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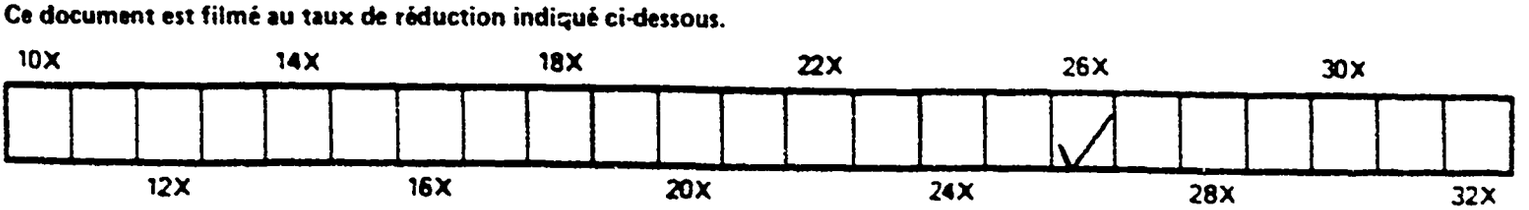

Canadian Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XX. TORONTO AND MONTREAL, APRIL, 1903. No. 4.

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Canadian Journal of Fabrics

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INTER-IMPERIAL POSTAGE AND INTER-IMPERIAL TRADE.

It speaks volumes for the insight of the men who compose the Montreal Board of Trade that while they are all purely commercial men they have a statesmanlike perception of the influence of literature upon trade, and hence they were the first important organization to congratulate Sir William Mulock, the Postmaster General, on reducing the postal rates on newspapers and printed matter going to Great Britain to the level of our domestic rates. For four or five years Sir William Mulock has at various times asked the British Postmaster General to make the same reciprocal arrangement between the Mother Country and Canada, as has existed between Canada and the States ever since Confederation, under which arrangement printed matter is exchanged through the post-office at the domestic rate of each country, but the Canadian offer has always been met by that attitude of inertia which calls up Tennyson's characterization of "the stony British stare." However Sir William persevered and in the case of letter postage was able at last to get a mutual reduction to the penny (two cent) rate which has become a memorable postal reform by being extended to nearly all parts of the Empire. And now the fence that has barred out literature from easy circulation between the two countries has been partly broken down by the British office consenting to the admission of Canadian papers. books, catalogues, etc., at the domestic rate of Canada, We join the Montreal Board of Trade in congratulating Sir William Mulock on this step in advance, which is destined to have a momentous influence on the literary, social and trade relations of Canada and the Empire, because it is now only a question of a short time when cheap postal rates from Great Britain to the Colonies will follow as in the case of Imperial penny postage and the freer circulation of British literature over the British world will make itself felt in all phases of life.

A few Canadian editors having personal knowledge of the extent to which cheap newspaper and book and catalogue postage was being made the instrument of promoting the trade of United States manufacturers and merchants with Canada, and how this trade is maintained in spite of the preferential tariff in favor of British goods, took up the matter in the Canadian Press Association three years ago, and that association has done something to strengthen our Postmaster General's hands each year since.

The editor of the JOURNAL OF FABRICS was asked recently to make a statement of the case for cheap postage as it bore on the trade of Great Britain with Canada. As the subject is of real importance to British and Canadian manufacturers we make a few quotations from this article, which appeared in *Britannia*, of London and Glasgow, a magazine devoted to the closer union of home country and Colonies:—

"Taking the term 'press' to mean not merely news

papers, but periodicals, books, and even trade catalogues, it is the writer's purpose to show, from the recent history of the press in Canada, that the Mother Country is in effect maintaining, in the form of postal restriction, a tariff wall against its own trade throughout the English-speaking world. And the same restrictions that are suffocating trade between the Mother Country and some of her most important daughter-nations is also beginning to stifle that free interchange of thought and sentiment which is the life of an Empire separated by the seven seas. The postal relations of Canada and the United States afford a striking example of the commercial benefits of an unhampered interchange of the products of the press, and the fact should warn the people of Great Britain against continuing a policy that chokes off a million pounds' worth of trade for the sake of a thousand pounds in newspaper postage.

Profit has never been an object in the postal service of either the United States or Canada, and, more than once, laws have been in force giving free transportation to newspapers from the offices of publication, on the ground that the small loss in public revenue involved was more than recompensed by the educative influence of cheap newspapers among the people. This liberal view obtained in Canada as far back as 1851, an Act having been passed in that year and remaining in force till 1855, by which papers and periodicals devoted to education, science, agriculture, temperance and other special subjects, were carried free if published within the then Province of Canada. From 1859 to 1882 the charges on newspapers from publication offices varied from a small fraction of a cent. per copy (the papers being graded according to frequency of issue) up to one cent. a pound, but in the latter year all newspapers and periodicals from offices of publication became free, and remained so till 1898, except that free delivery was not accorded within the city or town where a paper was published. In 1898, to make up for the loss of postal revenue immediately incident to the introduction of the Imperial penny postage scheme (in which it will be remembered Canada led the way), newspaper publishers were assessed in postage at the rate of a quarter of a cent a pound, the rate being increased on July 1, 1900, to half a cent (one farthing) a pound. Even then free postage was not altogether done away with, as papers were allowed free to points within a zone of forty miles from the office of publication—though this is, it must be confessed, a rather illogical and certainly inequitable proviso, borrowed from United States legislation, by which it was intended that the rural newspapers should be "helped along" with a form of Government charity. . . . In such a large field for literary enterprise, and under such generous treatment, United States newspapers and the trade and technical publications are not only crowding British publications out of Canada, but have been for years rapidly gaining ground in South Africa, Australia, and, in fact, wherever the English language is the medium of printed thought; and everywhere they are heralding the introduction of American machinery and manufactures. With such a large home market for profitable subscriptions, the United States publisher can well afford to lose something on foreign subscriptions, if need be; though even here the loss is more than made up by the increased prestige he gets by bringing in foreign trade to his enterprising advertisers. The large circulation which United States technical and trade publications have obtained in recent years in Great Britain and her Colonies, is, in fact, one explanation of the great foothold American manufacturers are obtaining in the markets of British Dominions. This was exemplified strikingly in South Africa in such centres as Johannesburg, where skilful advertising, joined to the efforts of active agents, developed such a large trade in electrical, mining, and other machinery and manufactures up to the outbreak of the war, and again since the war closed . . .

Now, the effect of these cheap postage rates between Canada and the States is this: that a single mail train will sometimes bring into the Union Station at Toronto one hundred sacks of United States papers, or more than the total sacks of British mail matter (books, papers, and letters) passing through the same distributing centre in a whole week. Old post office employees can remember when the amount of British mail matter was at least equal to that coming in from the States . . . As a rule, the religious, educational, and technical papers and the higher class of literary papers of the United States are admirably conducted; but unfortunately, the United States papers having the largest circulation in this country are the "yellow" journals and equally "yellow" cheap magazines, that are most harmful to Canadian youth, and if Canadian public men do not see the baneful effects of this turbid tide in the present generation, they assuredly will in the one now growing into manhood and womanhood. Here and there, it is true, a British periodical still maintains a hold, but, as a rule, their Canadian circulations have declined almost in proportion as United States publications have increased. How could it be otherwise, with free trade in literature between Canada and the United States and on the other hand the enormous tax of eight cents (4d.) per pound on papers, etc., between this country and Great Britain?

Then, as to the commercial aspect of the question—not only have we this great circulation of the United States literature, but United States manufacturers also advertise largely in Canadian papers, and the result is seen in the remarkable circumstance that to-day, in spite of the fact that since 1898 British goods have entered Canada at a rate of duty 25 per cent. less than those from the United States, and 33⅓ per cent. less since 1900, United States trade with Canada is still gaining. That trade follows the press and not the flag, between countries with a common language, is clear from the postal history of these three countries, for not even the geographical contiguity of Canada and the United States can explain away the fact that, against tariff conditions adverse to the extent of one-third, the United States has increased her exports—chiefly manufactured goods—to Canada from $53,685,657 in 1891 to $110,485,008 in 1901, while Great Britain's exports here, which were $42,047,526 in 1891, stood at only $43,018,164 in 1901

Moreover, since the preferential tariff has been increased to 33⅓ per cent. in favor of Great Britain, her exports to Canada have fallen by over one and three-quarter million dollars, while those of the United States to Canada have increased by $640,000. . . . In their heart of hearts the people of the United States believe their manifest destiny in this twentieth century is to hold the primacy in the Anglo-Saxon world, in social and moral influence as well as in trade, and if they gain such a proud position it will be by the moral influence of their press. The ambition is not unworthy, but it is only sportsmanlike to arrange that the conditions for the friendly contest should be at least fair and equal. Will the British Government and people meet the demand of the times, or will they continue to fish on the plan of throwing the mackerel to catch the sprat?

CHEMISTRY AND THE TEXTILE INDUSTRY.

By John Waddell, D.Sc., School of Mining, Kingston.

The relation existing between the textile industries and chemistry is very intimate. Doubtless it is true that the most essential of the processes are mainly mechanical, the most important thing about the wool or cotton or silk being that it should be woven into cloth. But only second in importance is the preparing of the fibres and the treatment of the cloth when made. Hence the value of the manufacture of the chemicals such as alkalies, soaps, bleaching compounds and dyes and of the application of the most satisfactory methods of using them.

The treatment of raw silk is a case in point. Some kind of fabric could doubtless be made of raw silk, but it would not compare favorably with the product that is put upon the market. Raw silk contains two albuminoid compounds, fibroin and cericin, the former is the valuable part forming the real fibre, the latter is dissolved away by treatment in hot soap solution. The chemical relationships between these two compounds is not well known and chemical work might advantageously be done along this line.

In the preparation of raw wool for further use it is necessary to get rid of the grease and of the potash salts that are in it. The operations are chemical in their nature, soap is used for the purpose of removing grease or some solvent such as benzine may be employed, the benzine being afterwards recovered. A better solvent would be carbon tetrachloride, because it is not liable to catch fire, but at present it is too expensive. The wool is prepared in some of the ways indicated, but unfortunately the by-products are largely waste. Particularly is this true of the potash salts, which are of considerable value.

The different chemical characters of different fabrics determine the methods of bleaching and of dyeing. For instance, wool cannot be bleached by chlorine, which would combine with the fibre and would not destroy the natural yellow shade, and it is usually bleached by sulphur dioxide. On the other hand, wool being acid in character unites directly with basic dyes without the intervention of a mordant. The same thing is true of silk, but cotton is ordinarily mordanted before being dyed with basic dyes. Cotton is essentially cellulose, but all cellulose is not of the same nature. The composition of cellulose is known, but its exact chemical character is not thoroughly worked out. A large amount of labor has been expended upon the subject however, and valuable information has been provided by special investigators. Chemical investigation is responsible for mercerized cotton whose silk-like character has rendered the material of such interest.

Perhaps in the matter of mordants our methods are rather the result of empirical work than of strict chemical investigation. Nevertheless something of a scientific nature has been done, and it is to be hoped that in the future more good work will appear. The investigation of dyes is one of the widest branches connected with the textile industry, and the two main classes of dyes, the natural extracts and the artificial coloring matters, have been largely investigated. The debt owed to the chemist by the dyer and by the public that gets beautiful colors at a low price is not easily to be estimated. The aniline dyes and all those derived from coal tars have revolutionized our textiles.

The dyer, in order to carry on his business in the best fashion should have considerable chemical knowledge. He should understand the character of his dyes, and knowing their chemical relationships he is better able to use his methods with judgment.

There are many departments in the textile industry in which chemical research would be of great interest and advantage, but the necessity is not only in the line of research. It would be a great advantage if what has already been discovered were more fully known and understood by the textile artisan. It would enable him to work with more interest and more effect, it would enable him to vary his methods for varying circumstances, he would become less an imperfect machine and more a perfect machinist, he would rise from the artisan to the artist.

A paper was lately read by Dr. Matthews before the New York section of the Society of Chemical Industry, dwelling upon the need for research in the various branches of the textile industry and drawing attention to the limitations of our knowledge, and to the field open for investigation. Such investigation can be encouraged by technical schools of a high grade, schools in which men are given the preliminary training requisite and are also given the stimulus and the opportunity to investigate and are induced to carry out research along suitable lines. Dr. Matthews complains that in the United States too little attention is paid to textile chemistry. What is true of the United States is still more true of Canada.

But schools for research are not our only or our most pressing need. We do require technical schools for our leaders in industry, for the men who investigate and create, and our country cannot become really great until we have a fair share of such men, but in the meantime we probably need fully as much men of a lower grade who can understand and appreciate the work that is done by others

and can apply it in their every-day routine labors of the shop and of the factory.

Probably no trade needs such intelligent and educated workers more than the textile industry.

—The binder twine people are pressing the Government hard to have the duty which was taken off in 1896 put on again. They have $2,500,000 invested in ten factories. They promise that they will sell twine as cheaply to Canadians as American firms sell to Americans. The Canadian manufacturer is handicapped by the obstacles thrown in the way of export of manilla fibre from the Philippine Islands, which now belong to the United States, and the Government recognizes the disadvantage, but will they remove it?

—While the cotton manufacturers in Canada are calling for more protection, Senator Edwards calls attention to the other side of the question. He says it would pay the public to board the cotton men at the Windsor Hotel, in Montreal, and pay them two dollars a day, if their factories were closed down and the duty removed. From a strictly debit and credit point of view this may be correct, but is it not worth something to provide employment for many of our population who, if they did not find it here, would have to go to other countries to seek it?

—It is pleasant to know that someone is making money in the textile manufacturing industry, even though it be in Germany. For instance, the Leipsic Cotton Spinning Company pays 12½ per cent. for last year; the Leipsic Worsted Yarn Spinning Company, about 10 per cent., as against 8½ per cent.; the Leipsic Carded Yarn Spinning Company, 8 per cent., as against 5 per cent.; the Meerane Worsted Yarn Spinning Company, no dividend, as against 2 per cent.; the Thuringian Woollen Yarn Spinning Company, 10 to 12 per cent., as against 12 per cent.

—In answering the enquiries of a correspondent the American Woolen and Cotton Reporter makes the following comparisons between United States domestic wools and foreign wools, such as Australian: Foreign fine wools sell for more money than domestic fine wools because they are intrinsically worth more. Manufacturers are willing to pay the enhanced cost as is shown by the fact that all the fine foreign wools in this market are practically cleaned up about as rapidly as they arrive. Thus Australian fine wool, as compared with domestic, is actually finer and softer, and the fibres are more uniform in length. The wools are put up better, the tags are all out, they run more even in grade; in short they are a superior wool and greatly preferred in certain processes of manufacture, and they are absolutely necessary for certain classes of fabrics, and manufacturers of such lines would unquestionably buy them even if they cost more money than they do now, assuming that there was any call for such goods as they were making, for they would be obliged to have the wools in order to make the goods. The domestic wools which come nearest the Australian in quality are the best Ohio, Pennsylvania and West Virginia wools.

