has been awarded to the Crown Tailoring Company, Toronto. The summer suits will be made for \$12.50 and those for winter for \$16.

The trade mark of Shetland wool used by R. Poole & Co., of Leicester, England, has been expunged from the list of Canadian trade marks on motion of R. Forbes & Co. in the Exchequer Court.

The feeding of sugar-beet pulp to lambs in Colorado is increasing, and it is reported that 200,000 head are now feeding in Weld and Larimer counties, and are consuming the pulp in a very liberal manner and with very satisfactory results.

A scheme for the manufacture of paper buttons is being put forward in San Francisco. These buttons, say the promoters of the scheme, will be cheaper than the bone and metal ones, quite as serviceable and of as good an appearance.

In China the down of the thistle is gathered and mixed with raw silk so ingeniously that even experts are deceived when the fabric is woven. It is also used to stuff cushions as a substitute for eiderdown, and a very good substitute it makes.

Gun metal hose is one of the latest novelties. It is not intended to relieve anxious mothers who have long claimed that nothing short of armour steel-plate hose would ever wear on a restless boy's feet more than a week, but refers to the color only. It is a lineal descendant of Oxford gray.

A raid was made a few days ago in Brooklyn, N.Y., on the sweat shops, and fifty of them were closed. The news got out in advance, and many child slaves of these places were hustled out before the inspector arrived. In each shop the inspectors discovered pale faced men and women tailors in a state of terror and ready to collapse.

B. Powell, who lives at Hatchley, a small village near Brantford, has made a record gathering of furs, having collected up to February 10, 1,486 skunk, 1,439 muskrat, 470 racoon, 390 mink, and 43 red fox. The majority of the skunk were prime, of narrow stripe, fine quality and color. The mink were as fine a lot as Mr. Powell ever came across in his long career as a fur buyer. Some were so large as to resemble young otters and mostly, all were of superior quality and color. Muskrat, racoon and redfox were very fair. When ready for shipment the furs consisted of 22 bales and bags, weighing nearly a ton. They will be made up mostly into ladies' coats and wraps.

Half-a-million pounds weight of cotton is grown annually in Cyprus.

There are lively times in the Cotton Exchange in New York. One day recently March cotton was selling at 10.25 cents per lb. and May cotton at 10.17 cents.

A Pekin, China, despatch says: Five thousand bales of cotton, of as good quality as the imported staple, and 3,000 bales of silk have been exported from Port Arthur.

The Cassella Color Co., which has a branch at 85 and 83 Youville Square Montreal, has issued a set of samples of dyeings fast to acids on loose cotton; also Azo Merino Black B and 6B, Patented, on piece goods.

The Silk Association of America give the dutiable imports of silk at New York for the month of February, as amounting to \$3,501,843 as against \$2,840,782 in 1902. The imports of free raw silk for the same month were \$1,431,955, as against \$977,221 in 1902.

Through a process patented recently in Great Britain, Germany and Belgium, it is possible to make use of a by-product resulting from the manufacture of tow yarns in the production of a linen yarn with a cotton core. It is asserted that the yarn, from 8s to 25s, can be woven into a practically pure linen fabric.

At a recent sale in New York a Persian carpet was sold to a well known New York dealer for \$38,000. As its size is 11 ft. 10 in. by 6 ft 1 1/4 in., this means about \$3.65 a square inch, or over half a cent per knot. It is supposed to date back to the fifteenth or early sixteenth century, and to have been a present from a Shah of Persia to a Sultan of Turkey, having been in the possession of the Sultan Abdul Aziz at the time of his death.

Business in binder twine is extremely limited, as the leading manufacturers adhere to their policy of not making general prices. Owing to the advance in raw material recently, manufacturers are less disposed to make prices, and some of those that were made have been practically withdrawn. Trade opinion seems to be tending in the direction of fairly high prices for twine this season. It is probable prices will be pretty well fixed by April 1. At present 10 to 11 cents are named for small lots.

A despatch from Russia says that the large fur dealers of Moscow and St. Petersburg are petitioning their Government for protection against the inroads of what are called American take fur manufacturers. They claim that the trade in beaver, blue fox and ermine is threatened by American dyeing methods which turn out the skins of rabbits, dogs, cats and rats, in imitation of the real article. The fur dealers demand that all imitation fur exposed for sale shall be plainly marked shoddy.

