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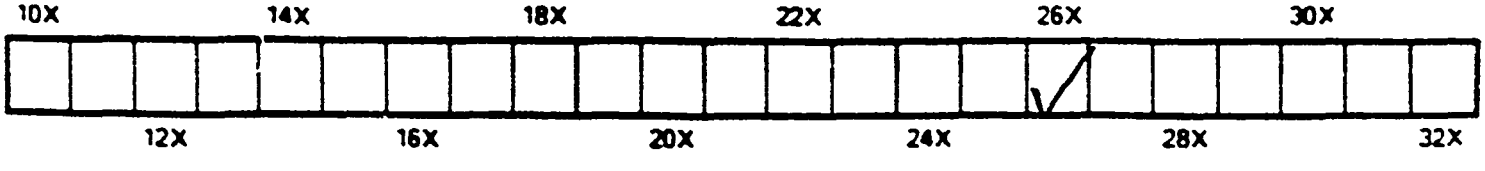

# Canadian Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XV. TORONTO AND MONTREAL, JUNE, 1898. No. 6.

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# Editorial.

## THE COTTON TARIFF.

A discussion of much interest to the cotton manufacturers, and the shirt and collar trade took place recently in the House of Commons, at Ottawa. On motion to go into supply, Mr. Monk (Jacques Cartier), called attention to the treatment which has been meted out to the shirt, collar and cuff industry under the present tariff. Mr. Monk claimed that the duty on the raw material is the same as that paid upon the finished product. The cotton manufacturers have every advantage while the kindred industry called into existence under the late Government is being driven to the wall. It has been compelled to reduce the wages paid to operatives and is having a hard fight to make both ends meet. The importation of colored cotton by the trade is upwards of a million dollars, and in addition to this half a million dollars worth of Canadian cotton is used. The Finance Minister reported that at this late stage of the session it would be difficult to reopen the tariff question. The case of the collar and cuff manufacturers has already been very fully laid before the Government. That they are placed at some disadvantage in comparison with other industries there is no question. These difficulties, however, seem to be magnified, and there did not appear to him any reason why the shirt men should not still make reasonable profits in their business. The Government had last session attempted a measure in relief of the shirt manufacturers in allowing them to bring in their cotton at a reduction of ten per cent., but this plan did not seem to work out and appeared to favor the larger manufacturers, and was afterwards dropped. He was sorry that there did not appear to be any relief possible.

The result of this decision on the part of the Government is the announcement that the shirtmakers of the Dominion have decided to reduce the wages of their employees 10 per cent., beginning on July 1st. On the present duty they claim that the United States makers can undersell the Canadian makers, and unless they cut down expenses they will be driven out of the market. The Employers' Association is a strong one, extending all over the Dominion. The workers are also well organized in the Province of Quebec, but there are not very many in Ontario and the organization is weak.

## HOW TO REDUCE SECONDS IN A KNITTING MILL.

Seconds, which are caused by gross carelessness, accidents, etc., are something which require much thought and watchfulness to avoid them.

1st. The mill should be well lighted and well heated in winter, for when the machines are chilled they will work badly. See that the machines are in good order, that no imperfect needles are used, for if the machines are working properly then you can reprove the operators for making imperfect work, in which case they will be more careful On the other hand, if the machines are not in good working order the operators will get careless and pass through work that will not be detected by the most watchful eyes.

2nd. The yarn should be as even as possible, and free from lumps; if it is solid colors see that the colors are even and not streaked; avoid winding a new batch of dyed yarns on the same bobbins that have yarn on from the preceding batch, as two batches are seldom the same shade, even should they be from the same dyer. The winders should keep their frames free from fly and waste, and keep the guides as tight as the yarn will permit, so that no lumps or waste will pass through. Keep the yarns in separate bins or boxes, and the number of yarn marked on each box or bin containing the same.

The foreman or forelady should be watchful of the yarn, or if they are not the winders will not be, and good spooling is the essential part to avoid seconds.

The winders should whip their colored skein yarn well before using as this removes most of the dry dyestuff and grit that generally adheres to the yarn in dyeing. Some run their yarn through oil, but if the yarn is properly manipulated as above no oil will be required as it gives the goods a dull appearance after being pressed. This refers to solid colors. Good lard oil is a help on mixed.

See that the operators are careful with their work and that the lengths are correct. Goods should be tried on the form three or four times a day as the gauge is liable to slip or may get out of order, thus making seconds. The machines should work properly, for if they do not the knitter will make seconds. Never let a knitter run a machine that is out of order. The rib machines should be kept in good repair and the cutters so instructed that they will not let any bad tops, etc., go through. Special attention should be given to the rib machines.

The power should run even, which will greatly facilitate the working of all the machines. On light colors or solids see that in oiling the machines it is properly applied so that it does not make black streaks or spots, thus saving seconds. The knitters should be required to turn out all scrubs and holes caused by the breaking of a needle, etc., thus saving seconds. See that the machines are cleaned every night, which will save seconds. Goods should be kept on the wrong side until the pressers are nearly ready for them. The knitters should turn them as they make them, and they should be mended before they are turned by the turners, as they are liable to make a second out of a mender with their sticks. All goods should be paired, folded and boxed as soon as pressed to insure them against getting soiled.