WASTE ACCUMULATIONS.

In all hosiery factories there are more or less a variety of yarns used, as the producing of various weights requires a variety of thickness of yarns, or, as they are termed, numbers or gauges. Besides this there are the various colors used, and the different principles of yarns according to the fibres of which they are composed, and of the material from which they are spun. These various sorts of yarns necessarily leave us at the end of the year with certain quantities of each, many of which may be yarns that from some cause or other we are not using at this time upon regular goods, and, again, we have certain numbers of yarns not being used because we had to change from the number first used to another number to, perchance, cause a difference in weight or for some other object. None but those who are closely connected with this department of our trade will understand how these accumulate, though the most careful watch may be kept on them throughout the year. But when stock taking comes, whenever that may be, and all the corners are turned out, the little here and the little there, when added together, amount in figures to a number that often considerably surprises the principal as well as the manager of the department.

Another department will produce a similar surplus. We refer now to the manufacturing department. If we are making socks, hose or half-hose, we have oddments of the various kinds that are the overplus of orders, or that may have been made wrong through some neglect. But all these should come to the surface at the annual stocktaking, and it is then a question of how to turn these to the best advantage. In the manufacturing department, where the goods, whether shirts, pants, or hose and half-hose, are cut from a web made upon the machine in rolls, we have lengths of various sorts left, and sometimes portions of rolls, or even whole rolls, that have been made in excess of an order with the hopes that repeats for similar orders may be forthcoming. But these having failed to arrive as anticipated, we are left with them in stock, only to depreciate in value the longer they are kept. So the better plan is to use these to the best advantage, and thus clean up our surplus stock as it is produced Taking, first, the pieces of web made on the smaller diameter machines, such as are used for half-hose and hose, these may be utilized by being cut up into small socks or even smaller sizes of half-hose or hose. All the various sorts when so cut out and finished may be boarded to their respective sizes, and being assorted will make a mixed line that can be sold at a price that will repay for the trouble that has been taken, besides often finding work for those that otherwise would be doing nothing. Thus labor in reality has not been an item, a point that needs much consideration from a profit or loss point of view, the object being to so make our surplus stock into that form that will realize the greatest return without incurring any more extra cost to our pay list than is absolutely necessary. Wider pieces of web, as used for shirts and pants, can nearly always be utilized into some kind of ladies' undergarments that can be composed of a number of small pieces. In such lines as are made from these odd pieces it is often not detrimental to make articles of additional pieces, and so having a joining where in ordinary goods there is no such seam. Take, as an example, children's bodices and combined bodice and skirt; an extra

seam in either of these is no objection under the circumstances. The garment so made will use up many bits that would not be otherwise utilized.

It will be understood that it is first necessary to sort out the oddments into lots nearest to each other in quality, and better advantage can often be gained by sorting the same with a view to the articles to be made, so that they can be afterwards dyed. In such cases the difference in shade does not require such exact matching as would be the case where articles are undyed, the first selection being made with the object of matching the pieces for undyed goods If both ribbed and plain fabrics are to hand, a number of different makes of goods, especially half-hose and hose, can be made that will use up nearly every available piece, if only some judgment is first used in properly assorting with this end in view. We will suppose we have various lengths of a similar quality of rib web. Some of this may be long enough to form the leg only of a half-hose or hose, while others may make long insteps of the rib, a loose bottom being used of a plain web, which will use up the shorter pieces of such web In case of loose bottoms a different color may be used if only judiciously matched, and so use any bits that would otherwise be waste in its truest form. We have seen even the smallest pieces utilized for cuffs and mitts, which have been finished with a fancy edging, and made into a salable article, that, in the first instance, was made only with the object of utilizing these smaller pieces, but which brought a demand that had to be supplied by steady production.

By this system, besides our odd webs, various other items are used, as in making socks. For these rib tops are required, which, being small, use up pieces that one would not deem possible to be of such use. In making up bodices, etc., odd braids, buttons, sewing cottons and a number of other things can be cleared out of stock, after having been laid aside as not suitable for regular goods These suggestions will at once show what disposition may be made of old stock, if it is only properly handled at a time of the year when nothing more profitable could be done. It may be advantageous also to use up some of our odd lots of yarn by knitting webs suitable for any of the garments mentioned, or into something which may suggest itself to the manufacturer. It is not until a start has been made in the direction mentioned, and with the above objects in view, that it is found how a stock may be reduced, and a line of goods made that will find ready sale at the price at which it can be produced. When finished articles have accumulated, they should be completed and made salable We often find in factories that we get a number of legs with no yarn to foot them, and they are thrown to one side to turn up again none the better for their rest These now require to be finished in the best possible form, and from the stock at disposal. Wi. shirts we find bodies with sleeves and vice versa. These should be utilized to the best advantage. A cut sleeve may now be used in a wrought body or a wrought sleeve in a cut body, and so on.

This same system may apply to other branches of our trade than those to which I have made particular reference. There is a similar accumulation of odd pieces in the warp trade, and many of such pieces will be found suitable for small neck warps, or for centres of shoulder shawls, if a bordering is matched to the best advantage. In the glove trade, too, yarns may be used up to make pairs, a number of which will make assorted dozens that will find a ready sale. There is no department that this system cannot be applied to, and with advantage, if care and judgment, according to circumstances, are bestowed.—Hosiery Trade Journal.

SULPHUR BLACKS, AND THEIR ACTION UPON COTTON.

By Louis J. Matos, in the Journal of the Society of Chemical Industry.

The discovery of the sulphur coloring matters dates from the success, in 1873, of Croessant and Bretonneus, who produced what is known commercially as Cachou de Laval, and which discovery has been regarded as the prime starting point from which the subsequent sulphur coloring matters have been developed. The manufacture of all the sulphur colors is carried out on generally the same principle, that of making a "melt" of certain nitrogenous organic substances with caustic soda, sodium sulphide, and free sulphur. This fusion is conducted in large cast-iron pots, supported in brickwork, and suitably inserted over a fire. The duration of the fusion depends upon the nature of the raw product, but in nearly all cases it is stopped when a test sample of the melt is found to dissolve completely in water. Some of the commercial products are ready for the market without further treatment, while others are subjected to a subsequent baking in large pans suspended one above the other in a large externally heated oven. Depending upon the particular process of treatment, and governed by the raw materials, the finished product may be dense and tough, sometimes hygroscopic, whilst, in other cases, it may be porous and brittle, resembling coke.

The technical importance of these new blacks to the textile industry is their great value in producing shades of the utmost intensity and with a minimum of expense, and combining to a remarkable degree the qualities of extreme fastness to exposure to weather, light, ordinary washing, soaping, acids and alkalies. Of course these qualities are relative, as all the black sulphur products are not exactly alike in their several properties.

Compared with the ordinary types of blacks for cotton (excluding those obtained from logwood or other similar sources), we find that, in the sulphur blacks, we have products yielding shades that more nearly approach those obtained from aniline, and which are, in many respects, equally as fast. We further find that the practical details for producing a high-grade black are much simpler than for the same depth of black by the aniline process.

In comparison with the ordinary direct dyeing blacks, it is found in practice that the dyeings obtained from the sulphur products are always superior in point of fastness; and that when compared with the so-called diazotizing and developing blacks, there are a number of details in connection with the latter to be carefully watched, in order to guard against off shades, unevenness, and lastly, tendering of the fibres, defects not prominent with the sulphur blacks. This latter complaint has been also made in reference to the sulphur blacks, however, and the present paper is intended to direct particular attention to this subject.

As sulphur blacks are of importance only to the cotton dyer, the general details as followed in practice will be briefly outlined. The dyebath is made up with a sufficient volume of water, to which dissolved dyestuff is added, together with sodium sulphide—in some cases caustic soda also—and always common salt or Glauber's salt, to increase the density of the dyebath The material to be dyed is then immersed, the temperature gradually brought to the boiling point, and maintained for about one hour, during which time the cotton is worked, in order to ensure level or even shades

Other classes of the sulphur blacks do not require the addition of sodium sulphide to the dyebath, but the addition of a small quantity of soda ash is regarded as an advantage.

Thus, we are likely to find in the dyebath, besides the dyestuff, one or more of the following substances: Sodium chloride; sodium sulphate; sodium sulphide; caustic soda (sodium hydrate); sodium carbonate; regarding the action of which, upon cellulose, in the form of chemically cleaned cotton threads the subjoined notes may be of interest. All the experiments were made parallel, and under strictly the same conditions, and upon the same material. Test samples were frequently taken and subjected to tension in the dynamometer, to ensure regularity and uniformity throughout each series.

Action of Boiling Aqueous Solutions on Sulphur Black (St. Denis Black, B).—Ten grms. of fine cotton was boiled for one hour in a simple 1 per cent. solution of the black, loss of water prevented by means of a reflex condenser. After boiling and washing the yarn, drying under normal conditions without the aid of heat, no loss of strength was noticed in an average of 30 tests.

Action of Dilute Solutions of Sodium Chloride.—Same apparatus, strength of solution, time, etc.: 27 tests; loss 0.47.

Action of Dilute Solution of Neutral Sodium Sulphate.—Only 5 tests were made with this salt, the results of which showed no action on the thread.

Action of Dilute Solution of Sodium Sulphide.—The commercial crystallized article was used for this series of tests. Solution, 1 per cent. strength; 24 tests were made; normal yarn, 100; average of 24 tests, 94.2. Maximum, 98.3; minimum, 88.56.

Action of Dilute Solution of Caustic Soda.—One per cent. solution. One hour boil. Yarn washed and dried at normal temperature. Average of 21 tests; no practical loss.

Action of Dilute Solutions of Sodium Carbonate.—One per cent. solution. One hour boil. Average of 14 tests; no loss.

From these tests we are led to conclude that there is some slight loss in strength of the material dyed, but then it must also be remembered that the treatment received by similar material in actual practice would not be nearly so severe, and that the loss of strength of the dyed material would be very much less.

Operations subsequent to dyeing, as applied to the Sulphur Blacks, may be only washing and soaping, or a "fixing" in a special bath containing certain metallic salts in solution, usually in the presence of some acid. The object of fixing as applied to those sulphur colors that require it is to cause a deposition of the black color base on the fibre substance. When such dyed and "fixed" fibres are examined under the microscope, however, no evidence of insoluble particles are discernible, but we are safe in assuming that such deposition is the case in view of the well-known reactions of the Sulphur Blacks when in solution.

The fixing baths, as usually made up, contain as a maximum five per cent. of bichromate of potassium or sulphate of copper; sometimes mixtures of these two salts are employed, in which case the combined amount rarely exceeds six per cent. As a rule, one and one-half per cent. to four per cent. of sulphuric acid, or three to six per cent. of acetic acid is used, according to circumstances, all calculations being upon the weight of the cotton. The temperature of the bath is usually kept at 75° C., and the duration of the immersion from one quarter to one-half hour.

The influence of this fixing bath upon the black as dyed is to cause it to become almost absolutely fast to the most severe milling, and unless insufficiently washed before fixing will in no instance stain adjacent white material.

The action of the fixing bath upon the fibre substance is of importance. Owing to the character of the ingredients used, we might infer that some distinctive action would take place, but this does not happen. A series of tests were made upon clean cotton yarn; same yarn, dyed; same yarn, dyed and fixed; and the loss in strength, due to the subsequent fixing, was inappreciable.

The action of the chrome fixing bath, however, when allowed to act for several hours upon either dyed or undyed cotton, has a marked influence upon the strength, but when the immersion is only one-half hour at most, and at a moderate temperature, no loss was recorded.

When objections have been raised to the loss of strength suffered by the dyed yarn in cases where it has been "fixed" in the manner described, this loss has been traced directly to insufficient washing after fixing, and then when sulphuric acid was used.

Summing up the observations, we note that the several components of the dyebath, either alone or in combination, have no appreciable effect upon the cotton fibre; that the subsequent "fixing" bath, or its several constituents, is likewise free from action, when used at the usual temperature of 75° C.; that failure to wash the dyed and fixed material thoroughly, thereby allowing traces of acid to remain in the fibre, is a cause of fibre weakness; and it has been practically demonstrated, upon large scale tests, that where ample washing was done, the dyed and finished material had lost none of its original strength.

OILING OF WOOL.

The preliminary treatment of raw wool as it comes from the sheep's back is to extract the fat, grease, and dirt it contains, usually by an alkaline treatment. The cleansed wool thereby obtained does not card well or spin well, so it is found necessary to oil the wool before it undergoes this treatment. For this purpose olive oil has been used for a long period, and a very efficient material it is for the purpose, but it is rather expensive. A more recently used substance is oleic acid, obtained as a by-product in the preparation of stearine (stearic acid) for candle-making, from fats like tallow and palm oil; it is prepared in several grades, varying in color from pale straw to dark red, and at prices proportionate thereto. These commercial oleic acids consist chiefly of oleic acid itself with a little unchanged fat and a little hydrocarbon oil, resembling paraffin oil, produced by decomposition during the distillation of the material. Several crude oleic acids (or oleines, as they are often called) are produced by distillation of waste fatty matters; these contain much oleic acid, some unchanged oil and hydrocarbons varying very much in amount according to the character of the crude grease from which they are derived. It is important to remember that after the processes of spinning and weaving, the oil has to be got out of the wool before the processes of dyeing and finishing can be conducted satisfactorily. Now oils like olive oil, derived from animals and vegetables, are converted into soap by means of alkalies like soda and potash, and so an alkaline washing treatment removes them from wool. Oleic acid is even more readily saponified than olive and other similar oils, so that it also is easily removed. But hydrocarbons are not saponifiable and not chemically acted upon by the alkalies; hence they are removed with difficulty from wool. So we find that the

crude oleines, last referred to, are not completely removed from wool, especially if they contain comparatively large quantities of hydrocarbon products; but they are much cheaper than either olive oil or oleic acid, and so are much used, chiefly on low grades of wool.

Another class of oils that are often used, either alone or in conjunction with those named above, are the hydrocarbon or mineral oils obtained from paraffin shale or petroleum. Simply regarded from the point of view of oiling the wool for carding, spinning, and weaving, they are quite as efficient as the other products; and, being much cheaper, wool manufacturers are tempted to use them, especially for very low classes of shoddy wools which cannot stand much expense, either alone or in combination with other oil products. But they are not saponifiable and cannot be entirely removed from the wool by scouring with alkali and soap. Some is sure to be left in the wool, and this will prevent the fibre from taking the dye easily and is liable to produce patches and stains. By mixing them with a large proportion of oil or oleic acid they are more readily removed from the wool, but it is difficult to entirely get rid of them, so that in the case of fine wools their use should be avoided.—Dyer and Calico Printer.

PECULIAR METHOD OF MERCERIZING.