P. D. Bourque has a fox farm near Moncton, N.B. He has enclosed a large area between two hills, through which runs a stream with a wire fence eleven feet high, the top projecting about three feet. The base of the fence is made of stone to prevent burrowing. Last summer he had thirty foxes, but killed off a number, and has now one silver fox, one patch fox, imported from Newfoundland, and eight other foxes. The animals killed were very big, fine ones. He intends going into the business on a large scale.

There is increasing strength shown in woollen goods in Canadian markets. The steady advances in the prices of wool in the English and continental markets and the fact that stocks of Canadian fleece are now practically exhausted have caused finished woollen goods to be held with greater firmness by the manufacturers both at home and abroad. Jobbers say it is impossible now to buy blankets at the old

prices. Some houses are paying higher prices for blankets for present delivery, and for future delivery it is quite certain that prices cannot go any lower. Flannels are very much in the same position. In fine domestic woollen goods the situation is very firm. Retailers who have stocks of these goods left over could sell them back to the jobbers at a good profit.

The city council of Montreal is considering a report of the police committee recommending that criminal action be taken against Drolet, Dufour & Co., tailors, who are charged with having allowed thirteen police officers to take private clothes in lieu of uniforms and charged the city with the latter. The amount involved is \$289. The city attorneys have given a legal opinion that an attempt had apparently been made to obtain money under false pretences from the city of Montreal.

Personal

Harry Osgood has given up his situation at the Preston Glove Works.

E. B. Crompton, dry goods merchant, Brantford, has returned from his 51st trip across the Atlantic.

Robert Coats, of the dry goods firm of R. Coats and Son, Clinton, Ont., died February 22 at the age of 74.

John Bain has been promoted to overseer of spinning at the Auburn Woolen Co., Peterboro, Ont., succeeding Michael Welch.

Wm. McIntyre, jr., of Brockville, has removed to Dundas, where he has entered the employ of Smith & Baker, glove manufacturers, formerly of Brockville.

William S. Henderson, about 30 years of age, a clerk in the gents' furnishing establishment of R. J. Tooke, Montreal, for about three years, dropped dead in the store.

The Custom Cutters' Association, of Hamilton, presented a handsome tie pin to C. M. Nickel, on his leaving for Montreal. He has been employed by A. Zimmerman for the past six years.

J. A. B. Smith, at present in the employ of Livingston Eros, Kingston, has been selected by the nominating committee of the Reform Association for appointment as master tailor at the penitentiary.

Conrad E. Foehlich, an employee of the Waterloo Woolen Mills, died at the Berlin-Waterloo hospital, after a year's illness with kidney trouble. Deceased was married less than a year ago.

Ford Kumpi, who for the past two years has filled the position of superintendent of the Berlin-Waterloo Street Railway, has resigned, having gone into the William A. Greene Shirt and Collar Co., at Waterloo.

William J. McNaught, on severing his connection with the dyeing department of the R. Forbes Co.'s mills, Hespeler, to accept a position with the Galt Knitting Co., was presented with a handsome celluloid shaving set by his fellow employees.

Peter Ewing, a well-known resident of Carleton Place, is dead. He went to Carleton Place about 24 years ago, and took a position as accountant in the Hawthorne Woolen Mills, which position he held until W. H. Wylie disposed of the property, since which time he has continued to reside there.

Textile Design

WOOLEN CHEVIOT TROUSERING.



Complete Weave
Repeat 4 x 4.

Warp:—2,160 ends, 8-harness straight draw.

Reed:— $8\frac{1}{2} \times 4 = 64$ inches wide.

Dress:

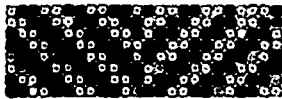
- | | |
|---|-------------------------|
| 1 end, 2-ply, 5-run twist, black | } $\times 9 = 18$ ends, |
| 1 end, 2-ply, 5-run twist, black and white | |
| 1 end, 2-ply, 5-run twist, black | = 1 end, |
| 1 end, 2-ply, 5-run twist, black and yellow | = 1 end, |
| 1 end, 2-ply, 5-run twist, black | = 1 end, |
| 1 end, 2-ply, 5-run twist, black and white | = 1 end, |
| 1 end, 2-ply, 5-run twist, black | = 1 end, |
| 1 end, 2-ply, 5-run twist, black and blue | = 1 end. |

Repeat of dressing: 24 ends.

Filling:—36 picks per inch, all 2-ply, 5-run twist, black.

Finish:—Cheviot finish; scour well; 56 inches finished width.