## CLOTH SELVAGES.

In the manufacture of cloths which are made otherwise than by the plain treading of the healds, some special arrangements are usually necessary to secure a plain selvage, or, at any rate, one which, when the cloth is finished, will be a good substitute for a plain selvage. When stripes are being woven, in which the ground is plain cloth, the shafts which make the ground may be utilized for making the selvage — care being taken in designing the pattern to so arrange that the first and last stripe shall be equi-distant from their respective selvages. In other fancy cloths, it is sometimes possible, by using two or more of the shafts to make a suitable selvage. These are matters for the designer, and should never be forgotten when designing a pattern for striped cloth. In jacquard weaving, it is usual to reserve certain needles for the formation of the selvage. In these cloths, therefore, no further special arrangement is necessary. But in three and four shaft drills, where one heald only is raised or depressed at one time; in five shaft sateens, in matting, serges, oatmeal, mock crapes, and a variety of other cloths, it is absolutely necessary to have some arrangement by which a different selvage from the body of the cloth may be made. The old plan was the addition of skeleton shafts to the shafts required for weaving the body of the cloth. Skeleton shafts are shafts on which healds only are knit when required for raising or depressing the selvage ends. Up to within a few years ago, it was usual to make these healds of the same yarn, or similar to that used for the ordinary healds, but, it being found that the great strain upon the few healds, placed upon these skeleton shafts, caused them to wear out long before the healds upon the other staves, thus resulting in loss to the manufacturer, it is now usual to employ selvage mails—that is, healds containing metal eyes, which, when properly made, last a very long time. In many cases, however, it is impossible to use skeleton shafts without the addition of some arrangement to actuate these shafts, for instance, in making three or four shaft drills, and five shaft sateens, where motions exist which only provide for actuating three, four, or five shafts respectively. When this is the case, it is obvious that some further arrangements are necessary. One arrangement for this purpose is the addition of two small plain tappits to the tappit shaft; these tappits are cast in halves for convenience of application. They are placed just under that point where the selvage ends will come. Two small treadles are actuated by each of these tappits, and these treadles, in their turn, actuate the skeleton shafts. Where a spring top is used, the top staves may be attached to two of the jacks, should there be any not previously employed, or arrangements may sometimes be made to attach them to a long heald roller. In some cases, only one plain tappit is employed. This tappit is, of course, fixed upon the tappit shaft, whilst the three, four, or five, leaf tappit is upon the twill shaft. When this is done, some care is required in designing the tappit. In all cases where strong selvage ends are used, the skeleton shafts should be placed behind the other shafts, and not before. When two small tappits are used, skeleton shafts are sometimes done away with, and the selvages are made by a harness arrangement. The selvage healds are threaded through small comber boards, which are attached to the loom side or loom top, similar to those used in making fancy bordered dhooties, and either connected at the top with two of the jacks of a spring top, or else with elastics. Another variation of this plan is to have only one pair of these tappits at one side of the loom. The mail healds are connected with two of the jacks of a spring top. These jacks, of course, actuate their fellow jacks to work the selvages on the other side of the loom to which

other mails are also attached. These setts of mail are connected to elastics or springs at the bottom of the loom. The great objection to the last two arrangements is that it is necessary to use a considerable quantity of heald cord, which has the unsatisfactory property of being subject to the changes in the weather. It is needless, probably, to point out that, as this is the case, the loom overlooker may have considerable work in readjusting the selvages of his looms when a moist atmosphere has been replaced by a dry one, or *vice versa*. Recent investigations and experiments have, however, shown that it is possible to make heald cord so that it is almost impervious to the weather, but as the arrangements by which this cord is made are not perfected, it is probably better not to enlarge upon this point. Another method very usually employed to make a bastard plain selvage is what is called the boat system. Between the healds and the yarn rods, two pieces of hard wood, one at each side of the loom, are placed upon a round weight iron bracket affixed to the loom side. These pieces of wood are so fixed that each end can be swayed up and down from the centre of the wood, giving a motion like that of a boat—hence the name. The boats are placed under the warp—the distance being regulated by the length of the wires placed at each end of the boats. These wires are usually made of reed wire bent double and fixed in slits at the ends of the boat. The number of wires is regulated by the number of selvage ends required. Half the selvage ends are drawn through the back, and bent wires are drawn into the healds of the two back staves only, above the eye, and not in the eye, as is usual; and the ends which are drawn through the dents in the front of the boat are drawn through the healds on the front stave, but always above the eye of the heald, and not through the eye. This system is a very inexpensive one to apply. It makes a selvage as follows: Three-shaft drill, one pick in a shed, two picks in a shed; five-shaft sateen, one pick in a shed, three times repeated, two picks in a shed. Where boats are used, very strong selvage ends are necessary, else the selvages will weave very badly, and much time will be lost by the weaver. The healds also are found to wear out very soon at those parts used by the selvage ends. The weaver has also to draw the selvage ends in at the loom. Where sufficient room in the loom exists, the tappit arrangements would seem to be in most respects superior to the boat plan, and, where manufacturers order looms for the weaving of fancy cloths, care should be taken to make such arrangements as will permit of their adoption if required.

## PHOTOGRAPHY IN WEAVING.

BY NIC. REISER, DIRECTOR OF THE WEAVING SCHOOL, AASCHEN, GERMANY.

The writer gives in the following the result of his inquiries into an invention which seems likely to cause an entire revolution of the art of designing, the most essential and up to now most difficult part of the textile industry. Since the introduction of the jacquard, about the beginning of this century, no new idea of greater importance and utility has been added to the art of pattern weaving, and already it seems certain that all those branches of the weaving industry which involve designs of any kind will consult their interests by securing and applying the invention.

Designing for weaving by the aid of this process, which has been protected by patents in all countries having textile industries (Jan Szczepanik, of Vienna, being the patentee), is done by means of photography in such a way that any picture or object, of whatever nature, can be produced on an enlarged scale through an optical obstruction (a screen) directly upon sensitive paper. This screen, which is called "Raster," is a photographical negative about 80 x 80 centimeters in size, and is made on a strong glass plate, mounted firmly in a frame. About thirty such rasters or screens are required to make all designs whatever occurring in the whole of the weaving industries. One of them, called the chief screen, is a light gray negative with a strong lineage similar to designing paper, each of the lines consisting of two parallel strokes, one of which is black, the other white. The lineage forms a large number of squares, 800 to 1,000, in the width representing the warp, and an equal number representing the weft ends. The whole surface of the screen thus contains 640,000 to 1,000,000 squares.

The photographic apparatus, which is used for designing, has a focussing screen, which is also covered with a black fine lineage, and conforms in its scale to that of the chief screen, and all the other screens used. A small picture in front of the lens of the photographic apparatus can very easily be projected in the desired scale on to the focussing screen in the following manner: The object, if fixed exactly in the centre of the board, is carried in a stand to the front of the camera; then the apparatus is adjusted so that the image covers the desired number of squares in the width of the focussing screen. The closer the lens is brought to the picture, the larger will be the projected image. At the same time the focussing screen must be removed from the lens until the image appears sharp enough. In order to reduce the picture, the lens is removed from the picture, and the focussing screen is advanced to the lens until the image is quite distinct. The stand and camera are connected by two rods fastened to their side, and containing a scale for mechanically finding the enlargement desired. The board B can be vertically adjusted by means of a crank; another crank works the horizontal adjustment of the board. These motions serve the purpose of easily projecting the picture on to the focussing screen. The focussing screen contains squares representing the warp and weft ends, in the proportion of 1—1. The other proportions—when more warp than weft ends, or more weft than warp ends are in one square—are usually represented on the designing paper by oblongs of different size. These oblongs are so arranged as to divide the design into the desired number of warp and weft ends, in its length and width. With the present arrangement the squares are not altered, but the image projected on the focussing screen is shortened or lengthened by optical means, so that the length also is thrown upon the desired number of squares in the length of the focussing screen, although the width of the image remains unaltered. The width, of