In order to provide cotton yarn with a silky lustre of the highest perfection, says The Textile Manufacturer, two conditions must be complied with. On the one hand, the fibres ought to be mercerized whilst in a state of considerable tension; on the other hand, however, they should not be mercerized in the form of finished yarn, but before the spinning operation. The former condition cannot be complied with in the least when simply treating the fibres, but even by treating the spun yarn, and especially a single-ply of untwined yarn, the first of the above-mentioned conditions is accomplished incompletely, the second condition being entirely neglected, by reason of the fact that the degree of stretching is limited by the tensile strength of the yarn. It is obvious from the foregoing that the first condition will not be complied with by a treatment proposed recently, according to which the fibre is mercerized in the form of a roving. The strength of such a provisional yarn will be in all cases less than that of regular yarn, and great care must be taken not to approach the limit of strength in view of the fact that the fibres have to remain uninjured in order to be returned again to the initial state. In order to accomplish both said conditions in a perfectly efficient manner, a continental inventor has decided to neglect any regard for the limit of strength, and proposes to mercerize the fibres in form of a yarn, at the same time, however, to purposely submit that yarn to a tension exceeding the limit of strength, i.e., to stretch the yarn until it tears, and then to tear it, if necessary, completely, or to cut it through for the purpose of treating it afterwards, as is generally the case with waste yarn, in a willowing or other suitable machine adapted to open out the yarn, after which it is subjected again to a fresh process of spinning, so that only this second spinning provides the final product, which thus consists of fibres mercerized in the form of yarn, then torn apart and returned to the initial fibrous form, and finally spun again. In this roundabout way the cotton, though it has been mercerized in the form of a yarn subjected to considerable tension, may be considered, with regard to the final product, as mercerized fibre.

SMALL GAS ENGINES USING CITY GAS.

Among the papers read at the annual meeting of the Canadian Society of Civil Engineers was one by Homer M. Jaquays, of the Applied Science Department of McGill University, on the economy of small gas engines using Montreal gas.

The author referred to the development of the gas engine in the past ten years as being little short of marvellous, and went on to say: Notwithstanding the fact that most attractive thermodynamic problems and possibilities of high heat efficiencies were always presented by the gas engine, its development during its early growth was neglected because of the difficulties, chiefly mechanical, that necessarily had to be overcome before it could become of practical use. Manufacturers, following the path of least resistance, strove by improving the steam engine to obtain greater economy in heat engines; and indeed obtained the desired result. But with the high pressures used at the present time in the multi-cylinder engines, it is obvious that, without superheating, the limit of economy in this direction has been practically reached. Accordingly, during the past ten years serious attention has been directed to internal combustion engines, and the rapidity of the gas engine's development has amply repaid all work done towards its improvement. Previous to 1891, the majority of engineers were doubtful about the gas engine as a prime mover; to-day units of 2,000 to 4,000 horse-power are being constructed, while those of 1,000 to 1,500 horse-power are in operation.

Herbert A. Humphrey gives, in Engineering, an interesting table, showing the gas engine horse-power installed and in process of manufacture by the chief builders of Europe and America. In England, Crossley Brothers and the Premier Gas Engine Co. have supplied, or are about to supply, 7,600-h.p., averaging 345-h.p. per engine. On the continent four leading manufacturers have made, or have in process of manufacture, engines capable of developing 115,000-h.p., the average unit being about 675-h.p. This table gives a record of 271 gas engines of over 200 horse-power each, and aggregating 148,500 horse-power in Britain and on the Continent made by four or five leading firms. While the production of gas engines in America is hardly as large as in Europe, three firms in the United States have made, or are making, engines capable of developing over 33,000-h.p. in units varying in size from 300 to 4,000 horse-power. These figures, which do not include units smaller than 200-h.p., merely indicate how rapidly the gas engine is being developed, and how widely it is employed at the present time. In Canada, the gas engine is not used to such an extent as its popularity elsewhere would seem to indicate that it should be. This may be occasioned by natural influences, which would exclude the gas engine, even granted that it is a most economical heat engine. It is probable, however, that, in addition to this, there are other reasons. In most power installations it is doubtful if the idea of using the gas engine as a prime mover is ever entertained; and while there are places where at present it is, doubtless not the best and most economical prime mover to be employed, there are just as surely others where it asserts its superiority.

That there should be hesitation about installing gas engines here is not surprising. The mere fact that there is such a scarcity of information concerning the consumption of engines using Montreal illuminating gas that it is almost if not quite impossible to arrive at the cost of running them, might account for it.

The paper then gives an account of tests made on two engines that form a part of the equipment of the Department of Mechanical Engineering at McGill University For convenience, these engines are referred to as Engine No. 1 and Engine No. 2.

Montreal illuminating gas was used in all the tests. The average calorific value of the gas is taken as 620 British thermal units per cubic foot, and was determined by tests made on the Junker calorimeter.

For complete combustion one volume of this gas requires 5.85 volumes of air, and at atmospheric pressure and at a temperature of 60 degrees Fahr., one cubic foot weighs 0.03079 pounds.

In all the trials each engine was running on its governor, and the brake load was kept as constant as possible during each trial. The gas was metered by means of dry meters, one on the main gas supply and one on the igniter circuit. All meters were calibrated by means of a standard wet meter after the trials and the readings were corrected. The brake horse-power was obtained in each case by means of a brake on the fly-wheel of the engine. The load was measured on a Fairbank's weighing machine, weighing to one-eighth of a pound. Both engines were fitted with hot tube igniters, and as it is impossible with this means of ignition to have successive explosions occur at exactly the same point in the stroke, the indicated horse-power cannot be calculated with any degree of accuracy. Because of this the indicated horse-power is not included in the results, but indicator diagrams taken during each trial by means of Crosby indicators are appended. The revolutions were obtained by means of a revolution counter attached to the crank shaft of the engine. The trials were, for the most part, of one-half hour duration, and the revolutions, gas meter readings, brake loads, etc., were recorded every five minutes. The greatest error in the results occasioned by reading the gas meter is probably not over two per cent. The chief dimensions and particulars of engine No. 1 are as follows: Cylinder diameter, 8.5-in., length of stroke, 12-in.; hot tube igniter, governor of the hit-and-miss type; Otto cycle.

The trials of this engine were all made on December 18th, 1902, and, as stated previously, the engine was run on the governor with approximately the same mixture of gas and air throughout all the trials. The engine ran continually during the series. Indicator diagrams were taken, but no explosion counter was used, and because of this and other difficulties referred to previously, the indicated horse-power is not worked out. The results of some of these tests are here shown:

Trial No.	1	2	3	4	5	6
Revs. per minute	208	208	208	208	204.3	204.5
Load on brake	9.19	18.88	29.06	39.0	48.0	60.0
Brake horse-power ..	0.827	1.700	2.62	3.51	4.25	5.31
Total gas per hour (cubic ft.)	109.5	201.0	221.0	224.0	263.0	260.0
Total gas per hour used by igniter (cub. ft.)	6.0	6.0	6.0	6.0	6.0	6.0
Gas per hour used in cylr. (cubic ft.)....	103.5	195.0	215.0	218.0	257.0	254.0
Gas per brake-h.p. per hour used in cylinder (cubic ft.)	234.0	115.0	82.1	62.1	60.5	47.8
B.T.U per B.H.P. per minute	2420	1184	848	642	625	495

The mechanical efficiency, as obtained from previous trials, was, at full load, about 0.80.

The chief dimensions of engine No. 2 are: Cylinder diameter, 7.5-in.; length of working stroke, 8.4-in.; length of compression stroke, 5.34-in.; hot tube igniter; governer of the hit-and-miss type; Atkinson's cycle.

This engine has one working stroke for every revolution of the crank shaft and, in all, four strokes per revolution. The admission, compression, expansion and exhaust strokes are all of different lengths. The tests of this engine gave the following results:

Trial No.	1	2	3	4	5
Revolutions per minute	133	138.2	143.5	138.0	138.5
Load on brake	39.75	32.25	25.5	17.62	9.0
Brake horse-power	2.28	1.01	1.57	1.04	0.54
Total gas per hour (cub. ft.)	95.3	92.9	90.3	86.6	80.2
Gas per hour used by igniter (cubic ft.)	6	6	6	6	6
Gas per hour used in cylinder (cubic ft.)	89.3	66	84.3	80.6	74.2
Gas per brake H.P. per hour used in cylinder (cub. ft.)	39.1	46.7	56.8	85.4	165.0
B. T. U. per B. H. P. per minute	405	472	587	882	1701

The mechanical efficiency of this engine is, at full load, approximately 0.70. In all the above results the British thermal units per brake horse-power per minute are found from the gas actually used in the cylinder. The gas required for the igniter is not included as it is a constant quantity at all loads and should be considered separately.

When running under the most efficient load, the consumption per brake horse-power per hour is less for engine No. 1 than for engine No. 2, due probably to increased compression and size. Larger engines would show a further decrease in B. T. U. per horse-power per minute. As the load decreases the gas per brake horse-power per hour increases very rapidly. The figures, however, demonstrate (1) the importance of running engines of this type at approximately three-quarters to full load. (2) That the size of the units should be so chosen as to make this possible, and (3) that where there is a great variation in the load there should be multiplicity of units if attendant conditions do not recommend otherwise. The cost of gas for running engine No. 1 at full load, for one hour a day for three hundred days would be, with gas at $1 per thousand cubic feet, approximately $9 for the gas used in the cylinder, and twenty-five cents for igniter gas per brake horse-power. The amount of water necessary for cooling purposes varies with the seasons. A large number of trials performed at various times throughout the year, gives twenty gallons per brake horse-power per hour, as an average quantity that need not be exceeded. Assuming fifteen cents as the cost of 1,000 gallons of water the cooling water would be, on this basis, ninety cents per B. H. P. for one hour a day for three hundred days. The following table shows the cost of gas and cooling water for one horse-power for one hour a day for three hundred days:

	Cylinder gas.	Ignition gas.	Cooling water.	Total.
Engine No. 1 . ...$	9.00	$0.25	$0.90	$10.15
Engine No. 2	11.73	0.90	0.90	13.53

The lubricating oil will cost approximately the same as for a steam engine of the same size.

The attendance required by gas engines is a minimum and the cost for this relatively small. Very little skill and knowledge in engineering matters are demanded from the attendant since his duties are practically confined to starting, stopping and oiling. The cost of running the above gas en-

gine compares favorably with the cost of running steam engines of the same size. If we assume fifty pounds of steam as the amount used per brake horse-power per hour, which is a fair value for single cylinder engines of the size in question, and six pounds of water as evaporated per one pound of coal burnt, the coal used per brake horse-power for one hour a day for three hundred days would be one and one-quarter tons. This at four dollars per ton would be five dollars. The water would cost approximately twenty-five cents at the above rate. If we consider the extra cost of boiler plant, piping, attendance, etc., necessary for the steam engine, the advantage that the gas engine has of making a much more compact and convenient plant and the fact that it can be run by others than licensed engineers, the difference between the cost of the two is slight. The gas engine cannot, however, without a gas producer, successfully compete with compound steam engines except in places where the conditions are peculiarly favorable.

In places where there is no gas supply and where the conditions do not recommend the building of a producer, an oil, instead of a gas engine may be used. Engine No. 1 is designed for either gas or gasoline, as a working substance, and it is hoped, shortly, to furnish figures giving the comparative cost of running this engine with each. Reports are favorable as to the running of oil engines. The results of tests show about the same number of B. T. U. used per B. H. P. per minute as do those of the gas engine. Assuming 310 as a fair value for the B. T. U. used per B. H. P. per minute by an oil engine, we can easily arrive at an approximate cost of fuel for an engine using kerosene oil (Canadian). A sample of this oil, when tested in the Junker calorimeter, gave a calorific value of 18,600 B. T. U. per pound. Taking 8.3 lbs. to the gallon, the British thermal units in one gallon are 154,380. With oil at twenty cents per gallon, the cost of oil per B. H. P. for three hundred hours would be approximately $7.20. This compares favorably with the cost of operating gas engines. The cost of gasoline will not differ much from that of kerosene oil.

Mr. Coffin, in the Journal of the New England Water Works Association, gives the following table on the comparative cost of pumping water by means of gas, gasoline, oil and steam engines:

COMPARATIVE ANNUAL COST OF PUMPING WITH DIFFERENT KINDS OF POWER.

	Oil Engine.	Gasoline Engine.*	Gas Engine.		Steam Engine	
Average daily pumping. Galls.	Oil at 9c. per gal.	Gasoline at 9c. per gal.	Gas at $1 per 1,000 cub. ft.	Gas at 50c. per 1,00 cub. ft.	Coal at $5 per ton.	Coal at $4 per ton
50,000	$ 770	$ 735	$ 920	$ 675	$1,230	$1,160
100,000	1,250	1,200	1,580	1,035	1,740	1,600
200,000	2,200	2,050	2,815	1,820	2,525	2,300
300,000	3,085	2,875	4,000	2,510	3,130	2,850
400,000	3,920	3,640	5,140	3,150	3,700	3,350
500,000	4,745	4,400	6,270	3,780	4,200	3,790

The above prices include attendance, repairs and supplies, interest (4 per cent.), depreciation (3 per cent.), and fuel. These figures indicate that in small units, at any rate, the internal combustion engine can, as far as cost is concerned, successfully compete with the steam engine; while the employment of gas and oil engines for driving electric lighting and pumping machinery, for automobiles and marine work, has long passed the experimental stage. Perhaps under no conditions does the gas engine promise more than in connection with, and when run by the gas from blast furnaces. So great has been its success already in this relation that one enthusiast has ventured to prophecy that "the day is not far distant when iron will be a by-product of the blast furnace, and furnaces will be primarily gas producers, while steam engines will have to be sought for in museums." It is probable that even the most ardent supporters of the internal combustion en. e do not look for this state of affairs in the immediate future. But when we realize that smelting one ton of iron supplies gas equal to 9,000,000 British thermal units and that the gas is more than three and one-half times as efficient, when used in the gas engine as when used in steam boiler furnaces, and when, moreover, we bear in mind the successes of the past decade, we cannot but expect from these engines much more in the near future than has been, or is at present being accomplished.

*Gasoline is now much dearer, being about 17 cts. in the United States and about 24 cts. in Canada

LIME IN THE DYEHOUSE.

Quicklime.—Quicklime is prepared by expelling the carbonic acid from the natural carbonate of lime by burning in kilns, it being the oxide of the metal calcium. Its uses in bleaching and dyeing are entirely dependent upon its alkaline properties. While presenting some analogy with caustic potash and soda, it differs from those alkalies in being much less soluble in water, and consequently in many cases much less energetic in its action. There are conditions, however, under which it may act with even greater power than the more soluble alkalies.