WOOLEN CHEVIOT SUITING.



Complete Weave.
Repeat 24 x 4.

Warp:—1,580 ends, 8-harness fancy draw, all $2\frac{1}{2}$ run, dark gray mixed, cheviot yarn.

Reed: $12 \times 4 = 66$ inches wide.

Filling:—33 picks per inch arranged thus:—

- 1 pick, $2\frac{1}{2}$ run cheviot yarn, black, twisted with twist composed of 36/s worsted, black, and white silk 36,000 yds. per lb.,
- 1 pick, $2\frac{1}{2}$ -run cheviot yarn, black.

2 picks repeat of pattern.

Finish:—Cheviot finish; scour well; 56 inches finished width.

Textile Record.

ANTIQUITY OF WEAVING.

One tradition states that Nahmah, daughter of Lamech, invented the spinning of wool and the weaving of thread into cloth. On two rock-cut tombs of Beni Hassan in Egypt, and dated B.C. 2800 to 2600, are depictions of weavers at work. Antiquarians have traced rug manufacturers as far back as 2400 B.C.

LITERARY NOTES.

The Century for March has plenty of matter for the grave and gay. Prof. Pickering, the astronomer of Harvard University, tells some interesting things about choosing a site for an observatory; Justin H. Smith, in the fourth chapter of the "Prologue of the American Revolution," gives a graphic account of Montgomery's attack upon Quebec; and Geo. B. Fife continues his series of articles on the great trusts, dealing in this number with the big tobacco trust. Those who wish for stories or sketches "in lighter vein" will find plenty in this number.

The Delineator for April has the usual variety of matter to interest the housekeeper. In this number the service problem of women—not exactly the servant problem, but the broader subject of the nobility of labor in general—is discussed by Miss Clara E. Laughlin. No one is born with the love of serving, but it is a daily factor in our lives, and the sooner that men and women realize the dignity of labor, the happier they will be. Now that woman has gone out

into the fields of the workers, the lesson of service has been more strenuously impressed upon her. In the industrial fight she has come by many a hard lesson, and in many cases has learned to delight in the struggle; but in the end almost invariably she reverts to the home, and the signs indicate that before long the exodus of women from the home will, in large measure, decrease.

WOOL MARKET.

The second series of Colonial wool sales for the year opened in London on March 10, with a large number of buyers present. Competition was spirited. The offerings numbered 12,687 bales, including a good selection of Queensland, which sold briskly. Cross-breeds were taken freely by the home trade. Some fine half-breeds were taken by American buyers at the highest rates. The continent bought scoureds readily, paying full rates for fine grades. Low and faulty scoureds were easier. Cape of Good Hope and Natal was in small supply. Greasy was in good demand at $\frac{1}{4}$ d. decline. Punta Arenas were also in good supply, and met with a steady sale, inferior sorts selling at $\frac{1}{4}$ d. decline. Withdrawals were light.

The offerings the second day were 14,064 bales and the third day 13,344. Scoureds were in brisk demand for France and Germany. Merinos were in spirited request and firmer. Some superior parcels were taken for America. Lambs sold freely. Crossbreeds were in large supply and were taken chiefly by the home trade and continental buyers. Fine grades were firm and hardening, but low and greasy sorts were dull.

The following were prices at the opening and any fluctuations from these figures have not been very great: New South Wales—Scoured, 1s. to 1s. $8\frac{1}{2}$ d.; greasy, $8\frac{1}{2}$ d. to 11d. Queensland—Scoured, $9\frac{1}{2}$ d. to 1s. $9\frac{1}{2}$ d.; greasy, 7d. to 1s. $1\frac{1}{2}$ d. Victoria—Scoured, $4\frac{1}{4}$ to $7\frac{1}{2}$ d.; greasy, $4\frac{1}{2}$ d. to 10d. South Australia—Scoured, 1s. 6d.; greasy, 6d. to $9\frac{1}{2}$ d. West Australia—Greasy, $5\frac{3}{4}$ to $10\frac{1}{2}$ d. New Zealand—Scoured, 6d. to 9d.; greasy, $4\frac{1}{2}$ d. to 10d. Cape of Good Hope and Natal—Scoured, nil; greasy, $6\frac{1}{4}$ d. to $8\frac{1}{2}$ d. Punta Arenas—Scoured, 8d. to 10d.; greasy, $4\frac{1}{2}$ d. to 10d. Buenos Ayres—Greasy, 3d to $5\frac{1}{4}$ d.