course, may be arranged in the same manner. The foregoing is effected by a cylindrical mirror, or cylindrical lenses, which are arranged between the lens and the picture. The latter is thus lengthened or shortened when desired, in one way only. It is sufficient to properly arrange the cylindrical mirror or cylindrical lenses, and then to adjust them by means of a screw fastened to the lens, in order to obtain the desired shortening or lengthening of the image, according to the proportion required between warp and weft ends. For simplifying the adjustment the screw has a scale, which gives all the proportions between warp and weft.

After projecting the object upon the number of squares required both for length and width, the focussing screen is withdrawn and replaced by the chief screen, which is firmly fixed in a dark slide. Behind the chief screen is arranged a sensitive paper, the film of which is placed against the screen. The back of the paper is covered and made light-proof by the lid, and its front is protected by an adjustable shutter. After a short exposure and the necessary development, the photographic paper shows a squared picture which represents the finished design. The squares appear black on light ground and white on black ground. The outlines of the image appear in full squares. This is effected by the chief screen being arranged at a given distance farther from the objective of the dark slide than the focussing screen, through which the picture is no longer projected in its original sharpness.

It is known that different colors in photography have a different effect; therefore, the design of a colored picture appears in two different tones. Two tones, gray and black, upon a white ground, can easily be defined in card cutting. Thus, pictures of three colors, each of which causes a different effect in photography, give a design complete without any addition or alteration whatever. There being, however, many different colors, which, when photographed, are hardly distinguishable by the human eye, it is necessary to paint the object according to a scale of colors specially constructed for this purpose, and always to be adhered to, two of a photographically indistinguishable effect never being applied against one another, which causes no difficulty whatever.

If the object is composed of more than three (for instance, six) different colors, we must repaint three of the tones on the design with a transparent color. For nine-color objects we must use three colors, etc. In this way a quite sharp design can be obtained, for in repainting three tones with red, for instance, a light red, a gray red, a dark red ground is formed according to the white, gray or dark ground. The repainting of such a design does not require any considerable amount of time or practice. Such a design already, with squares only, obtained by the use of the chief screen, can be used for weaving purposes in a great many instances.

To obtain the positive screen more exact, more beautiful and cheaper, we recommend that it be composed of single parts, printed in any desired manner on a greater scale. The expenses of a screen suitable for 800 platinas would be about 10s. Thousands or any number of designs can be produced with one screen thus obtained, each of which would then cost about 1s. to 2s. The photographic apparatus used for designing is most simple, but it may even be replaced by a camera obscura. A photograph studio is not required; a light room will do. In case of need the designing with screens can be done during the night and with artificial light. The present invention opens new prospects, for instance, for portrait weaving. It is possible to obtain natural images with technical effects that were previously unattainable. The invention is of equal importance for weaving plush, damasks, paramount, curtains, carpets, gobelins, etc.

For a few shillings and in the course of a quarter of an hour we can make any designs whatever, and these ready for card cutting, which up to now have required a great amount of expenditure in both time and money. These designs have the advantage of being entirely free from all defects which were previously unavoidable by human hands and eyes, for in the photographic process the bindings are mechanically designed by the light. The fear that designers may be displaced will, as it has done many times before, prove unfounded. As the designing will not take much time nor require the expenditure of much money, many new designs will be combined and constructed, so that they can be otherwise employed. The writer does not hesitate to admit that he had great doubts as to the merits of the invention at the beginning, but after a thorough study and practical test he is convinced of the great utility and perfect success of the invention, and he hails it as a process which opens up quite new prospects to the textile industry.

## ANALYSIS OF FABRICS.

There are various means adopted for determining the material of which the cloth is made, and, in the case of mixture yarns, how to ascertain of what the mixture is composed, and the relative quantities of each. A common and ready way for finding the difference between animal and vegetable fibers is to burn some of the threads of yarn in a flame. The vegetable fiber is composed of carbon, hydrogen, and oxygen, while the animal fiber, in addition to these, contains nitrogen. By burning, the threads used in testing the first mentioned fiber will result in carbonic acid and water, while those of the latter, or of animal fiber, will result in combinations containing nitrogen, which element readily makes itself known by its peculiar smell, or disagreeable odor, similar to burnt feathers. Another point, which it is well to note, is the rapidity with which the thread composed of vegetable fibers burns, as compared with the thread having an animal substance as its basis. In the latter case, only a little bunch of porous carbon forms itself at the end submitted to the flame, and there is no flame, as in the case of the former. Another method is to untwist the threads, and note carefully the appearance of the released fibers. If they are wool fibers, they will be waved in exactly the same way as in the raw wool—the finer the wool, the greater the number of waves or corrugations that will be shown. On the other hand, cotton fibers will maintain the same straightness which

they show in the raw state. We might, with advantage employ the microscope, as, by this means, we shall be able more readily to determine what is the nature of the fibers under observation. Under the microscope, wool fibers can be detected by the scales which are upon the surface, and which overlap each other after the manner of scales upon the back of a fish. This peculiar property belongs to all qualities of wool and hair. Cotton, under the microscope, shows as a thin transparent ribbon twisted, without any of the scaly appearance noticed in the wool, while silk has the appearance of a glass rod divided in the middle.

In some instances, owing to the effect of finishing and milling, and especially in the case of materials which have been previously worked up, the above tests may be unreliable, or so undefined that they cannot be trusted. In such cases, we should have a means of testing or analyzing that can be depended on, both to determine, at once and with accuracy, the class of fiber or fibers that we are dealing with and the quantities of each, where two are mixed together. This can be done by a chemical analysis, that is, treating the cloth or fibers with acids or alkalies.