Slacked Lime.—This is a combination of water with quicklime, very considerable heat being evolved during the combination of water with lime. Lime mixed with an additional quantity of water forms a white mixture known as milk of lime, consisting of fine particles of hydrate of lime suspended in the water. If these are allowed to subside a clear liquid is left which is called lime water. Lime water has an alkaline character, but this is very weak on account of the small quantity of lime it contains. A gallon of lime water only contains a quarter of an ounce of lime, and the strength cannot be increased by concentration of the liquid. Hot water dissolves less lime than cold water, which is contrary to the usual law of solution. The most reliable experiments show that it would require a gallon and a half of boiling water to dissolve as much lime as a gallon of cold water. The first water obtained from lime is usually stronger in alkali than the subsequent ones. This arises from the minute quantity of the alkalies, potash and soda being present in the lime, and being all dissolved in the first water; the second and third waters from the lime are pure lime water and naturally weaker. How many waters can be obtained from lime bottoms depends upon the quality of the water used. Pure water continues to dissolve lime, and will yield good lime water many times, but water containing bicarbonate of lime will not yield more than three or four good lime waters, and that only with thorough r[illegible]ing up of the lime bottoms. In the general application of lime in dyeing and bleaching, it is used in the milky state—that is, containing undissolved lime, —and though it is contrary to theory to suppose that the undissolved lime is chemically active, there can be no doubt that, besides acting as a reserve to maintain the water saturated with lime, the finely-divided particles have an action which is at present not to be distinguished from that which

is considered purely chemical Liming used to form an integral part of all bleaching processes, and it was then essential for the removal of the fat, oil, wax, etc., from the cotton, but modern processes discard it, using caustic soda instead It is known that lime can disorganize vegetable textures, and that some cases of tender cloth in bleaching are attributable to the action of lime, while it cannot be shown that clear lime water produces such effects. Lime combines with all acids, neutralizing them and forming salts of lime or calcium; the film or crust which forms upon lime water exposed to the air is carbonate of lime, the carbonic acid being derived from the air. Lime is a powerful base, and can displace the oxides of many metals from their combinations, itself combining with their acids. Upon this property depends the use of lime in raising colors in indigo dyeing or other cases In raising or fixing iron buff from salts of iron, for example, the cloth containing acetate or sulphate of iron in its pores is passed into milk of lime; the lime combines with the acid, forming acetate or sulphate of lime, while the oxide of iron, deprived of the acids which made it soluble in water, is deposited on the fibre. The action of lime in bleaching depends also upon its powerful basic properties bringing about the decomposition of the resinous, waxy, and fatty matters on the cloth.

Carbonate of Lime.—The only form of carbonate of lime familiar to the dyer and printer is chalk or whiting, which, being ground, is used in some few cases as an anti-acid in fixing basic colors with tartar emetic, in alizarin dyeing, etc. It is very suitable for this purpose, especially when an excess of alkali would be injurious. Chalk does not completely neutralize diluted acid liquors. A dye liquor may have an acidity which, though small, is too much for some styles. In such cases carbonate or bi-carbonate of soda, or carbonate of lime, is added, or even lime water, if cautiously used. In the printing of alizarin dyes the goods are frequently passed through a chalk bath Ground chalk, though cheap, is liable to adulteration with sand. The quality of chalk is liable to variation, and all kinds are not equally suitable for the calico printer's use; some varieties contain magnesian salts, others a good deal of silicates, and these often do not work well. Chalk is frequently used in madder dyeing, and care should be taken that it is tolerably pure. The lighter variety appears better adapted for general use than that which is dense and heavy; good qualities do not contain more than 5 per cent of moisture Carbonate of lime is insoluble in water, but forms a soluble combination with another equivalent of carbonic acid. This is so loosely held that it often escapes by simple agitation of the liquid or exposure to the air, and more readily on heating, leaving the ordinary carbonate of lime in the insoluble form Some spring waters are saturated with this solution of carbonate of lime, and let it fall out so easily that it collects in stony masses about the source of the spring and deposits scale in boilers fed with it. The best test for lime in solution, says the Dyer and Calico Printer, is oxalate of ammonia, which gives a white precipitate, provided the solution be neutral or slightly alkaline; in moderately strong solutions sulphuric acid throws down a bulky precipitate of sulphate of lime, but not in weak or ammoniacal solutions Sulphate of lime is an abundant natural product It is chiefly known as gypsum. When deprived of its water by roasting or calcining, it forms the substance plaster of Paris It exists in most spring and river waters, and affects the dyeing of certain colors, as, for instance, alizarin It is only slightly soluble in water, about 1 pint in 500 It is produced when sulphuric acid and a soluble salt of lime are mixed together, and is the precipitate which forms when sulphate of alumina or alum is mixed with acetate of lime in the making of red liquor. It is sometimes used in finishing to give the appearance of body to inferior qualities of calico. It is sold under the names of terra alba and mineral white.—Textile Manufacturer.

SISAL FIBRE.

A single sisal fibre will sustain a strain of 9 lbs., and it would seem as if it might be used for weaving fabrics the same as flax, but an examination shows that the fibre tapers from butt to tip of leaf. It is possible that the shorter fibre, worth only about 2½d. a pound, might be used to give strength to shoddy. The green refuse, which amounts to about 95 per cent., and consists largely of carbonates of lime and magnesium, with 6 or 7 per cent. of potassium salts, is a valuable fertilizer, and experiments are being made with the idea that, as it readily ferments, it may prove a valuable source of alcohol and acetic acid. Though usually known as sisal, the name is merely derived from the shipping port of that name in Yucatan, where it is extensively grown. The plant really belongs to the agave family.

FINISHING WORSTEDS.

To finish worsteds acceptably becomes at once a complicated study. They are at all times a staple article, and while some mills seem to always have a steady demand for their goods, others are unable to hit the market. This is largely due to the finish of the fabric, for while the material may be to all intents and purposes the same, there is still difference enough in the fabric when finished to make one sell and the other go begging. It becomes, therefore, a question of how to finish the goods so as to meet the favor of the buyer, for upon the latter favor hinges the success or failure of the establishment. Much headway has of late years been made in this respect by the introduction of special machinery to get the best results possible, and it is nothing short of folly to try to put goods on the market without making use of all the latest and most improved machinery to be found. While the machines which are put upon the market are designed mostly to reduce the labor cost as much as possible, there are still many improvements found which tend to do the work better also. We will, therefore, consider the finishing of worsteds in this article, making use of the latest improved machines to be found on the market. Special care must, of course, be exercised on all worsted fabrics, as regards the burling and mending, and this subject need not, therefore, be treated at this time. After the burling and mending the goods are taken to the singeing machine, and are thoroughly singed This operation is omitted in most places in the finishing of worsteds, but for a good-looking piece of cloth, whether fancy or piece-dye, it is of great importance, for it takes care of all the loose fibres which in the after-process are apt to felt down, and require much work to properly free the face of them All singeing machines should be supplied with a brush, and if the machine is not so supplied it is generally an easy matter to fix a brush to it at very little expense. By having a brush on the machine to brush off the singe dust, the fibres will be in a better state for the next operation, besides keeping the room cleaner The brush should be encased in a tin or sheet-iron box, with just enough room left for the free travel of the cloth. This box can be connected with a suction fan, which will take

the dust and, through suitable conductors, lead it out of doors. This will make the work around the singeing machine much more pleasant, and also be of benefit to the goods, for the dust cannot be of any advantage to the fabric, and the sooner it is removed the better. After singeing, the pieces are taken to the crabbing machine. The old-style crabbing machines are generally used in pairs, and for continuous work this is necessary. The pieces are run on the lower roll of the first crab, the tank being filled with hot water (125 to 130 F.). The top roll is let down on the goods and a moderate pressure applied, and after the piece or pieces have all been run on they are allowed to rotate in this hot water with pressure, for about twenty minutes. The water must be kept at an even temperature, and should not be allowed to drop below 120° F. at any time. About five per cent. of pearl ash is added to the water before the pieces are run on, and this will help to loosen the sizing, as well as to aid in the washing later on. After they have run twenty minutes the goods are run back, beamed on wooden rolls, and stood on end for from forty to forty-five minutes, during which time the rolls are turned end for end, once or twice, to prevent the sizing from settling on one side. Care should be taken to regulate the work at this point so that the goods do not have to remain on the rolls longer than forty-five minutes, for, being hot, the inside end will be weakened if they are left to stand that way too long. They are then ready for the second crab, and are again wound on the lower roll under fair pressure, but the water in the second tank is kept at the boiling point all the time. After treatment for twenty minutes they are ready for the cooling tank. This tank was omitted on the older style machines; but it has been found that it is beneficial to the goods to have them cooled off as soon as the setting process is completed, and therefore another tank is added containing cold water, through which the goods pass. They are folded off cold and are then ready for the washer On worsteds nothing but an open or breadth washer should be employed, and this one item alone will tend to make quite a large difference in the looks of the finished fabric. They should never be run in rope shape if it can be possibly avoided, and there is little use in attempting to compete in the market with firms who do employ these machines. Quite an improvement is noted in these machines of late, for they are now built with three instead of two wash rolls, which nearly doubles the washing capacity; then an opening device in the shape of two spiral rolls, is placed in front for the goods to pass over, and this keeps them entirely free from creases and wrinkles. At the washer a thin but fairly strong potash soap is used, and the strength is regulated with pearl ash in preference to soda products. This will impart a soft and silky feel to the goods, which it is impossible to obtain in any other way. By dint of much work the feel of the goods may be brought somewhere near to what may be gained by the use of potash soaps, but never can it be entirely produced by other means. This matter of using potash instead of soda soap in the finishing of any kind of woolens will be found worthy of careful investigation; but on worsteds the use of potash soaps is, beyond any doubt whatever, the best possible plan. After the washing the goods receive a generous bath of Fuller's earth, and they are then ready for the dyehouse. It is held by some that by first washing worsteds thoroughly and then subjecting them to a steaming, better results may be obtained; but, to say the least, the advocates of this plan have never handled a well-finished piece of worsted, for, if they had, they would have speedily altered their opinion. While the steaming process is beneficial, it can never take the place of the crab with any measure of success

The proces, as outlined so far, has given, and is giving, the very best of satisfaction, and not only that, but it is the manner in which most of the finest goods are treated. As beneficial as the crabbing process is, however, it is being superseded by the new continuous wet-finishing machine. This machine consists of a series of either four or five tanks, into which squeeze rolls similar to the crab rolls are set, and each set of rolls has underneath it an opening device to keep out wrinkles. The rolls are substantially like the crab rolls, and pressure can be applied to them to any desired amount. The five-tank machine is the best for all practical purposes. Each tank is filled with water, which can be kept at the desired temperature, independent of the others. The goods are run into the first tank, passed under the guide roller at the bottom, and then brought up from the back and passed through the set of rolls with a medium pressure. This tank is heated to 125° F., and the piece passes through it slowly and over the top roll, passing on and down into the next tank ,and through this in the same manner as the first tank. This tank is also heated to 125° F., and 5 per cent. pearl ash is added to both of them. When leaving the second tank the pieces pass on and into the third tank, and then to the fourth. The water in both of these tanks is kept boiling. It is not enough to keep it at the boiling point, but it has to be boiling well and strong during the time the goods pass through. Then the goods pass either into the fifth tank, filled with cold water for cooling off, and then to the folder, or if the fifth tank is omitted they are at once folded off, and are then ready for the washer. The finish obtained in this manner equals, if it does not surpass, that obtained by the old-style crab, and the saving in labor is very great. To operate a pair of crabbing machines four men are required, while on this machine two boys can do 120 pieces a day easily. If the goods are fancy, care must be taken at all stages so as not to injure the colors, but as such goods as these are generally of the best kind, a moderate amount of care will keep them all right. If, on the other hand, the goods are for piece-dyes, and a high lustre is wanted, a light steaming is now in order, and then they are ready for the dyehouse. Fancies go from here at once to the dryer, and if the last squeeze rolls are set tight enough, they do not need to go to the extractor. At any rate, it is better to pass the goods through a set of the rolls of the wet finishing machine with a very hard pressure, if squeeze rolls are not at hand, and they will then be in good shape for the dryer.

In drying worsteds it is desirable to do it more by ventilation rather than by excesive heat, for the heat, if at all high, will impart a certain harsh feeling to the goods, which it has been the object so far not to have, and therefore care must be taken that at this point the beneficial effect of the previous processes is not destroyed. If the goods come back from the dyehouse they are either run into the washer or, better, into the continuous wet finishing machine. If run into the washer they are rinsed well and then given a bath of Fuller's earth. If run through the wet finishing machine, the first two tanks should have a solution of Fuller's earth, the third one hot water of about 115 to 120° F., and the fourth cold water. The pressure must be set as hard as possible, and the goods dried after running through. After drying they are given one run over the pumicing machine, which is sufficient, as these goods have been treated in a manner which makes the work here much easier. The singeing leaves the goods clean enough not to need pumicing or polishing, for the threads will be found clear and round; and for the

teel, the treatment given with potash will be found to give better results than any amount of work on these machines could produce. The usual back burling is omitted on account of shearing the goods on the rubber-rest shear, and two or three runs will be sufficient here. The pieces are next looked over for specks, of which there should be very few, if any, and then the goods are sent to the dewing or dampening machine, and receive a fair dampening before going to the press. To finish the work properly an apron press is required, of which there are two styles. On one, the apron is fixed so as to cover the cylinder, the goods coming in contact with the bed, and on the other, the apron covers the bed so as to bring the goods in contact with the cylinder. This latter style is best adapted, says the Boston Journal of Commerce, for the purpose of pressing worsteds, and the pieces are run in face up and receive a hard pressing, and a light steaming after pressing, either on the machine or the steam brush. They are then ready for final inspection and doing up, and it will be found that a very superior finish has been obtained. Textile Manufacturer.

THE ORIGIN OF THE WORD TWEED.

In the early part of the nineteenth century, what is now the prosperous manufacturing town of Galashiels, Scotland, was nothing more than a little village situated at the junction of the river Tweed with a small stream called Galawater, from which the town derives its name. The Rev. Mr. Douglass, who was parish minister of that district at that time, advanced money to a few weavers, who had previously done weaving at their own homes. These men formed a company for the increase of the industry, and built the first small mill in the town. The cloth manufactured there was a four-leaf twill, or, as then spelled by the Scots, "tweel." As this business increased, other mills sprang up, and by and by the goods found their way to the London and other markets, and it was there that the name "Tweed" was first applied to the product of the Galashiels looms. The manner of its being so applied was the result of an accident. A consignment of goods had been sent to the old commission house of James Locke & Co., who were woolen goods dealers and exporters, in Saville street, London. The goods were designated on the bill as "tweel" cloth. The handwriting being poor, as it usually was in those days when the weavers were bookkeepers, mill-owners and everything else, the "l" in the tweel had taken the form of a "d." The London merchant noticed this on the bill or invoice, and thought it was a capital name to give the goods, and that it was intended as a compliment to the river of that name. The word became universally adopted, and Scotch Tweeds were, and have been ever since, in demand for men's wear. At one time it was a hard and fast rule with manufacturers in Scotland that a piece of tweed should be dressed so many ells long, and finish so many yards, in other words, should shrink from 45 inches in length to 36 inches. Even to day this rule is rigidly adhered to in some of the best mills in that country.—Textile Journal.