Speaking of conditions before the sale the Textile Mercury states that there was very little enquiry recently for either merino or crossbred wools, and the quantities sold privately have been quite unimportant. Advices from manufacturing centres, both at home and abroad, indicate an improvement in the position of merinos, owing to the deficiency of supplies this season, which causes both dealers and top-makers to hold their stocks with great firmness. The sharp fall in values of medium and coarser growths of crossbreeds at the close of the last auctions has unsettled business, and the tendency of prices remains somewhat uncertain. Of course the present sale will again establish prices.

In Boston the business is limited, and made up mostly of small lots taken by the moderate or small-sized mills. The large mills are doing practically nothing beyond taking on a small line of stock to fill out with. There is no snap to the demand, most of the mills of good size being still amply supplied with raw material.

From Minneapolis in the west this report comes. Market firm but not active, although wool is in light supply in all the principal American markets. There is no prospect that it will be higher. If prices were forced up manufacturers

would use more substitutes like cotton and shoddy, which would check the advance.

Montreal.—The market for all fine merino wool is firm with an upward tendency. Low quality and inferior lots are easier. Crossbreds of fine quality are selling at about 5 per cent. advance. Coarse and faulty lots are easier with a decline of 5 to 7½ per cent.

Toronto.—The market is quiet, with stocks in small compass. Fleece is quoted at 15 to 15½c., and unwashed, 8½ to 9c. per lb. Pulled supers are quoted at 15½ to 16c., and extras at 18½ to 19c.

SELF-IGNITION OF COTTON.

Henry W. Diederich, the American consul in Bremen, reports the conclusion of a high court in Prussia in an action in which was involved the question whether there can be self-ignition of cotton. Experts were asked to submit opinions, and after they had testified the judges decided as follows: "Self-ignition of cotton is entirely out of the question, according to the universally acknowledged opinion of men of science and men of experience. It is a peculiarity of cotton that it may conceal combustible matter within it for weeks, and longer, as was seen in this very case, for several bales of cotton that were saved from the fire and lay in a pond for some time during the following winter suddenly burst into flames late in the following spring, without any cause, as was proved by competent witnesses."

TEXTILE TRAINING

"The Training of a Modern Textile Manufacturer" was the subject of a debate at a recent meeting of the Yorkshire College Textile Society at Leeds. The president said that a manufacturer ought to be well acquainted with the qualities of the materials used, have a knowledge of chemistry and dyeing, and some knowledge of machinery would also be very useful. Alfred Armitage, manufacturer, Huddersfield said he regarded a good general education to be first necessary. Speaking more particularly of the fancy worsted trade, he advocated that the theoretical knowledge should be gained in technical schools and the practical part in the mill. Prof. Beaumont said that an organized scheme of study was requisite, and that manufacturers were suffering because they refused to recognize the merit of the training afforded in technical institutions. The loss sustained by the textile community in this respect was incalculable. He hoped the manufacturer and the student would become more closely associated.

The Colonial Bleaching and Printing Co.'s hockey team played a match with the Magog team, at Magog, recently, which resulted in favor of the latter by 16 to 1, which goes to show that the former can run textile machinery better than they can play hockey.

—Some 19,000 garment workers in Vienna, Austria, are on strike. As this is the height of the Vienna season, it is expected the employers will be obliged to capitulate.

An employee of the Canada Woolen Mills at Hespeler named Dreisinger, has had smallpox, which he contracted while on a visit to Guelph with the Salvation Army.

—One hundred and fifty feet of the wall of the Avon cotton mills at Gastonia, N. C., was blown down by a wind storm, falling inward on the operatives and machinery. Two girls were badly injured.

The firm of W. H. Brightman & Co., Brockville, had recently 254 fox skins hung up ready for shipment, besides several other skins. They purchased 564 skins last month and the animals were all killed in the vicinity of Brockville. They also purchased 692 mink skins this winter, and have an order for 50,000 muskrat skins for which they expect they will have to pay fancy prices.

WANTED.—One Hundred Inch Broad Loom. State make and how long in use. Address, Valley Woolen Mill Company, Southampton, N. S.

DYESTUFF MANAGER WANTED.—A large firm of dyestuff dealers desires an experienced salesman and office manager. Address, Box 78, New York City.

FOR SALE.

TWO SETT WOOLEN MILL.—Four miles from Almonte, On Mississippi River. Good water power. Six broad and one narrow Crompton Looms, with other machinery for manufacturing tweeds. Address, PETER McDOUGALL, Bisheny, Ont.