To detect cotton or other vegetable fiber in woolen or silk fabrics, one authority gives the following: "Boil the samples to be tested in a concentrated solution of caustic soda or potash, and the wool or silk fiber will rapidly dissolve, producing a soapy liquid. The cotton, or other vegetable fiber therein, will remain undisturbed, even though boiling in weak caustic alkalies for several hours, care being taken to keep the samples below the surface of the solution during the operation. If, during this steeping process, it is exposed to the air, the cotton fibre becomes rotten, especially when the exposed portions are also, at the same time, brought under the influence of steam, (any cotton fibers remaining from the testing, if colored, may be bleached in chlorine water, and afterwards dissolved with cupra-ammonia)." Professor E. Kopp gives the following test:—"Wool is only soluble in cupra-ammonia by the aid of heat. Concentrated acids, such as sulphuric, nitric, or, preferably, hydrochloric, act in the cold upon silk, but not on wool. The dissolving properties of cupra-ammonia, on all vegetable fibres, make it one of the most reliable of tests. Cupra-ammonia is prepared by suspending strips of copper, in concentrated ammonia, in a large flask, tightly corked, and occasionally shaken, so as to bring the metal in contact with the oxygen of the air. By degrees, a tolerably concentrated solution of oxide of copper in ammonia is obtained, which dissolves cotton and other vegetable fibers, leaving animal fibers untouched." Professor Hummel gives the following test for detecting silk from wool or the vegetable fibers:—"The best solvent for silk is an alkaline solution of copper and glycerine, made up as follows:—Dissolve 16 grains copper sulphate in 140-160 cc. distilled water, and add 8-10 grains pure glycerine (Sp. Gr. 1.24); a solution of caustic soda has to be dropped gradually into the mixture until the precipitate at first formed just re-dissolves; excess of NaOH must be avoided." This solution does not dissolve either wool or the vegetable fibers, and thus serves as a distinguishing test. Another method is given as follows:—"Concentrated zinc chloride, 138° Tw. (Sp. Gr. 1.69), made neutral or basic by boiling with excess of zinc oxide, dissolves silk slowly, if cold, but very rapidly, if heated to a thick gummy liquid. This re-agent may serve to separate or distinguish silk from wool and the vegetable fibers, since these are not affected by it. If water be added to the zinc chloride solution of silk, the latter is thrown down as a flocculent precipitate. Dried at 230° to 235° F., the precipitate acquires a vitreous aspect, and is no longer soluble in ammonia."

In testing either cloths or fibers, where wool or silk is mixed with vegetable fibers, the better test is to use caustic soda, as this has less effect upon the vegetable matter than sulphuric acid would have upon the animal fibers—that is, if we subject a mixed yarn or cloth to the action of caustic soda, the soda would have, as shown in the above quotations, little or no effect upon the vegetable matter, while, on the other hand, if we treat it with sulphuric acid, there is a danger of the wool being affected by it, before the acid has entirely destroyed the vegetable matter, but it is best to be guided by the proportion of the two materials. If the cotton or vegetable matter predominates in the sample to be tested, it is better to use the alkali or caustic soda test, as it will destroy the wool or animal matter without disintegrating the sample, and thus allow the residue to be washed out without any fear of any of the vegetable matter escaping. On the other hand, if the animal matter predominates, better results would be obtained with the acid test, but, in using the acid, care must be taken not to have it too strong, or to allow it to boil very long, otherwise some of the animal matter might be destroyed. If the samples are undyed, the process is very simple, but, if dyed, the difficulties are increased, owing to the action of the acids used for mordanting, and the various coloring matters used in dying. These should be got rid of if possible, and, in most cases, subjecting the sample to boiling in a concentrated solution of hydrochloric acid will either remove the color or render the material subject to the tests to be applied, but, after thus boiling, care must be taken to thoroughly wash away the acid and the impurities loosened by the process.

The method we should adopt in the case of dyed samples would be to boil, for two or three minutes, in the hydrochloric solution, putting the sample in while cold, so as to allow it to penetrate the sample, then, immediately, to thoroughly wash it and allow it to dry in a cool, airy place, after which we should carefully weigh it, and then subject it to either the acid or the alkali treatment, according to the above-mentioned rule. We should use about a 5 per cent. solution, and put the sample in while cold, and gradually raise the temperature to boiling point, and allow it to boil for two or three minutes, and then wash off and allow it to dry in a cool, airy place, so as to get it, as nearly as possible, the same temperature as before, when it is again carefully weighed, and the loss noted, and the percentage of loss calculated. One method generally adopted is to dry the sample to be tested in a copper oven, heated by a bunsen burner to a temperature of 105°C, and then to weigh it and test it in the above manner, and, after washing, to

evaporate the moisture, and dry to the same temperature before weighing, so as to ensure having the same amount of moisture on each occasion of weighing; but, when the sample is weighed at this temperature, it readily takes up moisture from the air in the process of weighing, and we find that, unless we get the accurate weight immediately, it will gain weight so quickly that, in the case of using a very small sample, our percentage of loss will be very far out. We should prefer (if the oven is used) to leave the sample in the air for a few minutes after drying, so as to get it the same temperature as the balance or scales would be, and then to weigh it. By this means we could ensure getting the weight accurately, without it taking up moisture during the process of weighing.

Having stated at length the receipts and methods adopted by several authorities, we will give a complete analysis, as found by the above method, viz.:—Drying the sample in a copper oven, and then allowing it to take up moisture from a room, at a temperature of 62° F. before weighing, and then subjecting it to test, and again drying in the oven to evaporate the moisture, and allowing it to again dry in the air before weighing it to ascertain the loss.

Weight of cloth =8 0 grains.

After treating with the caustic soda = 2.67 grains, or 33⅓ per cent. cotton

Wool dissolved in the process = 5 33 grains, or 66⅔ per cent wool.

Warp weighed 1.14 grains.
After treating, .40 grains, or 35 per cent. cotton.
Wool dissolved, .74 grains, or 65 per cent. wool.
Weft weighed 3 4 grains.
After treating, 1.05 grains, or 31 per cent cotton
Wool dissolved, 2.35 grains, or 69 per cent. wool.

In the above example, there is either more wool in the weft than in the warp, or else some of the short fibres of cotton have been lost in the working, owing to there being less twist in the weft. If we take the warp and weft together, we find the proportion of cotton 32.2 per cent. against 33.5 per cent. in the cloth, so that there has evidently been a slight loss in separating the warp and weft from the cloth.