WEAVING AS PRACTISED BY THE ANCIENT EGYPTIANS.

Human invention must have passed through various stages of progress, and suffered frequent relapse, before the art of weaving was accomplished in the simplest or most elementary form. It is said, "the inventor of the bow or the harpoon must have been a genius, whether his contemporaries thought him so or not;" but what a history of difficulty overcome, and mechanical problems solved by slow and arduous mental thought and laborious manual practice, would be that of the development of the arts of spinning and weaving!

Egypt, the birthplace of the crafts and of the sciences of mathematics and astronomy, is the country which affords reliable data on the applied arts as practised three or four centuries prior to the Christian era. We possess a treasury of the textiles of the remote past in the woven specimens preserved in the tombs of Ancient Egypt. What a misfortune it would be to the future of the colossal factories of modern times if the life of the present-day fabrics, used for clothing purposes, were comparable in durability with those woven by the old-world craftsmen.

It is not in the imperishable monuments of the pyramids alone, or in the statuary of such monarchs as Rameses II., that the genius of the Egyptian race of fifty to sixty centuries ago is revealed. Such speak to the grandeur of the architectural conception of those far distant times when the world was in its infancy, and of the supreme effort to compass in these works immortal fame; but the picture representations of the life, customs, arts and crafts, affecting home, social, and industrial life, so realistically portrayed, none the less contribute to the stock of human knowledge, nor are they less suggestive of the processes of human development than the monuments of stone which, during thousands of years, have resisted the elements of nature.

To clearly understand the nature of the woven fabrics peculiar to any historical period or people we must be acquainted with their customs, religion and mode of life. In the early dynasties of the Egyptian monarchs the dress even of the nobility was extremely simple, being a short garment resembling a Scotch kilt, similarly fluted and worn in the same fashion, and fastened in front with a girdle. When more completely attired, this under-garment was covered with a robe of fine linen extending from the shoulders to the ankles, with full sleeves reaching to the elbow. This outer garment was fastened to the waist by a second girdle.

From the 12th to the 18th dynasties more extravagant habits, both in dress and in the decoration of dwellings and palaces, were affected, resulting in increased varieties of dress, still the short linen tunic remained, but the fashionable people also wore a cape over the shoulders. King Amenhotep II. is represented wearing three garments over his tunic, the outer one being adorned with an elaborate and brilliant ornament, and to which is attached a broad stripe in blue, red, yellow and green, and three ribbons on either side.

The dress of the artisan class was decidedly simple, probably one purpose of this being to allow of freedom of limb, and we can understand the apparent lack of appreciation of clothing, if the following is a true record of the conditions under which they worked. It is stated that the weaver inside the house "is more wretched than a woman, his knees are at the place of his heart, he has not tasted the air, he is dragged as a lily in a pool. He gives bread to the porter at the door, that he may be allowed to see light."

Indulgence in dress and luxury was, with the Egyptians, a law of nature in the times of ample prosperity, as with the Greeks and Romans; and this tendency grew with the increase of national wealth, so that elaboration in style of fabric and design was, from age to age, demanded. Early examples in weaving are of a simple type in texture and pattern, and are chiefly interesting from the evenness of the yarns of which they are woven, and for the fineness and gauge of the texture the better qualities possessing a muslin-like appearance.

Historical periods in the life of a nation are distinguished

by styles of architecture, literature, and dress, and in the types of fabrics which have been found in excavation, it is in some degree possible to read the story of the taste in woven fabrics of the people of Egypt. Originally, it is likely that flax was the chief raw material used in weaving, but considering that the shepherd and his flock figures in the early wall paintings, it may be assumed that wool was also made into yarn. One cause for the use of wool is that it may be as readily spun into yarn and perhaps more so than flax, the process from the raw material to the thread being more direct, but want of cleanliness, as compared with flax, in a warm country, would cause the linen to be more commonly preferred. A reason why woolen fabrics are only rarely found in tombs is that the colors are less durable, and are wanting in purity of color as compared with linen.

The manual processes of any art which have been superseded by highly mechanical contrivances are instructive—first, inasmuch as they show what degree of perfection was attainable with the rudest appliances, and second, how the hands of the worker performed the necessary functions before knowledge and invention had sufficiently advanced to devise and construct the machine as substitute. But when these processes appertain to a people whose history contains records of such great antiquity, they are suggestive of the common requirements of humanity, and of the old proverb that "necessity is the mother of invention," hence the craftsman of five or six thousand years ago adopted the same methods, and used the same materials, to produce a fabric as his successors in subsequent ages.—Textile Recorder.

A PIONEER OF THE UNDYED CLOTHING CRAZE.

In the rituals of some archaic religions, the wearing of dyed garments may have been forbidden, but we cannot recollect any case in point. Failing such, then the credit of making a scruple, on religious, sanitary, or sanatory grounds, about wearing dyed clothing, would seem to belong to an English Quaker of the eighteenth century, one John Woolman—a good textile name, by the way. The origin and growth of his ideas thereon is set forth in his own account of the matter, written in excellent sober English, as became a member of the Society of Friends. Referring to certain journeys he made up and down the country—"In these journeys," (he wrote), "I have been where much cloth hath been dyed; and have at sundry times walked over ground where much of their dyestuffs has drained away. This hath produced a longing in my mind that people might come into cleanness of spirit, cleanness of person, and cleanness about their houses and garments. Dyes being invented partly to please the eye, and partly to hide dirt, I have felt in this weak state, when travelling in dirtiness, and affected with unwholesome scents, a strong desire that the nature of dyeing cloth to hide dirt may be more fully considered. Washing our garments to keep them sweet is cleanly, but it is the opposite to real cleanliness to hide dirt in them. Through giving way to hiding dirt in our garments, a spirit which would conceal that which is disagreeable is strengthened. Real cleanliness becometh a holy people; but hiding that which is not clean by coloring our garments seems contrary to the sweetness of sincerity. *Through some sorts of dyes cloth is* rendered less useful; and if the value of dyestuffs, and expense of dyeing, and the damage done to cloth, were all added together, and that cost applied to keeping all sweet and clean, how much more would real cleanliness prevail! Thinking often on these things, the use of hats and garments dyed with a dye hurtful to them, and wearing more clothes in summer than are useful, grew more uneasy to me; believing them to be customs which have not their foundation in pure wisdom The apprehension of being singular from my beloved friends was a strait upon me, and thus I continued in the use of some things, contrary to my judgment, about nine months. Then I thought of getting a hat the natural color of the fur, but the apprehenston of being looked upon as one affecting singularity felt uneasy to me. On this account I was under close exercise of mind in the time of our general spring meeting in 1762, greatly desiring to be rightly directed, when, being deeply bowed in spirit before the Lord, I was made willing to submit to what I apprehended was required of me; and, when I returned home, got a hat of the natural color of the fur. In attending meetings, this singularity was a trial to me, and more especially at this time, as white hats were used by some who were *fond of following the changeable modes of dress, and* as some friends, who knew not from what motives I wore it, grew shy of me, I felt my way for a time shut up in the exercise of the ministry. Some friends were apprehensive that my wearing such a hat savored of an affected singularity; those who spoke with me in a friendly way, I generally informed in a few words, that I believed my wearing it was not in my own free will." Howsoever far the readers of this quaint record may be from following the good man in his predilection, all must acknowledge his sincerity and worthiness He lived, unfortunately, a century and a half too early for his happiness.—Textile Mercury.

MILLING WOOL WITH ACID.

Some ten years ago, Lobner introduced the plan of milling wool in a liquor of sulphuric acid of about 6 degrees Tw. strength, and for some time the process was in vogue, more especially for light woolen articles like flannel. Its main advantage lay in the fact that the acid could be more easily washed out of the goods than could soap liquors, and further, that if any trace were left in the material, its presence would not be so objectionable as soap. The milling was, however, scarcely so well done as with alkaline liquors. It was found that the acid liquor materially affected the machines, causing them to become rough, which roughness often caused the pieces to be torn, and was also liable to produce stains. The process has, therefore, practically become obsolete.—Textile Mercury.

IMPROVEMENTS IN SETTING INDIGO BATHS.

For this process two vats are employed, one for mixing and one for dyeing. Into the mixing vat, which is placed on a higher level than the dyeing vat, and which is provided with a steam-coil and a draw off tap, there are introduced 1,200 litres of water, 5 to 7 kilos carbonate of potash (or other alkaline carbonate), and 4 kilos of finely ground commercial indigo. In another vessel 15 kilos of zinc powder are mixed with 90 kilos bisulphate of soda, 60 degrees Tw.—the mixing being continued from two to five minutes. This mixture is then poured into the vat in which the water has been previously raised to the boiling point, and the whole kept well stirred at this temperature The dye-vat, which may hold 7,000 litres, is half filled with soft water raised to the boil, to which the clear liquor from the mixing vat is then added From 20 to 25 kilos indigo paste —obtained by grinding indigo with glycerine—are mixed in a separate vessel with a certain amount of liquor from the dye-vat, and then poured through a sieve into the vat The

whole is now raised to the boil and kept stirred. When the effervescence ceases, the vat is filled up with cold water, until the temperature is lowered to about 65 degrees C

After being exposed to the air, the goods are plunged into boiling water containing hydrochloric acid, in order to brighten the color. The following proportions are given as the best, in every case the amount of water being taken at 7,000 litres:

Indigo	Indigo Paste.	Soda Ash.	Zinc Powder.	Bisulphite 60° Tw.
0.2	1	0.25	7.4	44.5
2	10	2.5	11	66
4	20	7	15	90
5	25	8	17	102
8	40	16	23	138
10	50	18	27	162
20	100	45	47	282

The goods to be dyed are well wetted and immersed in the clear liquor, and as there is no objection to their sinking to the bottom of the vat, the field of action is increased, and in this way the indigo is completely exhausted in the one operation.

FROG SKIN LEATHER.

Not long ago, says an exchange, we referred to the use of large frog skins for glove-making, the skin being exceedingly tough and elastic; it is now being used for book-binding in the highest class of work. It makes a very fine soft leather and takes the most delicate shade of dyes. There is here a hint for the maker of pocket books and purses, tobacco pouches and cigarette cases, and also an opening for Mr. Talati, who has already made a specialty of the lightest class of leather at his Bandra works. There is no lack of frogs in India, in many places they are too numerous, but if the frog skin should take on for small work it might some day lead to a new industry in the breeding of frogs for the sake of their skins. The collection of frog skins would find profitable occupation for some of the half-wild hill and forest folk, whose struggle for life is usually a severe one. This would open up a new industry for Canada.

CHEMICAL DETECTION OF TEXTILE FIBRES.

The recognition of the textile fibres by means of the microscope is an operation which, although entirely accurate, is beyond the resources of the average textile chemist, as microscopy is distinct from chemistry, and a sufficiently fine instrument is not always at hand. A writer in the Textile Colorist claims no originality for any of the methods here given, but has collected them from various researches of the most noted authorities on the subject. As the operations are conducted in different manners and in variable quantities, according to the fancy of the investigator, it has been thought best not to attempt to tabulate, but give each in its order.

The reagent used is 1 grm. potassium iodide in 100cc. water, to which is added as much iodine as will dissolve, leaving a small excess undissolved in the bottom of the vessel Two grms. of pure glycerine mixed with its own volume of water is cooled and three times the volume of glycerine in concentrated sulphuric acid added.

A drop of the iodine solution is touched on the fibre, and after a few seconds removed by a bit of filter paper and a drop or two of the acid glycerine solution applied to the same spot. Pure cellulose (free of lignin) does not swell or give a clear blue color. Vegetable fibre of a woody nature gives a yellow color.

Instead of the above-mentioned solutions, an iodine solution containing zinc chloride is occasionally used. Von Hohnel gives the method of preparing this solution—1 grm iodine, 5 grms. potassium iodide, 30 grms. zinc chloride, and 14 grms. water; total, 50 grms. This solution colors cellulose reddish and bluish shades of violet.

Woody fibres are colored red by an aqueous solution of indol and afterwards hydrochloric acid. Sulphate and chloride of aniline, to which hydrochloric acid is afterwards applied, give a yellow coloration to woody fibres. Under the same conditions chloroglucin or pyrrol gives a red color, and alpha-naphthylamine hydrochloride an orange color. Jute gives no reaction with these later reagents, but with the iodine and acid glycerine is turned yellow.

Cuprammonium solution, made by dissolving freshly-precipitated copper hydrate in an excess of ammonia and agitated in a stoppered flash in the dark, is used as a solvent for vegetable fibres, and according to the rapidity with which they dissolve they may be recognized. Cotton dissolves immediately; cellulose containing lignin—flax, for instance—swells and slowly dissolves, but fibres containing much lignin or woody matter scarcely swell at all and show no signs of solution.

Alpha-naphthol in a 20 per cent. alcoholic solution is used as follows: 1 centigramme of the fibre is placed in 1cc. of water containing two drops of the alpha-naphthol solution, and 1cc. conc. sulphuric acid is added. Vegetable fibres give a deep violet solution upon agitation. Animal fibres give a russet brown, but the fibre does not dissolve. Thymol, in place of alpha-naphthol, gives a red solution.

The following scheme of detection of the presence of cotton, wool and silk, is carried out by means of this reaction:

1. A violet color results: (a) The fibre dissolves entirely if vegetable (may contain silk); (b) the fibre dissolves partially if composed of vegetable fibre and wool.

2. Weak color or absence of color: (a) The fibre dissolves immediately if silk; (b) it does not dissolve if wool; (c) the fibre dissolves partially if wool and silk.

Caustic soda of potash of sp. gr. 1.04 dissolves animal fibre, whereas vegetable fibres are scarcely affected. Wool dissolves in five minutes and silk in fifteen minutes at the temperature of the water bath.

The following process has been adopted for the determination of the quantity of wool in a mixture with cotton. In a porcelain beaker of 1000cc. capacity is placed 5 grms. of the fabric, 200cc. of a 10 per cent. solution of caustic soda poured over it, and the liquid heated gradually, so that it comes to a boil in no less than twenty minutes. A gentle simmer is maintained for fifteen minutes longer. The wool is then entirely in solution, and this is filtered through asbestos in a Gooch crucible, washed with water, then with dilute acid, next with more water, then dried and weighed as cotton. A solution of rosaniline containing ammonia is heated, and pieces of cotton and wool yarn dipped in it for a moment. The wool is dyed a magenta color and the cotton remains undyed. (Rosaniline is prepared by decolorizing a solution of fuchsine with ammonia and filtering hot.)

Boiling dilute nitric acid colors wool yellow, silk less markedly, whereas the vegetable fibres remain uncolored. Concentrated nitric and sulphuric acids in equal volumes form a nitrating mixture which changes cotton to pyroxylin or gun cotton (recognized by its explosive character when washed and dried, and by its solubility in a mixture of ether and

alcohol). Under the same conditions wool and silk are not similarly affected, but silk dissolves in fifteen minutes, and wool is colored light yellowish brown.