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In applying, state experience, give age, mention references and wages expected.

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15 Dewees Trimmers or Seamers.
13 Overseamers,
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In good order, now running—nearly new.

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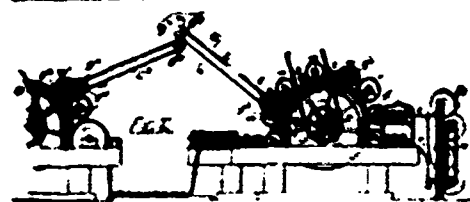
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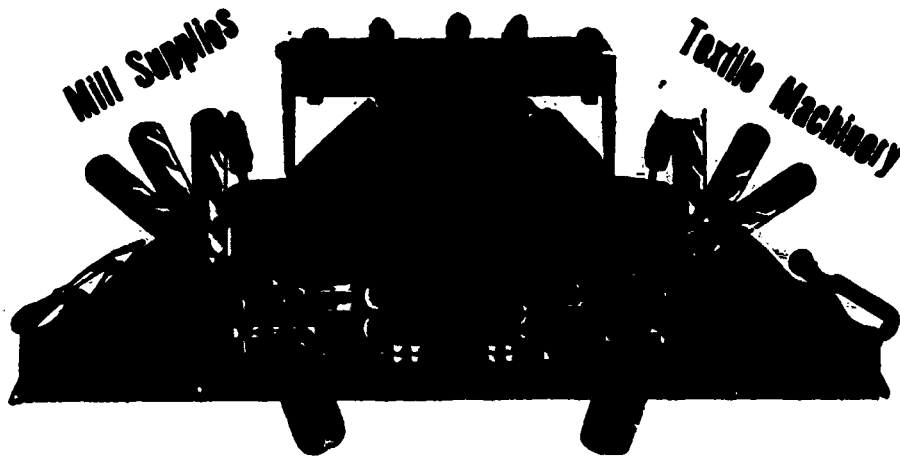
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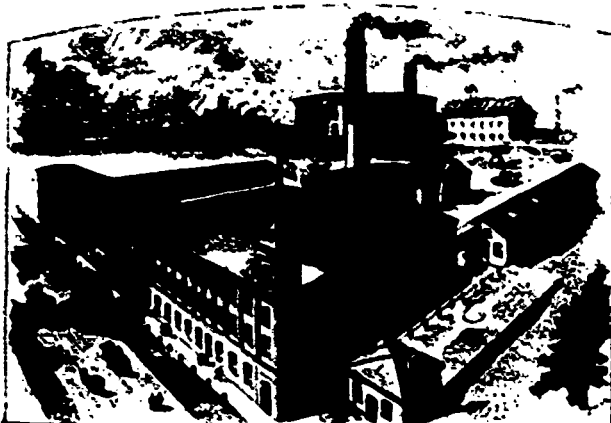
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Of SILK, WOOL, COTTON, WASTE, JUTE, etc., it will
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Machine on one-half the power.— Has no rival on the market.

Toronto Woolen Machinery Company

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L. B. DANNAN, Manager.

Sole Agents for Canada and the United States.

Prices on Application.

Prices on Application.

—A Royal International Exhibition, under the patronage of the Princess Royal of Greece, and assisted by the Greek Government, will be opened on April 3, 1903, at Athens. The exhibition, which will last for six months, will comprise the products of commerce and industry, hygiene, and alimentation, fine arts and sciences, and education.

—For the driving of countershafts in any part of the mill a good quality of woven hair belting is most efficient and economical. It costs less than leather, and wears better. This woven belting has been tried with a fair measure of success in many cases for the counter-driving of mules. The drawback is that the action of the forks in the constant changing from the fast to the loose pulley soon frays the edge.

—An English patent has recently been granted on an invention to provide "mechanism in connection with spinning, twisting and the like frames so that the spindles, top and bottom rollers can be stopped without the main driving drum of the machine. The spindles and rollers on one side of the frame are driven by one cylinder. The spindles have separate bands and are carried in rails, each rail having about ten spindles each. The rails are suspended on the arms centred at the thread board so as to swing away from or near to the cylinder. Shafts are carried behind the spindle rails along both sides of the frames. On these shafts are wipers and weights which press the rails outwards and tension the bands. At the end of the frame a lever is fixed to the pressing shaft, and on the framing a hand lever communicating with same."