## BUILDING AND EQUIPPING A COTTON MILL.*

The main building of a cotton mill should not be over three stories high, with weaving shed connected by means of a fire-proof covered run, said run on hallway being located near the elevator. The shed should be at least twenty feet from the main mill, with a fire-proof wall for end, said wall caps to be made of iron or stone to protect it from the weather.

The shed should be constructed with a saw tooth roof for the purpose of diffusing light; the main building constructed on any of the well-known plans, but I should prefer the Lockwood style of floor beams, with the exception that the intermediate beam be carried to the centre of double window frame, and there supported by an I beam extending down to the window stool. This will give the beam a strong support, and not in the least unsightly. I would advise the use of steel I beams. There would be no shrinkage in them to allow machinery or floors to settle, and the only objection I know of to their being used is that they might sag in case of fire; but who would not rather run that risk, which is but a minimum with our well protected mills by first-class systems, than run the risk of shrinking beams and settling floors.

The power house should be located conveniently to the mill, also conveniently to the railroad, so as to have the least amount of handling of coal. I would advocate the steam engine and electric generators as the prime movers and carry the power to motors in mill, the said motors to be located on the ceiling over the spare floor in the centre of the rooms in long mills, and at the ends in short mills; the motors located far enough below the ceiling to be handily oiled and operated. Each main line should have a separate motor, and each long countershaft should also be drawn by a separate motor, having all switches located on the wall, convenient so that the overseer or secondhand could operate easily in case of danger or accident, by the use of electricity. The extra heavy shafting, pulleys and belting are all done away with, and the fire risk reduced, as the power can be isolated from the main buildings.

Picker rooms to-day, I think, have reached the standard of perfection, and I strongly advocate the opening of cotton one week in advance before it reaches the feeders attached to the picking machinery. This opener should be connected by a short trunk, of not less than 10 feet or over 15 feet in length, to the first breaker. From breaker the cotton should pass to intermediate lapper by doubling four into one, thence to finisher with same amount of doubling. This will insure every time an even, clean lap, providing you have given the fans an ample dust room, with at least three square feet of outlet to each fan. It is but six or eight short years ago that cotton manufacturers complained that first-class carding engines were not built in this country, but to-day there is no need of any such complaint, because the machinery manufacturers have built, at a great expense to themselves, a carding engine equal in all respects to any made in the world. Now, have the manufacturers of cotton done their part?

You buy an expensive and accurately made machine that is built to be adjusted to a few thousandths part of an inch and set it on a floor that will settle and give more or less each and every day with the weather. You expect this finely made machine to do good, accurate work. If you want good, first-class carding, set your carding engine on a foundation made as firm and solid as you make the foundation for your steam engine. You will then not only get extra good carding, but the repairs for your cards will be reduced to such a small amount that you will hardly know that you have any in your mill. Carding rooms should be located on the ground floor.

Drawing frames, although the simplest machines in the mill, are about the most important and have given the machinery manufacturers no small amount of trouble and expense to perfect, but that has now passed over and a first-class machine may be had. Fly frames should be located with cards and drawing and have equally as good

* Paper read by Malcolm Campbell, Woonsocket, R.I., before the New England Cotton Manufacturers' Association.

a foundation to insure long life and smooth working with a small amount of horse-power. I have now in mind a mill where the frames were set lengthwise with the floor beams and in one year they settled, as also did the beams, one inch. This was in what is termed "a modern mill," built to see at how small a cost per spindle it could be done for, and not to see how low the running cost could be made, which should be the all-important factor. In selecting a fly frame, care should be exercised to get one that will give the most even tension to the sliver, and look out for lost motion caused in the gearing by reverse of bobbin rail; also see that proper differential gearing, oiling arrangement, roll stands, cap bars, fine adjustments to cone belt traverse, etc., can be produced.

But I think there has been and is to-day a great mistake made in the system of banding of spinning frames. I would advise the system used by all worsted mills on their frames, *i.e.*, banding four spindles with one band by means of binder or idle pulley which swings on an arm hung on a rod under the frame near the cylinder. If this system was used, we would hear no more about slack twisted yarns, tight and loose band, weather affecting the bands, extra large amount of horse-power consumed by bands being too tightly put on, tight bands in damp weather, complaints that the bands were put on too slack, or too tight, as I used to put them when working in the spinning room. To be sure, they were tight enough so I would not be sent for because the new band just put on had got too slack. I would advise the mill men of this country or any other to look well into this system of banding. The spinning room I would locate on second floor of mill and use the third floor for spooling, warpers, drawing-in, etc.

—Up to about 1850 superiority was the guiding principle of the manufacturers, whose study it was to excel. To-day their position seems reversed, and inferiority rules, and we seem to study how far we can deteriorate our goods, whilst maintaining an outward appearance of quality.—Ex.

## NEW DYESTUFFS.

Direct Deep Black E and Direct Deep Black E extra.—This is a new homogeneous Benzidine color in two concentrations. The black corresponds to the well-known brand Direct Deep Black G, being somewhat clearer in shade. It exhausts better and is of the same strength. The Extra brand, however, is double as strong. Up to the present time the cheapest direct blacks have had preference, irrespective of their shade. Many dyers have changed to cheaper blacks, even when the shades have been totally different to that which they have been using. Direct Deep Black E extra being just twice as strong as other direct blacks, is proportionately cheaper in price as saving in freight and packing can be effected.

Diazo Indigo Blue B and Diazo Blue 3 R.—These products are the two latest substitutes for indigo on cotton just placed upon the market by the Farbenfabriken of Elberfeld. The disadvantages of indigo in cotton dyeing, viz.: high price, bad penetration, looseness of color to washing and rubbing and consequent continual stripping of color, have been long recognized by textile manufacturers as well as color makers.

Diazo Indigo Blue B gives of itself light or medium shades of indigo when diazotized and developed. For dark shades it is combined with Diazo Red Blue 3 R. or the new Diazo Blue 3 R. The last named color produces clear reddish blue shades when diazotized and developed on the fiber. Besides dyeing easily level, these colors do not affect the the natural softness of the cotton or deteriorate it for spinning. In price they are much cheaper than indigo.