Concentrated sulphuric acid dissolves silk quickly, but wool more slowly. A quantitative separation is based on this property. The fibres are allowed to remain in the concentrated acid for a minute, then this is diluted with a large volume of water, filtered, washed, and after drying weighed.

Sodium plumbate colors wool dark brown on account of the sulphur present. Silk and vegetable fibres are unaffected. An alkaline solution of wool gives the sulphide reaction with sodium nitroprusside (distinction from silk.)

A fabric supposed to be cotton and linen is placed in concentrated sulphuric acid from a half to two minutes, according to the thickness of the cloth, then diluted and washed with water and rubbed with the fingers, then neutralized with ammonia and dried. Any cotton present is thereby removed and the linen remains unchanged. Another test for linen in the presence of cotton is to wet the fabric with an alcoholic solution of rosolic acid, then with caustic soda. Linen is colored rose, while cotton remains white.

The distinction of shoddy from wool cannot be made by chemical methods, since they are chemically identical, but by practice it is easy to distinguish by means of the physical characters, as shoddy shows the effect of the operations it has been through, and is more or less worn out and has shorter fibres. In this case the use of the microscope is necessary, and it alone will show the split ends on the shoddy fibres.

TEXTILE PATENTS.

The following patents relating to textiles have been issued in Canada since the publication of our last list:

Pin Fastener. A. Schaeffer, Berlin, Prussia.

Skirt Protector. The Hensel Colladag Co., Philadelphia, Penn.

Spinning Head. F. A. Breeze, Forest Mills, and Jas. Wilson, Richmond township, county Lennox, Ontario.

Art of Preparing Leather for Belting. The W. S. Nott Co., Minneapolis, Minn.

Manufacture of Twine from Unretted Flax Stamps. Wm. Deering, Chicago.

Process of Rendering Materials Moisture Proof. Abraham Kronstein, Karlsruhe, Baden, Germany.

Stiffening Strip for Women's Dresses. Aaron M. Webber, New York.

Garment Support. E. L. Pitts and W. M. Parks, Jerome, Arizona, U.S.

Shoe Lace. E. L. Pitts and W. M. Parks, Jerome, Arizona.

Means of Inserting Weft into the Shed in Looms. Otto Hallensleben, Luzern, Switzerland.

Cloth Finishing Machine. Frank Stiner, Lawrence, Mass.

Girth. R. L. Owens, White Oaks, New Mexico, U.S.

Shade Hanger. Wm. A. Tew, Bowling Green, Ohio.

Rubber Boot and Shoe. A. T. Schermerhorn, New Hope, Penn. (2 patents).

Rubber Tread. D. S. Pratt, Brookline, Mass.

Umbrella Ribs and Stretcher Joint. L. W. Edler and Alice S. Mahaffey, Williamsport, Penn.

Carpet Fastener. H. O. Butler and Samuel Harris, Franklin, Indiana.

Dress Shield. Gertrude M. Grant, Joseph C. Grant, H. A. Groth and W. L. Groth, Chicago.

Shade Bracket. Wilbert O. Person, Marinette, Wis.

Curtain or Shade Fixture. F. E. Sircolomb, Denver, Col.

Knitting Machine. Daniel A. Buoker, West Peabody, Mass.

Knitting Machine. Horace C. Coleman, Norristown, Penn.

Hat Guard. Wm. Mole, Toronto.

Neckwear Fastener. Wm. H. Hart, jr., Philadelphia, Penn.

Spinning Spindle. Wm. Gihon, Chicopee, Mass.

Sad Iron Handle. G. H. Ober, Chagrin Falls, Ohio.

Placket for Skirts or Dresses. A. G. E. Lowman, Winnipeg, Man.

Spinning Spindle. Wm. Gihon, Chicopee, Mass.

Means of and Apparatus for removing Hair and Wool from Skins. Seth L. Johnson, Ellen Johnson and A. H. Gibbings, Bradford, England.

Bag or Sack. Arbuckle Bros., New York.

Braiding Machine. Jakob Lundgren, Philadelphia, Penn.

Cop Tube Carrier. Universal Winding Co., Portland, Maine.

Winding Machine. Universal Winding Co., Portland, Me.

Knitting Machine. The McMichael & Wildman Manufacturing Co., Morristown, Penn.

Leather Manufacture. Mendel Pianko and H. F. Bindseil, New York. (2 patents).

Stop Motion for Knitting Machines. H. C. Coleman, Norristown, Penn.

Drying Process. Geo. W. McMullen, Picton, Ont.

Portable Wardrobe. Peter D. Graff, Fresno, Cal.

Process of making Waterproof Articles. Caulfield Rubber Co., Bridgeport, Conn.

CANADA BOBBIN COMPANY.

About the beginning of December, 1902, the Canada Bobbin Co. entered into negotiations with Ker & Harcourt, late of Parry Sound, Ont., for the purchase of their spool and bobbin plants at Wiarton and Parry Sound, and about the middle of January of this year the entire plant and machinery was moved to Walkerton where the business is now being carried on, Mr. Ker and Mr. Harcourt being associated with the new concern. The factory site is admirably situated in the business portion of the town, having a frontage on three streets, and occupying half a block. The factory building is of brick, metal roofed, 2½ stories high and has a floor space of 12,200 square feet. With other smaller buildings on the premises are a two story frame building 30x50 for storing lumber and stock, a machine shop and four large cribs for air drying bobbin stock, each 115 feet long with a total capacity of three and one-half millions of roughed out bobbins. The new company has increased and added to the plant purchased from Ker & Harcourt in many respects till they now have a thoroughly up-to-date factory. The company have been handicapped at the start by having to turn in and try to fill pressing orders and at the same time go on with the improvements to their plant and buildings, and have had to work night and day nearly half the time since they set up their first machines.

LITERARY NOTES.

"The Diamond Mines of South Africa," by Gardner F. Williams, M A., is the title of a sumptuous volume in watered cloth binding, published by the Macmillan Company, New York and London. The author is peculiarly qualified for the work of placing before the world a record of the rise and development of the great diamond mines of South Africa, which have influenced to such an extent both the political and commercial history of the South African colonies. He has had an extensive practical experience in mining, and has acquired expert knowledge of this specific branch of mining and of the inner workings of the South African corporations as general manager of the great DeBeers mines at Kimberley. The book Mr. Williams has here produced is a monumental one and will remain the standard work of reference for years to come. He has made full use of the modern art of illustrating, and almost every aspect of diamond mining is pictured in the 300 or 400 half-tone engravings, the 29 photogravures, and the seven maps that accompany the text. The author in this volume of 681 pages carries the reader from the earliest records of diamonds through the traditions of Ophir land down to the beginnings of mining at Kimberley in the seventies of last century and thence through every stage of mining with machinery operated by steam, electricity and compressed air. It is a cyclopedia of diamond mining, and not the least interesting to Canadians are the chapters giving the most comprehensive account we have yet seen of the memorable siege of Kimberley. In this portion is described that noteworthy achievement, the making of the siege gun "Long Cecil," with illustrations of the gun, and many interesting scenes during the siege by the Boers.

Dockham's Directory of the Textile Manufactures and Dry Goods Trade of the United States, Canada and Mexico, for 1903, has been isued from the press of C. A. Dockham & Co., 131 Devonshire Street, Boston. This is the 19th edition or 37th year of this standard publication which gives the capacity in spindles, looms, etc., of all the cotton, silk, linen, woolen and other textile mills in the countries named, with their products and the names of their selling agents. Lists are given also of the dry goods, commission merchants and wholesale dry goods dealers. Price, $6.00.

The Easter (April) number of the Canadian Magazine is an exceedingly creditable issue, with a special cover and a number of colored illustrations. The table of contents is an interesting one The leading article is an account of the Burning of the Parliament Buildings in Montreal in 1849, which, with the circumstances attending it, constitute one of the most exciting incidents in Canadian history. The article is by J. J. Bell and is illustrated with reproductions of some old prints in the author's possession, and a capital likeness of Lord Elgin, who was Governor-General at the time The history of the war of 1812 is continued by Jas. Hannay Norman Patterson has a timely article on our Transcontinental Railways. P T McGrath talks of Colonial Naval Reserves E W Thomson has a very readable story, Precise Justice, and Virna Sheard one entitled Fortunes Hill. Articles by E T D. Chambers, J S Willison and others, and a poem by W W Campbell, with notes on current events, etc., make up a very readable number.

The price of raw cotton is over one cent a pound higher now than a year ago, and two cents a pound higher than two years ago May cotton has sold up to 10.34, a new high record The great excess of exports over receipts is stated to be one of the causes.

Textile Design

WOOLEN CHEVIOT SUITING.

Complete Weave.
Repeat 8x8.

Warp:—2,500 ends, 8-harness straigh: draw.
Reed —9½x4 = 66 inches wide.
Dress.

3 ends, 2-ply, 5½-run black,
1 end, 2-fold, 5-run black and 6-run white twist,
3 ends, 2-ply, 5½-run black,
1 end, 2-ply, 5½-run white.

8 ends in repeat of pattern.
Filling:—42 picks per inch, all 3-run black.
Finish:—Woolen cheviot finish; full slightly, shear clear on face 56 inches wide.

An action is pending between C. A. Ahern & Co., Berlin, Ont., and the Sole Leather Tanners' Association, arising from an alleged attempt of the association to freeze out the small tanners by preventing customers of the association from buying certain kinds of leather from any but members of it

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Isaac C. Gilmor, one of the oldest wholesale dry goods merchants in Toronto, is dead. He went to that city in 1832 to take charge of the business of his uncle, Arch Laurie. Afterwards he was in business in the firm of Gilmor and Coulson. For a number of years he has been in the insurance business.

J. M. Swiggert, of Resolution, Great Slave Lake, recently sold to Ross Bros., of Edmonton, a lot of furs for $7,100 They were all first class and included 4 silver foxes, 4 pure white foxes, 37 red foxes, 285 marten, 12 otter, 56 beaver, 130 mink, 20 wolverine, 79 lynx, 8 fishers, 6 bear and 15 cross foxes.

The annual London fur sales, which began 23rd March, show higher prices. Indeed, there seems to be no limit to the height that fur values are reaching. Of the Hudson Bay Co.'s furs otter sold 40 per cent. higher than last March; fisher, 20 per cent. higher than last March; silver fox, 20 per cent. higher than last March; cross fox, 10 per cent. higher than last March; red fox, same as last March; marten, same as last March; mink, 10 per cent. higher than last March; lynx, 50 per cent. higher than last March; wolf, 5 per cent lower than last March.

TIMING OF THE LOOM.

In hand-loom weaving, the weaver spending all his time in front of one loom, and continually performing the same work of shedding, picking and beating up, relieved at regular intervals by a pull at the cloth roller lever, became practically a part of the loom, though by instinct he became acquainted with the conditions under which his work could be performed most easily and satisfactorily. A power loom, however, has no instinct, and the power-loom weaver or over-looker must arrange the mechanism of the loom according to the teachings of experience and certain technical rules.

Looms are now generally made to suit some particular class of fabric, those intended for narrow, light goods being constructed on a different scale as regards weight of frame

work, etc, to those of a very heavy description. While heavily-weighted cloths are being woven in lightly constructed looms, the working parts and often the framework also are soon worn out; and when light goods are being woven on heavy looms, owing to the slow speed at which the looms must be run, the amount of cloth produced cannot be satisfactory. In heavy looms a considerable amount of strain is put upon the lower shaft of the loom owing to the shedding and picking being directly accomplished from this shaft, but in light and quick running looms the chief strain is put upon the crank shaft, owing to the fact that the strain of oscillating the sley some 200 or more times per minute is put entirely upon the crank shaft. The shedding of a loom must be so timed and arranged that the sheds are level when the cranks are on the top centre, so that when the sley is at the front or fell of the cloth, the sheds are about half open for the following pick. This locks the preceding pick and prevents it from springing back. In very heavy cloths the healds are often set a little earlier than this, that is, they are level a little before the cranks reach the top centre; this still more effectively locks the picks. The size of the shed is a great consideration. The shed should not be any larger than is necessary to allow the shuttle to pass through without breakage of yarn, or danger of shuttle being thrown out, or riding over slack ends. The yarn may be allowed to touch the top of the shuttle when the reed is at its furthest point from the fell of the cloth. In the weaving of plain goods the front breastplate and the back rest are often level, and the line of warp when the healds are level is brought below the horizontal at the healds. This throws the top shed (when open) comparatively slack, so causing the cloth to have a full appearance. When the cloth is required to be still further improved in cover, it is customary to raise the back rest. The motion of shedding is not perfectly even or regular, as, in order to reduce the strain upon the yarn, healds and working parts, the healds in the traverse must commence slowly, increasing in speed till the middle is reached, then gradually decreased in speed till the pause is reached, during which the shuttle passes across the loom. The duration of this pause depends principally upon the width of the loom, and may be from one-third to two-thirds of a revolution of crank shaft. Longer the pause or dwell, the better is the cover of the cloth. A long pause, however, necessitates a short time in which the traverse of the healds takes place, and consequently the motion given to the healds is somewhat jerky.

The timing of the picking mechanism must be arranged so that there is as little jerking or vibration or waste of power as possible, and, generally speaking, the quicker the loom runs, the earlier should the pick be set. For narrow, quick-running looms the shuttle should commence leaving the box a little before the crank reaches its lowest point, slow-running looms may be set with cranks at the bottom point, or a little later. Later the pick is set, the greater is the perk given to the shuttle, this being caused to some extent by the backward movement of the sley taking up some of the length of the picking band or strap. The motion of the picking mechanism should be such that the shuttle commences to move slowly at first, and increases in speed till it leaves the shuttle box The shuttle should not be thrown with more force than is necessary to enable it to reach the opposite end easily, as too strong a pick is apt to break the cops, and is also very detrimental to the picking mechanism, and also the whole of the loom.—Textile Excelsior.

Foreign Textile Centres

Bradford.—Market firm. Confidence felt in the situation.

Belfast.—Tendency all round towards improvement. Spinning end brisk with good enquiry and substantial business. Tow yarns active at top prices. White goods for home market selling easily. Shipping trade a little stronger. Manufacturers holding for better prices.

Dundee.—Jute firm. Yarns quiet. Heavies unchanged. Hessians quiet. Jute fancy goods in fair request, but prices unsatisfactory. Ropes and twines wanted and makers all well employed.

Leeds.—Merchants in the higher woolen and worsted branches only buy for immediate requirements in the expectation of some concession, while producers maintain values, owing to the firmness of the London sales. Medium and lower class fabrics have a fair demand for the low-priced skirt trade. Men's clothing factories fully employed.

Leicester.—Yarn is active and stocks extremely low. Cashmere sells freely and rules strong, and business in lambs' wool and fancy yarns is good. Hosiery deliveries larger.