—The best wool was formerly grown in Spain, where the mild and equable climate favored its production. New South Wales was first stocked from Spanish flocks, and it is believed that in the Australian climate the wool has gradually grown softer, more elastic, and longer, than that produced

in Spain. Thus it has gained a high reputation. In 1891 there were 61,831,416 sheep in New South Wales, the greatest number on record, and it is considered that the country was at that time overstocked. The total amount of wool said to have been produced in the colony in 1891 was 375,600,667 lbs. In 1894, there were 4,000,000 fewer sheep, but 4,000,000 lbs. more wool was grown. There has been an almost constant decrease in the number of sheep down to the present time. Owing to the drought, the past year has been the most disastrous of all.

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 The report presented at the annual meeting of the Bran-
 don Binder Twine Co. showed the number of shareholders to
 be 2,068, and the number of shares sold 4,728, on which \$68,210
 had been paid in. There is \$31,033 of manufactured twine on
 hand, \$27,764 of raw material, and \$63,286 plant, the total
 assets being \$128,988. The liabilities include \$59,008 bills

 payable. The directors asked that the capital stock be in-
 creased, so as to provide a larger working balance, and as
 already stated in The Journal recommended that the neces-
 sary machinery for the manufacture of rope from $\frac{3}{4}$ -inch to
 one inch in diameter be installed, that a machine shop for
 repairs be installed and that authority be given the board to
 have a thorough investigation of the problem of the manu-
 facture of binder twine from Manitoba grown flax, to make
 experiments to that end, and that the manager be authorized
 to visit the flax growing and manufacturing centres of the
 world to secure needed information. The president stated
 that the operation of the factory has resulted most
 satisfactorily, and he anticipated better things in the future.
 The hands are becoming more skillful, and the demand for
 the output is increasing. The following directors were
 elected: N. Wolverton, Brandon; W. T. Johnston, Wawanese;
 J. T. Partridge, Sinaluta; J. G. Burke, Elmore; Allan Leslie,
 Chater; A. McPhail, Brandon; John Hanbury, Brandon;
 Frank W. Smith, Brandon; E. L. Christie, Brandon; N.
 Wolverton is president and manager, and S. H. Christie
 secretary-treasurer. Arrangements were made to issue \$40,
 000 of new stock.