Benzo Chrome Brown 3 R.—The above brown is the fourth and newest addition to the Benzo Chrome Brown family. The G, B, and R brands of which were recently brought out by the Fabenfabriken Co., of Elberfeld, met with such success, that the above Benzo Chrome Brown 3 R has just been added to the group, and will prove a very useful color. Benzo Chrome Brown 3 R direct, produces a clear deep reddish brown having the same properties as the older brands, and is therefore applicable either as a direct color or for after treatment with chrome and bluestone, and in the latter case is noteworthy for its great fastness to washing, light and rubbing. For dyeing half wool it should prove extremely useful, since it dyes both fibers equally as do the older brands; it is also suitable for dyeing half-silk.

Lazuline Blue R.—Lazuline Blue R. is the latest addition to the list of acid wool dyeing blues. It dyes very easily level, being in this respect equal to the average acid violets, to which, however, it is much superior in its fastness to light and rubbing and being therefore very suitable for the production of slates and drabs or bright navy blues, upon ladies' dress goods, yarn, etc. It is fast to milling and stoving and should prove useful in blanket manufacturing. Samples, dyed shades, and circulars of any of the above new products will be mailed gratis by applying to the Dominion Dyewood & Chemical Co., Toronto, sole agents in Canada for the Farbenfabriken, vorm. Friedr. Bayer & Co., Elberfeld, Germany.

## THE FLAX INDUSTRY IN THE UNITED STATES.*

A half century before the manufacture of cotton, Pennsylvania, Rhode Island and New York offered special inducements for the manufacture of certain kinds of linen goods. In 1810 over 20,000,000 yards of linen fabrics were made in this country in families. In addition to this nearly 25,000,000 yards of linens of coarser quality were made. Water and steam power, as well as labor-saving machinery, had been introduced previous to this, which resulted in a considerable extension of the industry. But it was still largely a household industry. Little by little the cheaper cottons have found their way into the homes, silencing the spinning wheels and almost all the looms engaged in the manufacture of the finer linens. At the present time the use of flax fiber in this country is chiefly in the making of twines, bagging, and the coarser fabrics to which our other fabrics are not so well suited. In certain parts of Kentucky and the Virginias the household industry still flourishes But this is chiefly in the backwoods districts, which still cling tenaceously to the old ways. The manufacture of the finer fabrics by machinery is confined almost exclusively to experimentation.

In spite of the decline of the linen industry, the culture of flax has steadily increased in the United States. At the present time the annual production of flaxseed and straw is approximately 12,000,000 bushels of seed and 300,000,000 tons of fiber. It is doubtful, however, if the farmers can continue to grow flax indefinitely for the seed alone. Unless some use can be made of the fiber, this great agricultural industry will doubtless suffer a considerable decline during the next decade

It is conceded that, next to cotton, flax is the most useful and valuable of all commercial fibers. It was thought at one time that cotton goods, on account of improved methods of manufacture, might eventually almost entirely take the place of linen goods. But, plainly, this is not to be. More and more flax is coming to be again what it was from the time of the earliest Pharaohs of Egypt to the beginning of the present century, the fiber of luxury, while cotton fiber is taking its place as the fiber of the masses. The United States is importing annually from foreign countries over $30,000,000 worth of linens -more than one-tenth of its total output of manufactured cottons. It has been estimated that the world's consumption of linen goods is not far from one-third the consumption of cotton goods in money valuation It must be evident that any country that pretends to lead in the manu-

* Extract from a paper by Jones S Davis, Holyoke, Mass., before the New England Manufacturers' Association.

factures of the world can ill afford to have no part in this important branch of human industry. One need only to visit the great centres of linen manufacturing in Ireland and on the Continent to be convinced that, next to the manufacture of cotton goods, this is the most remunerative of the fiber industries. A study of the comparative consumption of linens and cottons shows that with the steady rise in the standard of living of the masses in civilized countries, the per cent. of linen goods used is steadily increasing. To one in possession of the facts about this great industry, and especially about its early establishment in this country, it must be a matter of great surprise that this enterprising nation has allowed the industry to slip from its control.

Certain agricultural conditions are necessary. The most important of these is the cheapness of lands compared with values in Ireland and on the continent, where flax is now largely produced. Next to this in importance is the greater native fertility of our soils. A yet further condition in favor of the United States, especially in New England, is the fact that thousands of the best farms have been abandoned and ten thousands of acres of land of much higher native fertility than those under cultivation in Europe, now lie in idleness, or practically so. These conditions joined with the proverbial skill and enterprise of the American farmers, should give them a decided advantage in this enterprise over European competitors. We need only learn their methods of close and intense farming to surpass them easily in the growth of flax; at least to the extent of providing fiber for the production of linen fabrics for home consumption.

A final condition worthy of note which would be established by the introduction of this industry into New England, is the building up of a home market for all kinds of manufactured goods. If the abandoned farms of New England could be repeopled by the growers of flax, New England by this intense form of farming could support a rural population many times as great as she has ever supported

After a careful examination of all that has been written upon the subject, and as a result of personal investigations covering a period from my visit to Ireland and the continent for special investigation in 1851 to the present time, I venture the following practical suggestions about how to proceed in the establishment of the flax and linen industries in this country. What is needed first is a capable and progressive committee from a representative body of manufacturers to co-operate with the United States Department of Agriculture in carrying their recommendations into effect. Abundant information of the most detailed and reliable kind is at hand, illustrating every phase of the industry from the selection and preparation of soils up through every step of the agricultural features, as well as the processes of manufacturing, to the finding of the consumers for the finished manufactured products.

A committee, representing a body of capitalists of adequate resources, such, for example, as our New England Association, is an absolute prerequisite as a preliminary step. Such a committee, with a paid secretary, who should devote his whole time to the business, should address itself at once to the following tasks. First, they should acquire by lease or otherwise a plant sufficiently commodious for adequate experimentation, in a locality where a score or two of farmers are willing to grow a definite number of acres of flax each. The committee should have power to import the very latest and best machinery, both for scutch mills and for the manufacture of linen goods—in short, should be empowered to do in New England what has already been so successfully done in Canada and Michigan. When such a committe is ready to proceed, backed by such an organization and by the representatives in Congress of such a constituency as New England boasts, there is no doubt that adequate protection in the form of a tariff on importations could be secured. Even without protection a beginning can be made in the opinion of all experts on the question. But with protection, by making use of the abundant information at hand, there is not the slightest risk. Indeed there is every reason to believe that financial success is certain from the beginning. It is equally certain that the growth of the industry will be steady and substantial from the first, since every possibility of failure has been anticipated by previous experiment. Once sure of their ground through such an initial step, the committee should be authorized to acquire large tracts of suitable lands in the vicinity of present plants and water privileges, to which the industry may be extended as rapidly as is expedient, the distinct aim all the time being to supersede the making of coarser cottons by the making of linen fabrics. As fast as the space now occupied by coarser cotton machinery can be utilized by linen machinery, the cotton machinery should be transferred to the South, where mills should be established or acquired by the association. This double plan will secure to New England the great and remunerative linen industry to take the place of the coarser cotton manufacturing that you are bound to lose in the end, anyway, and will enable New England capital and brains to compete on equal terms on its own grounds with the South, that is taking the coarser cottons from us on account, chiefly, of certain distinct local advantages, as we believe.