Kidderminster.—Carpet trade active. Volume of business being done considerable, and many orders being received Spinners well employed, and all their machinery running full time.

Manchester.—Little change to note and conditions uncertain owing to state of raw cotton market.

Rochdale.—Orders for flannel being placed freely, but manufacturers not obtaining an advance commensurate with the price of wool.

South of Scotland.—Recent improvement in linen trade maintained. Linoleum and floor cloth trade active with considerable demand from abroad.

Prices for flax in Great Britain did not, as expected, ease off at the coming in of the new crop, on the other hand, they appear to be advancing. Linen goods are held at extreme firmness in the United States and Canada, as well as in Great Britain.

Several of the boot and shoe manufacturers of Canada say the only class of English shoes imported into Canada to any extent is felt slippers. In hosiery the wholesale dry goods merchants are inclined to smile at the expectations of the Leicester hosiers that they may shortly do a large business in Canada, owing to the advantages conferred by the preferential tariff. One well-known buyer who is intimately acquainted with the hosiery trade of Leicester, says that the days when the manufacturers of that industrious English city could do a large trade with Canada are gone, never to return Cashmere hosiery was the only line in which Leicester ever figured in the Canadian market, and our merchants bought these because they had to, not being able to buy cashmere in Canada. But ever since the Penman people of Paris, Ont., the Kingston Hosiery Co., and the Universal Knitting Machine Co., of Toronto, have been turning out a first-class article in this line, the Leicester trade has been doomed, and has gradually declined It may be interesting to any persons with feet to furnish to know that hosiery is one line in which American competition does not figure. We import no woolen hose at all from across the line, and only about one per cent. of cotton hose

ALPACA.

There is ample evidence that in remote ages the inhabitants of Peru were acquainted with the art of making cloth from the glossy fleece of the alpaca, as garments made of this material have been found wrapped round mummies which have been dug up from ancient tombs. It must have taken the native shepherds of the Andes many generations to completely subdue the alpaca from its wild state, and to rear it as a domesticated, fleece-bearing animal—its flesh useful for food and its skin for leather. The Spaniards at the conquest of Peru, who were acquainted with the management of the migratory flocks of merino sheep in their own country, were astonished at the minute and sagacious regulations that were enforced with regard to the rearing of Alpacas. Zarate, the Treasurer General of Peru in 1544, states that the wool of the Peruvian sheep is very good and fine, "particularly that of the species called pacas, which have very long fleeces." The Peruvians were well aware of the value to themselves of the graceful Alpaca, and they endeavored to restrict the animal to their own country by the most stringent penalties against its transportation abroad. The gentle and timid Alpaca is a beautiful animal, nearly six feet high, with a long graceful neck, an elegant and erect head, and very large black eyes. It is generally black, or tawny brown, with its hair falling on each side the body in long locks. The alpacas are kept in large flocks, which graze throughout the year on the bleak and nearly barren plateaux of the Peruvian Andes, ranging from 14,000 to 16,000 feet above the level of the sea. They are driven to the huts only at shearing time, which begins about the middle of December, each animal being shorn only once in two or three years. The alpaca trade is almost confined to the departments of Cuzco and Puno, and the Indian flock owners sell the wool to the merchants, who send it from Arequipa, through Mollendo and other ports

It is stated that the first alpaca seen in England was sent from Lima in 1809 to Mr. de Tastet, a gentleman resident in Essex, who subsequently transferred it to the Surrey Zoological Gardens, where it was on exhibition for several years. W. Walton, a wool stapler, wrote "An Account of Peruvian Sheep" in 1811, and he advocated experiments in acclimatizing the alpaca on the mountain farms of Wales and Scotland, where, he supposed, the temperature and the character of the herbage resembled those of its native place. Walton drew a pretty picture of the alpaca, stocking the waste lands, and becoming a favorite tenant of the park, where its fine figure, graceful attitudes, placid disposition, and playful gambols would excite interest. Thomas Stevenson attempted the naturalization of this animal at Oban, but without ultimate success. The Earl of Derby collected a fine flock of alpacas at Knowsley Park, where every care and attention were bestowed upon them throughout a considerable period. These alpacas finally came into the possession of Sir Titus Salt, in whose park they were kept, and this gentleman, after careful observation, arrived at the conclusion that the species could not be so far naturalized as to make it worth the attention of breeders. A great many attempts have also been made to acclimatize the alpaca in France, and large numbers of them have been reared in the Jardin des Plantes, and the Jardin d'Acclimatation at Paris, with the view and in the hope of their multiplying in the mountain districts of the Vosges, the Cevennes, and elsewhere, and thus becoming a source of wealth to that country. C. Ledger, who had lived in Peru and Bolivia since 1836, and was engaged in the alpaca wool and bark trades, succeeded in 1858 in the hazardous task of taking a flock of alpacas across the bleak mountain-passes of Bolivia, and embarking them for Australia. He arrived at Sydney with 276 alpacas, and although the Government bought them, and paid great attention to them, the attempt to naturalize the species did not prove successful. The alpaca can endure the intense cold of its native Andean heights, where it exists at an altitude only a little below the line of perpetual snow, but it would seem that it cannot be successfully naturalized in the more humid climate of Europe, nor in the warmer region of Australia.

Alpaca wool is long, soft and silky. If the animal is shorn each year the length of the wool is about eight inches, but if allowed to grow it will attain a length of twenty to thirty inches. Alpaca wool was shown at the great exhibition of 1851 measuring forty-two inches long. It is less curly than sheep's wool, but it is finer and stronger in proportion to its diameter, and the quality is more uniform throughout the fleece. It was in 1836 that Sir Titus Salt (then Mr. Titus Salt) bought a quantity of alpaca at 8d. per lb. from Hegan and Co., brokers, Liverpool, in whose warehouse it had lain neglected so long that at one time they contemplated returning the consignment to Tacna. Charles Dickens gives a trustworthy account in Household Words, in his own inimitable way, of this memorable visit of the Yorkshire manufacturer to Liverpool.

Mr. Salt after a prolonged series of experiments carried out with great determination, finally overcame the difficulties of preparing and spinning alpaca wool, and he succeeded in producing an even, strong, and true thread. In 1836 cotton warps were first introduced into the Bradford trade, and alpaca—by reason of its softness and elasticity, and exemption from spiral, curly and shaggy defects—combined admirably with cotton warps in the manufacture of fine goods, which almost attained the glossy brightness of silk. Expensive, superfine dress goods were made at one time from alpaca weft and silk warp, but these bright, costly materials are no longer in vogue, and the yarn is now used for medium priced dress fabrics, alpaca linings and light coatings for hot climates.

The quantity of alpaca imported into Great Britain between 1836 and 1840 averaged 560,800 lbs. yearly at 10d. per lb. In 1874, 4,186,380 lbs. were imported at 2s. 8d. per lb. Alpaca reached the highest price in 1866, when it sold at 3s 4d per lb. In 1886 the price varied from 11d. to 1s. 2d. per lb, and in 1896 it varied from 1s. 2d. to 1s. 9d. per lb., while to day it stands at 1s. 8½d. per lb., and constitutes one of the most valuable fibres of the animal kingdom as applied to textile manufactures.

Donaldson & Mathews have sold their clothing business at Vancouver to J. Walker, of Kootenay.

Among the Mills

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

A woolen mill is projected in the township of Machar.

The Clinton, Ont., Knitting Co., is a new business enterprise.

The Dominion Belting Company's building at Hamilton is being rapidly pushed to completion.

Among new buildings projected in Montreal is a clothing factory on Guy street to cost about $30,000.

The Truro Knitting Mills Co., Truro, N.S., has placed an order for humidifiers with the American Moistening Co., of Boston.

Frank Young got his arm caught in the gear of one of the mules in the Anchor Knitting Mill at Almonte, and will be laid off for a time.

The irons in the British American Laundry, and Gault's shirt factory, Montreal, are heated by electricity generated by power at Shawinigan Falls.

E. Syer, who has been connected with the Canadian Carpet Co. ever since its establishment at Milton, Ont., has removed to Wyoming, Ont., where he has rented a woolen mill owned by his father.

F. R. Lalor is president and John Slingsby is superintendent of the Monarch Knitting Co., recently established at Dunnville, Ont., for the manufacture of club sweaters, ladies' vests and other fine knit goods.

The travellers for W. H. Storey & Son, glove manufacturers, Acton, Ont., during the first six weeks of the present year received orders amounting to over $15,000 more than during the same period last year.

The Ontario Blanket Co.'s mill at Clarksburg has a new manager in M. P. Mangan, who succeeds V. E. Forster. He has been in the employ of the company for the past five years as boss carder and spinner.

The Streetsville Woolen Mills, the property of A. W. Brodie & Co., have been conveyed to George H. Edmison, in trust for the creditors. It is expected that the property will realize about $5,000 for division.

Work on the R. J. Whitla Co.'s overall factory, Winnipeg, Man., will soon be started. The building will be 50 by 120, two stories and basement. The basement will be of stone, exceptionally high, and the superstructure of wood, metal clad.

At the Stormont Mills, Cornwall, the old head motion is being taken off the Crompton looms and replaced by a device which puts in the changes as well as the head motion, making fifty per cent. better goods and bringing the repairs down 60 per cent. This device was contrived by Robert Keenan.

The Dominion Woolen Manufacturing Co. at Beauharnois, Que., is running day and night on friezes, serges, blankets and rugs. The mill has four sets of cards and sixty looms. The staff consists of J. Jarvis, carder; William Ashton, spinner, John Brown, weaver, George Smith, dyer, James Dunsmore, finisher, Riley Brooks, boss dresser, W. C. Smith and William H. Pearson, loom fixers; Harold Brooks, dresser tender; William Morrison, superintendent; Samuel Bradley, designer, and Valentine Wells, overseer of burling room.

The Colonial Weaving Company has decided to locate at Peterborough Local and United States capital is interested. The company will make woven trade labels, silk ribbons and probably piece silks.

T. A. Code, proprietor of the Perth knitting mills, two years ago built an addition, and now finds it necessary to again enlarge. He will add a building 81 feet long by 40 feet deep, two stories high with a basement.

The town of Bracebridge is applying for an act of Parliament to ratify the by law guaranteeing interest on $50,000 of debentures at 5 per cent., and exempting from taxation the proposed linen factory, which the town now seems in the fair way of securing.

A. H. Raymond, of Essex, Ont., proposes to erect a flax mill at Belle River, Ont., to cost not less than $4,000, to have capacity to handle annually the crop of 400 acres of flax land, and to employ not less than 20 hands. A loan of $1,500, with free site and exemption is offered.

Seven warpers employed at the Imperial cotton factory at Hamilton recently went on strike because one of their number who was to the fore in a movement to secure higher wages was discharged. On the other hand, the company's officials claim that the men were discharged, and will not be taken back.

The Riverdale Woolen Mills, at Inglewood, Ont., burned in February, are to be rebuilt at once, and will contain two sets of cards, mules to correspond, and knitting machinery T. H. Graham, one of the proprietors, and J. R. Scott, superintendent, have been in Philadelphia and other points in the United States placing orders for the machinery.

T. McMaster, eastern representative of the Guelph carpet mills reports that orders are coming in so fast that it is impossible to keep up. At present they are 300 rolls of carpet behind orders, which means that the mill will be kept busy for eight weeks filling orders on hand. As already stated in the Journal the mill is to be enlarged so as to manufacturing tapestries. The enlargement will cost $50,000.

Lowell, Mass., cotton mill operators have refused to grant the request of their employees for a 10 per cent increase in wages. The result would have been a strike had not the managers of seven big mills forestalled it by closing their mills, and 17,000 employees are now idle. The question of the recognition of the union is also involved. A large number of Canadians are employed in these mills. The shut down is likely to last for weeks.

At the Brockville hat works J. C. Saulnier, one of the proprietors, was severely cut and bruised about the face and head by being struck by a pulley flying out of place. At present 125 hands are employed at the works, and their orders are very much behind. Instructors have been appointed whose whole duty is to teach beginners how to make hats. The result has been very satisfactory, as many local men, who knew nothing of the process, are now making good pay, some making from $2 to $2.50 a day.

The threatened strike at the Forbes woolen mills at Hespeler about a month ago did not result in anything very serious. J. A. Flett, of Hamilton, general organizer of the American Federation of Labor, had a conference with the local textile union, as a result of which the strike over the discharge of union employees was headed off. The spinners in the Canada woolen mills went out on strike, but after being out an hour a satisfactory scale of wages was arranged between the spinners and management The Forbes Company also raised the wages of many of their employees

At the Assizes at Milton, Ont., on the 8th inst., the case of Traplin v. Canada Woolen Mills Company was tried, and the plaintiff awarded a verdict of $3,100. His spine had been injured by the fall of an elevator in the defendant company's mill at Hespeler.

W. M. Crowe, representing for the continent of America some of the leading British manufacturers of yarns, has now a Canadian branch in charge of H. Binns, 28 and 30 Wellington street west, Toronto. Mr. Binns has a practical knowledge of yarns, and is prepared to supply Canadian mills with the most saleable lines of special yarns, such as are not commonly made in this country.

The Dominion Carpet Co., of Sherbrooke, Que., will have four new Wilton looms installed next month, making eighteen looms in all, and a little later on will add four more new English looms. It is the intention of the company to spin its own yarns, and with this in view it has acquired the old factory of the Eastern Township Corset Co., which will be used as a yarn factory, where both worsted and woolen yarns will be spun. When these changes are made, more looms will be put in, making the total about forty. Both Brussels and Wilton carpets and rugs will be made. The company has water-power to the amount of about 900 horse power in its control. It sells to the wholesale trade.

The owners of a secret process of bleaching cotton, linen and other fabrics of vegetable origin write us that they are prepared to negotiate with some reliable firm for the introduction of the process in Canada. The owners state that the bleaching is done by a single operation, at a much lower temperature than any heretofore used, and that the cost as carried out in England is only twelve shillings per ton of cloth as against an average of thirty shillings per ton by present processes. It is further claimed that the loss in weight of cloth is less than one per cent., as against 10 or 15 per cent., by ordinary bleaching agents; that the sizing or filling is not taken out by this method, and that the time of completing the operation is reduced by one-half. A demonstration of the process can be given to interested parties. The address of the owners can be obtained through this journal.

The Rosamond Woolen Co., Almonte, has just installed a new hydro-extractor in their No. 1 mill. The machine, which is used in the process of drying the cloth, is of the very latest design, and was manufactured in Glasgow, Scotland. The mill is at present in the midst of its heavy-weight season, and is turning out some specially fine beaver and melton overcoatings, woolen and worsted suitings and worsted trouserings. Its equipment consists of 15 sets of woolen and worsted cards and about 70 broad looms. The last of the original outfit of narrow looms is being thrown out and broken up, the space being wanted for other purposes. The company has a complete plant for spinning its own worsted yarns, consisting of four combs and the necessary drawing, spinning and twisting machinery. B. Rosamond, M.P., who has been president ever since the business, established at Almonte by his father in 1857, became incorporated as the Rosamond Woolen Co. in 1870, is still at its head. The present mill staff is, Wm. Smith, superintendent; Ralph Hill, designer; W. F. Lowe, carder; John Anderson, spinner; Robert Dodds, weaver; Charles Clarke, dry finisher; Andrew Dunlop, wet finisher; Roderick Chisholm, dyer; Thos. Chambers, wool sorter, W. H. Cockroft, worsted department, George Clement, master mechanic.