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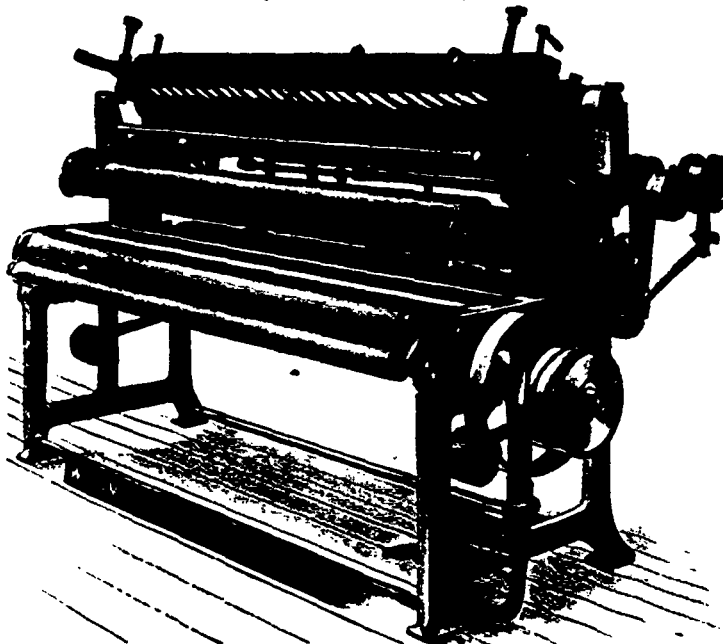
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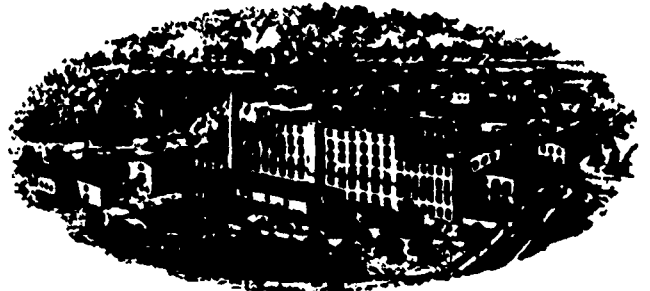
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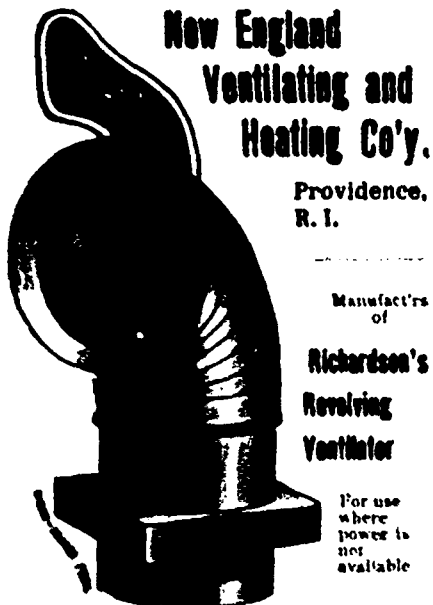
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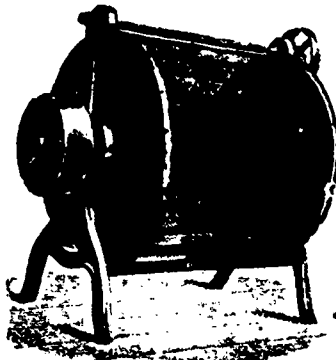
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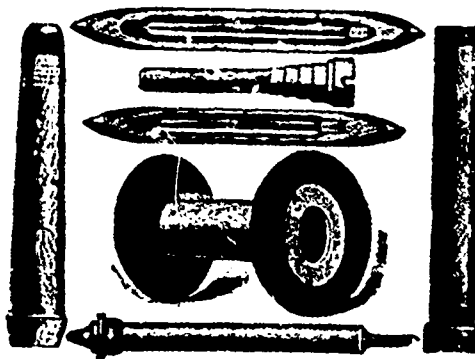