## PEARL BUTTON MAKING.

In former years pearl buttons were foremost in the list of exports from Austria to the United States. Nowadays a pearl button destined for sale in the American market is a rarity. For some time, says a writer in the Dry Goods Economist, a movement has been on foot to develop in the United States a domestic manufacture of pearl collar and other buttons. American manufacturers who have branched out in competition to the Austrians enjoy advantages which only good machinery can give, and what is more important, they are willing to pay slightly better prices for the shells, a condition arising from time and money saved by machinery and better prices realized. The production of pearl buttons in the United States, however, has not as yet had much to do with the general falling off in Austrian exports. Dealers here say that thus far only inferior goods can be made in the United States, viz.: buttons for use on underwear and other garments, where quality is secondary. Good, one-piece collar buttons cannot successfully be produced there in view of the fact that no machinery capable of doing the same clear, symmetrical work that is done by hand in the United States has been put on the market. But they expect the problem of machinery to be solved satisfactorily ere long.

The lethargy of the Vienna button trade, resulting from the closing of the American market to their output, is remarkable. There used to be a number of large factories, employing as many as two hundred workingmen, in active operation all the year round. To-day many of them are shut down. The employees earned good wages—often $6, $7 and $8 a week, amounts that are uncommon here. The majority of these men have had to quit work and learn some other trade. The commission merchants, who yearly cleared big profits, have been obliged to take up other lines or retire on their earnings; so not only have the general class of factory employees suffered.

The manufacture of buttons was also carried on largely as a "Hausindustrie," which means that the laborer was permitted to carry the material supplied him home to be fashioned. The machinery being crude, all the members of the family were able to help the paterfamilias, and in this manner one family could get through with an exceedingly large amount of work every week and lay away snug little sums for a rainy day. This happy epoch in the button-makers' life has passed, for the demand will not supply so many with work.

True, when the dealers recognized the hard fact that America would never again be the market it used to be, they cast about for new outlets, with the result that fair-sized shipments go pretty regularly to the East. This market, it is hoped, will, when worked vigorously and systematically, bear appreciable fruits, but, naturally, merchants do not expect to find in the Orient a second America.

A comparison of the prevailing prices for different grades of raw pearl with those of years gone by elicits the information that tariff and competition alone are not wholly to blame for the present sluggishness of trade. The Austrians have had to contend, to a great extent, against high prices. Within the last eight or ten months, and even earlier, the cost of raw material has advanced almost 40 per centum, and in addition thereto difficulty is found to obtain shells in sufficient quantities owing to the fact that better terms are offered to producers by America.

In Vienna, the shells used mostly in the manufacture of one-piece collar buttons are of Red Sea and Mediterranean growth, which cost, per pound, in the neighborhood of 35 cents. The product of these shells are the so-called hand-made buttons, which are still exported in

small quantities to the United States. There is, however, a more expensive variety of shells, brought from Australia, and costing about 60 cents a pound First-class buttons, opera glasses and umbrella handles are manufactured from them. Cheaper varieties from the Fiji Islands are sold for 25 cents per pound, and a still more inexpensive kind is grown in Panama and sold here for 20 cents. The poorest shells used for inferior grades of buttons are grown in Persia, and sold to manufacturers at the low figure of 3 cents.

The main cause to which can be attributed the scarcity of raw materials is that the beds are in a worked out condition. When business was prosperous, in order to meet the demand, pearl producers drained the beds to their utmost capacity, and, with a lack of foresight which has cost them dearly, neglected to allow the growing shells to reach maturity. As an example of such a lamentable state of affairs, dealers here cite the case of Egyptian shells. I understand that Egyptian shells were once comparatively plentiful, but so popular did they grow that they were gathered irrespective of the growth they had attained. Hence Egyptian shells can seldom be obtained except at unreasonable figures.

The rise and fall of the button trade is but an instance of the unstable condition of many lines of Austrian manufacture. The Austrian manufacturer of to-day, it seems, is a very different sort of man from what he used to be. The Germans are forging to the front with unquenchable energy, and in their strides for new fields are pushing the Austrian to the wall. Fortunately, the government is coming to realize the bad state of affairs. It is putting forth admirable efforts toward the establishment of new trade schools and kindred institutions that will tend both to improve the quality of manufactures and to do away with antiquated foreign trade methods, and if producers do not shove forward a peg or two under this new stimulant, they will have themselves to blame for Austria's future commercial position among manufacturing nations.

## FLOCKING.

The flocking process is one of the most important parts of fulling. Not only does it require some additional calculations, but with them also keen judgment, for the material out of which the flocks are made has an important bearing on the subject. As to the calculations necessary we refer our readers to the Fuller's Ready Tables, for the whole matter is there treated in a most comprehensive manner, says a writer in the Boston Journal of Commerce. So we will take it for granted that the amount of flocks which the goods require is known, and our chief aim will therefore be to devise the best way of getting them on the goods. There are several methods in use among finishers, all of which have their merits and some also their drawbacks, and among them we first find the dry flocking method as employed by some. The greatest benefit ascribed to this method is the even distribution of the flocks all over the goods, this being made possible by reason of the goods being dry. This plan will word admirably on some classes of goods, and may be employed on kerseys, meltons and such like fabrics. On cassimeres we should not want to advocate the use of this method for the reason that too much of the flocks are apt to find their way through the fabric to the face, and if fancy colors are present, especially of the lighter kinds, these are apt to appear muddled and will lack the brightness which they are intended to possess when they are made part of the fabric. Then again it will require extra time in the running of the goods, for it will surely take a quarter of an hour to distribute the flocks properly, and these fifteen minutes added to the regular running time will be found to be an appreciable item in case we are driven. We therefore cannot see any great benefit to be derived from dry flocking, and although we have tried it several times we never could find the results sufficiently good to warrant its adoption as a permanent method. When flocking dry, the amount of flocks required for the goods is put on them immediately after starting the mill, and after they are well distributed the soap is added to wet the goods down. It is claimed that by this way of doing the goods do not get a setback the same as they do when the flocks are applied when the goods are wet and begin to felt. However this may be, we cannot find anything in our experience which will bear out the assumption. After the goods are wet down the proceeding is much the same as described in the fulling process.