The strike at the St. Croix cotton mill, Milltown, N.B., among the weavers, to which reference was made in our last issue, lasted for two weeks. The management were quite firm in refusing to accede to the demand for an increase in wages, saying they could not afford it, and large numbers of the operatives left for the United States to seek employment. The business people of the town became alarmed, and through their intervention the mills were reopened without the increase having been made. The weavers say the increased cost of living and the poor material furnished has made them $2 a week worse off than formerly. Mr. Dexter, the manager, complains that he had no notice of the intention of the workers to quit. This is the second strike since the erection of the mill in 1882.

Just after the last number of the Journal had gone to press another woolen mill fell a prey to fire, J. Walshaw's mill at Bolton, Ont., having been entirely destroyed, involving a loss of about $50,000. The fire commenced in the carding room, and owing to the inflammable nature of the material lying about, it spread rapidly. The workmen were on hand at once with pails and water, and as far as the carding room was concerned, the fire was extinguished, but it was soon noticed that the fire had crept through the ceiling and was burning briskly on the third flat. A brave effort was made by the workmen, but the thick smoke made the fight a hard one. They did their best, and it was only when some of them were overcome and had to be carried out that they gave up the effort and devoted their attention to saving as much as possible from the ground floor. Nothing was saved from the second and third floors. Mr. Walshaw has been engaged in manufacturing at Bolton since 1882 and during that time has greatly increased the output of his plant. In 1896 the old wooden mill was destroyed by fire, and at that time the mill just burned was erected. It was a fine, three-story brick structure, 109 by 52 ft., with a basement, 36 by 52, and adjoining picker house, 24 by 50, and contained three sets of 60-inch cards, 10 looms, 900 spindles and made blankets and wool batting. It was driven by water power, and was a modern mill. The picker house was partly burned, but the storehouse with its contents of wool and finished goods was saved. The mill was lighted by electricity. It employed 35 hands, and will probaby be rebuilt.

Business Notes.

The Robert Simpson Co., Toronto, is doubling its capital from $500,000 to $1,000,000.

The clothing and men's furnishing stock of S. Korner, Fredericton, N.B., has been destroyed by fire. Loss, $15,000. No insurance.

In connection with its proposed enlargement the Toronto Carpet Co. has been authorized to increase its capital from $150,000 to $300,000.

Fritz Oldschwager, a furrier, who has been in business in Toronto for a number of years, has assigned, with liabilities of about $3,500.

Lenz & Leiser, wholesale dry goods and clothing merchants, Victoria and Vancouver, are being formed into a joint-stock company. M. Lenz, the leading member of the firm, is to retire from active management for the sake of his health, and will be succeeded by Joseph York.

Stanley, Mills & Co., of Hamilton, have been incorporated to carry on a departmental store; capital, $100,000.

The T. Eaton Co contradict a report that they are about to establish a large departmental store in Kingston.

David Komiensky, of St. John, N B, has been found guilty of obtaining goods under false pretences from the Strathcona Rubber Company, of Montreal

The New York and Boston Dyewood Company, incorporated under the laws of New York, has been licensed to do business in Ontario. A. W. Leitch, of Hamilton, is its Canadian agent.

The City Laundry Co., of Toronto, has been incorporated with a capital of $150,000. The incorporators are, P. H Patriarche, F. G. D. Durnford, J. W Siddall, J V Moore, and J. A. Kammerer, all of Toronto.

The Brantford Upholstery and Awning Co. is a newly incorporated company, with a capital of $10,000, the members of which are W. W. W. P. Bell, Hattie L. Bell and M. W. Hazelton, Brantford; Peter McDiarmid, St. Thomas, and W H. Barnum, Dutton.

It is expected work will be commenced before long on the cotton and pulp mills which an international syndicate purpose starting at the Chats Falls on the Ottawa under the management of Louis Simpson, formerly manager of the Montreal Cotton Company, at Valleyfield.

R. C. Struthers & Co., of London, and Gault Bros. & Co., of Montreal, have brought separate but similar actions against A. L. Pentecost, R. W. Pentecost and the W. R. Brock Co., claiming an account of the dealings by the defendants with the assets of A. L. Pentecost & Company, of Hamilton.

A. E. McNaughton sued the W. R. Brock Co., wholesale dry goods, for damages for wrongful dismissal He had been engaged as traveller for British Columbia by Jas. Johnston & Co., whose business was taken over by the Brock Co. in 1902, soon after which McNaughton was dismissed Judgment was given for the defendants.

H. E. Bond & Co. have been incorporated; capital, $250,000; head ce Toronto; to carry on the business of clothing manufacturers, and to acquire the business of Lailey, Watson & Bond, clothing manufacturers The incorporators are, H. E. Bond, John J. Doran, Nellie A. Bond and William M. Klingner, Toronto, and Ion B. Bond, London.

The Klotz Company has been incorporated with a capital of $20,000; head office at Montreal; to take over the business of Klotz & Co., at $10,000, wholesale dealers in tailors' supplies, buttons and other similar merchandise. The charter members are: J. S. Klotz and J. D. Kuppenheimer, of New York; J. C. MacGowan, Leon Garneau and A. H. Vineberg, of Montreal.

Three Toronto merchants, Maurice Bachrack, Wm. Blakley and Horace Levy, are charged with a conspiracy to defraud the creditors of George Margolius, the Montreal clothing jobber, who recently absconded to Chicago, and who has been arrested and brought back. The curator of the estate applied for warrants for the three men, but they were prepared to go of their own free will to answer the charge.

Woods, Limited, has been incorporated to take over the business of Jas. Wm. Woods, Ottawa. The company will deal in lumbermen's supplies, tents, tarpaulins, flags, dry goods, small wares and generally carry on the business of wholesale merchants and manufacturers. The capital is $250,000; head office, Ottawa, and the incorporators are, J. W Woods, Jas. Mather, John Carroll, Shirley Ogilvie and W J. White.

An application is being made for incorporation in the province of Quebec of the Eastern Townships' Clothing Company, with a capital of $5,000, head office at Sherbrooke, for the purpose of buying and selling clothing, and all kinds of woolen, cotton, silk and other staple goods. The applicants are, A. J. Hart, manufacturer, Westmount; Michael Margolick, book-keeper, and Abraham Greenberg, commercial traveller, of Montreal; J. L. Vineberg, merchant, of Sherbrooke, and L. A. Hart, notary, of St. Lambert.

FABRIC ITEMS.

Ramproof cloths are in much demand.

Blue is the ruling color in textiles this season.

A tailors' union has been formed at Toronto Junction.

James Tweddell has been appointed instructor in tailoring at Kingston penitentiary.

P. O'Connor, binder twine instructor at Kingston penitentiary, has been dismissed.

Rubber footwear prices will advance another five per cent in the United States on May 31.

A proposal is on foot to centralize the manufacture of cotton duck in the United States.

The Sandford Co., Hamilton, has received an order for khaki uniforms for the 13th Battalion.

The Government has not yet intimated what the price of penitentiary manufactured binder twine will be this season, and one of the M.P.'s is trying to worm it out of them.

There has been a magnificent general rainfall throughout South Australia, which makes the crop and cattle prospects very bright. It was the best early rainfall in many years.

Ernest Clegg and Bartholomew Calhoun were fined for intimidating W. G. Stevenson in connection with the late strike among the cutters at W. R. Johnston & Co.'s clothing factory, Toronto.

The weavers of lace curtains in Plauen, Saxony, have formed a combination to regulate the prices of production for three years. The mills in that vicinity sell largely to the United States trade.

Three sealing steamers recently arrived at St. John's, Nfd., with 25,000, 25,000, and 23,000 seal skins respectively. They report for about two-thirds of the fleet with 238,000 skins. The total catch is likely to reach 360,000.

Both plaid and striped effects in woolen material will be fashionable this spring. But the smartest of the new tailor gowns are made of fabrics of which the stripe or plaid is of the same color so that the pattern itself makes the figure

A quantity of wool has been seized at New York for undervaluation. The fraud consisted in entering the wool as carpet wool when in reality it was French scoured. The difference in duty is 29c. a pound. The Government would have lost $14,500.

Alex. Watt, merchant tailor, Hamilton, has been summoned for a breach of the lottery act He is one of many who have organized suit clubs among their customers The members pay in $1 a week and are given a ticket Each week a drawing takes place, and the member holding the ticket corresponding with the number drawn gets his suit at cut rates. After paying in $20 all members are entitled to a suit apiece.

The Cassella Color Co., whose Canadian branch is at 86 and 88 Yonville Square, Montreal, have issued a sample book of worsted yarn dyed fast to milling with easy levelling dyestuffs.

Personal

Geo. White, for many years engaged with his brother in the drygoods business at Woodstock, Ont., is dead.

Ebenezer Butterick, the originator of the well known tissue paper patterns, is dead.

John McNaughton, who died at Kingston recently at the age of 81, had been for 40 years a resident of that city, and was formerly in the tailoring business.

John Hammond, who died recently in the county of Lanark, though a farmer, in the early days built a loom and learned to weave. In those days homespuns and rag carpets were articles of domestic manufacture.

The late W. T. Murray, vice-president of the W. A. Murray Dry Goods Co., Toronto, left an estate worth $326,765, all of which is left to his widow. He was a brother of J. P. Murray, of the Toronto Carpet Mfg. Co.

Fred. Robinson, who has had charge of the finishing department from loom to case for over eight years for the Brook Woolen Co. has left and accepted a similar position in Seaforth, Ont., for the John Dick Co., Limited.

The death is announced, quite unexpectedly, of John Walker, for twenty-five years secretary of the Crompton C[illegible] Company, of Toronto. He was born in Scotland in [illegible], and came to Canada in 1867, settling at Chatham, Ont., where he became secretary-treasurer of the Crompton Corset Company, and coming to Toronto when the company removed here in 1877.

WOOL MARKET.

The second series of the wool auction sales in London closed March 22. When the sales opened business was brisk and merinos ruled unchanged from the January series. Later they strengthened and gradually scored a 3 per cent. advance. Greasy merinos showed greater firmness at times. Scoureds advanced to 5 per cent. above the opening rate. Fine crossbreds were unchanged from the first series. Coarse grades of crossbreds declined ½d. to ¾d., but improved slightly near the close of the series. Cape of Good Hope and Natal prices were barely maintained at the commencement, but strengthened and closed unchanged. Of the offerings, 11,906 bales were withdrawn and 73,000 were taken by the home trade, 71,000 by the continent, 6,000 by Americans and 17,000 bales were held over for the third series. At the close competition was spirited and fine grades were strong. The following were the prices at the close: New South Wales, scoured, 7½d. to 1s. 6d.; greasy, 7d. to 1s. 1½d. Queensland, scoured, 1s. to 1s. 9d.; greasy, 5½d. to 1s. 1½d. Victoria, greasy, 4¾d. to 11d. South Australia, scoured, 1s. 4d.; greasy, 5¼d. to 11d. West Australia, scoured, 1s.1d.; greasy, 8¾d. to 11d. New

Zealand, scoured, 1s. 1d., greasy, 4¾d. to 1s. ½d. Cape of Good Hope and Natal scoured, 6¾d. to 1s. 6½d.; greasy, 6d. to 9½d. South American, scoured, 10d. to 1s. 1½d.; greasy, 1s. 1d. Punta Arenas, greasy, 5d. to 9d. A marked feature of the sales was the large quantity of good, healthy, sound merino wools offered. The correspondent of the Textile Manufacturers' Journal emphasizes the disparity between the actual conditions of the new wool and the reports which have come from Australia and New Zealand during the past year. Wool men have been made to believe that the drought for several years back had been of unusual severity, and that the flocks had suffered severely. Probably none can form a correct conception of the damage which has been done to the flocks, but merino wools are coming, and will come into the market, wools in sound condition, and that famine which was predicted has not yet and is not likely to be realized.

In Boston the tone of the market is generally quiet, but there are evidences of slightly more active trading and considerable business has been put through. This is especially true with reference to medium unwashed fleeces and pulled wools, notably B supers. Prices have not varied, and there are no immediate signs of either decline or advance. The strikes and rumors of strikes tend to make consumers cautious.

Chicago is coming more to the front as a wool market, and now handles in the season from 10 to 15 million pounds of domestic and ranch fleeces and nearly as much pulled wool of various descriptions. Trade with local manufacturers of woolen goods seems to be on the increase each year, and the sales to the Eastern consumers have reached good proportions. Very little washed wool is received, the farmers having found that they realize more for the clip when sold unwashed. Medium wool is the staple crop, and it is brought to the market in better condition than formerly. The western mills are running full, and the employed are quite contented, so the demand from the mills is steady, and prices keep firm.

Montreal.—Strong market, but not active. Prices unchanged since last report. Merinos steady with an upward tendency. Poor class crossbred weaker if anything. Greasy Capes selling 17½c. to 19c.; B.A. washed, fine, from 32½ to 42c.; B.A. and Australian crossbreds, 20 to 25c.; New Zealand slipes, 17 to 20c.

Toronto.—Demand rather slow; market quiet. There is nothing being done in fleece wool. Fleece dull and prices nominal at 15c. for washed and 8c. for unwashed. Pulled Wools.—The enquiry from the home mills is not very active, but there is a steady demand, and the aggregate of business from week to week is very fair. Local dealers quote 19 to 20c. for extras and 15 to 16c. for supers.

CHEMICALS AND DYESTUFFS.

Business continues good, and enquiries numerous, all lines; heavy chemicals firm; advance expected daily on caustic soda:

Bleaching Powder	$ 1 80 to	$ 2 00
Bicarb. soda	2 00 to	2 05
Sal. soda	0 85 to	0 90
Carbolic acid, 1 lb. bottles	0 40 to	0 50
Caustic soda, 60°	2 35 to	2 60
Caustic soda, 70°	2 60 to	2 85
Chlorate of potash	0 10 to	0 11
Alum	1 35 to	1 50
Copperas	0 70 to	0 80
Sulphur flour	1 70 to	2 00
Sulphur roll	1 90 to	2 00
Sulphate of copper	0 06 to	06½
White sugar of lead	0 07 to	0 08
Bich. potash	0 7½ to	0 08
Sumac, Sicily, per ton	50 00 to	58 00
Soda ash, 48° to 58°	1 30 to	1 40
Chip logwood	1 90 to	2 00
Castor oil	0 08 to	0 09
Cocoanut oil	0 10 to	0 11