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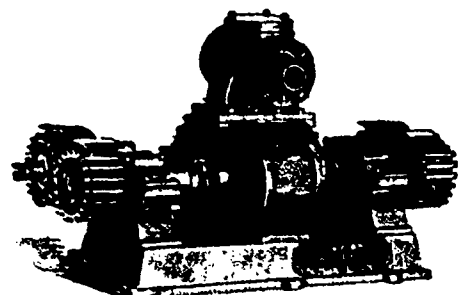
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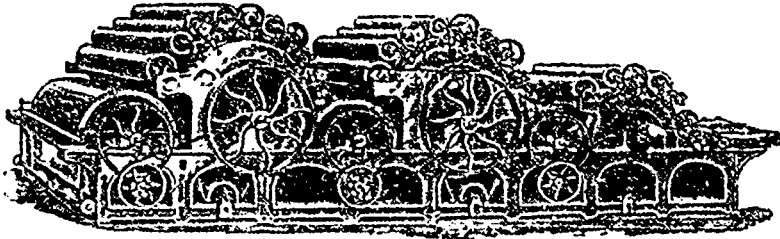
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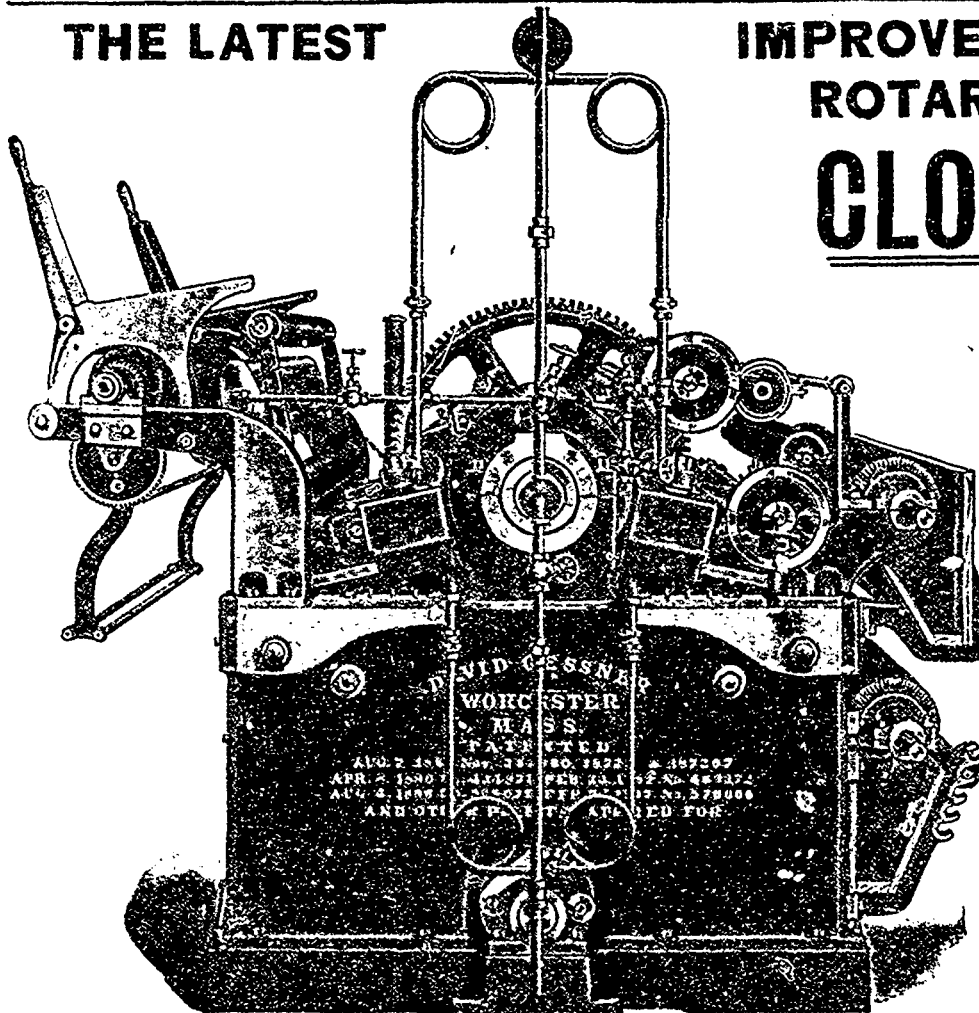
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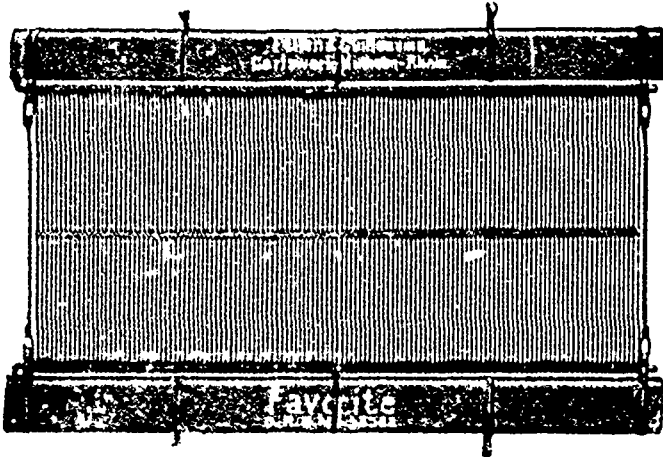
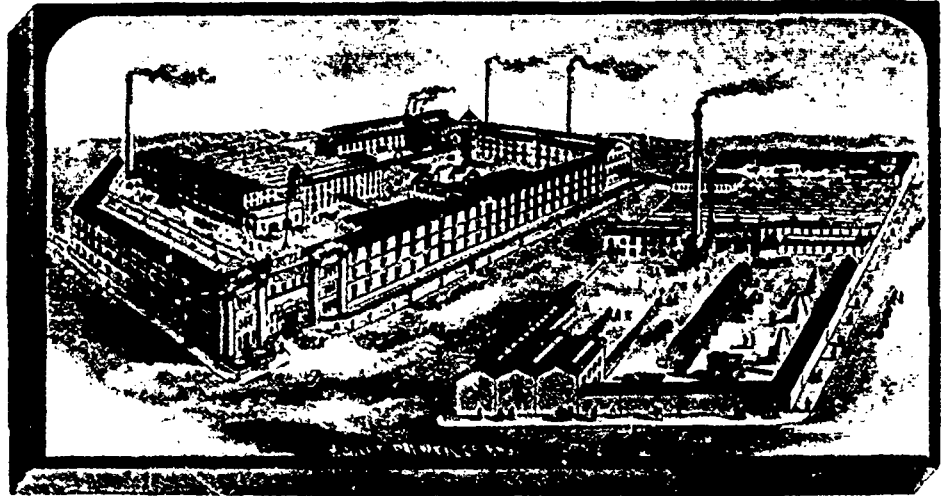
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