We next come to the wet flocking method, and here the greatest objection raised is that stated above. Of course if we intend to proceed in the wet flocking process the same as in the dry, the objection pointed out will no doubt hold good, and even then we can see no further harm done than a trifle more time required in the process, which is about equal to from five to ten minutes. But we do not intend to treat the goods to any such process as that, for when flocking wet the greatest advantage of the method is lost if we should dump the whole amount of flocks on the goods and then let them run. Therefore we take a small amount of the flocks required to be put on and sprinkle them on the goods lightly, and as soon as these have been taken up we can give them some more, and thus proceed till all of the flocks are put on. This again is objected to as being too much work, but for all that it is the only reasonable way to flock goods, and weight can be made with less flocks than with any other method. We think that the amount of work required is the greatest objection urged against this way of doing, but we have yet to find a way of getting goods finished in an A1 fashion without having to use considerable work. The flocks thus put on will stick better to the goods and become part of the fabric, because the flocks are not fed to the goods until the goods are in a condition to take care of them, and that is only when they become heated, for it is only then that felting begins. If to this is added a little felting capacity in the flock it can be easily seen that the process must be successful. Flocks which do not possess the felting qualities are not fit to use in any sense, but we would rather risk them on the goods, if they are put on in the way stated, and at the proper time, than to take a much better flock and put them on dry. We think that between the two the first named would be the better fabric all around. Not only will the colors be brighter, but the flocks will have been felted into the goods in such a manner that they will stay and not drop out at the first handling the goods get after they become dry. One of the best tests as to the truth of this may be found in the looks of the dry finishing rooms where the two methods are in operation. Where the dry flocking is carried on it may be noticed that the tables, etc., become quickly covered with flocks as soon as they are not in use, and we will be continually brushing tables. This shows that the flocks have not been incorporated into the goods enough to hold them, and as soon as they become dry the sifting-out process begins to stop only when the goods are worn out. No such state of things will be found where the wet flocking method is in use unless the quality of the flocks is entirely below what might be expected, but given the same quality of flocks as in the dry process there will be no sifting out, at least while the goods are in the mill, and not for quite a while after the goods have begun to wear.

Another method of flocking is half dry, half wet, and this method is used only when the amount to be put on the goods is excessively large. When that is the case, it would take too long to apply the flocks as described in the wet flocking method, for the goods would be up in width and length long before we had got them all on. Therefore we take the half of the flocks and put them on dry, and the other half as described before. We do not do this because it is the best way of doing the work, for there is no best way to choose, it is simply the only way the flocks can be got on, and for that reason we do it. While it may not make much difference on all-wool goods which are flocked in reasonable amount, how the flocks are put on, with the exception of cassimeres, noted above, it becomes quite an important item on the lower grades, that is, cotton-warp goods. The wet process should only be employed on them as giving the best results, but as this class of goods are cheap the amount of work required to do the flocking right is often grudged, and they generally receive the treatment which is of the least benefit to them. In our next we will treat of the gigging process.

## CARE IN DYEING.

The perfection in dyeing any kind of stock can be accomplished only by using every possible caution. There is a difference of opinion among superintendents as to whether each kettle of stock should be perfectly even in color and matched to sample, or whether it is sufficient to have the stock, when picked up, blend to make the desired shade. The perfect matching of a color in the dyehouse is a very

difficult matter, and, in fact, it is impossible except by chance. If a lot of 2,000 pounds to be dyed brown is called for, in many places it would be divided into kettles of 200 pounds each If you have made the sample and have an exact recipe, generally you will start all of your tubs on the same recipe You may have six kettles, and when done you will find each one of a different shade, but when all the stock is carded together it will match the sample Some of the stock may be of an olive shade, some of a red, and some quite dark; still, each had the same amount of dye, and, as nearly as possible, the same quantity of water, and each was boiled the same length of time. You will find the same result if you dye one lot to-day, and one a few days later Of course, if your superintendent is one who requires each kettle to be an exact match with the sample, you must throw out the dark lot and dye a new lot. The lot is not lost, as it can be dyed into some darker shade. The lighter ones must be shaded to the sample If you are using the concentrated dyestuff, the liquor must be run off and the stock redyed, as it may call for a few ounces of dye It may require only an ounce, or even as small an amount as one-quarter of an ounce, if the shade be a delicate one If the cost of this color be three cents a pound, the extra work will add at least two cents a pound, and will the shade be any better than if you were working for the superintendent who would say, "Try these different lots: weigh out equal parts from each, when dry take to the picker, and after picking have a small sample carded and show me" After doing this you may be a little short of red, and he will say, "what can you do with it?" Supposing, after several trials, 3 per cent of a reddish brown is added, and it matches to his satisfaction, then he passes it. The two ways will give the same result, but the one costs almost double the other. The writer has used both ways and under the latter one was able to turn off double the amount of work, and at half the cost of the first process. I should be very glad to learn the opinion of others as to why the expense is so great in one and so small in the other, but, at the same time, the result the same. Again, the same point is seen in regard to each separate kettle. In one way one must have every fiber of the same shade; in the other, as long as the fibers card to the shade desired it does not matter. There must be taken into consideration the manner in which the wool has been sorted, if sorted at all No superintendent or overseer has any right to expect even dyeing when there are grades in the wool from the coarsest to the finest, even paint and tag locks. Coarse wool always takes the dye quicker than fine, and in brown will take the red before the fine has any, thus making a very uneven color. If wool of different kinds, as to grease and dirt, is mixed, uneven scouring is the result, for, if the wool is scoured until the greasy portion is clean, the other will be over-scoured; and, if otherwise, grease will be left on part of the wool, so the result is as bad one way as the other, and the dyeing is equally uneven

There is one way in which this state of affairs can be overcome, but the unevenness will still be there, only it will not be so apparent. Place a picker in the dyehouse, and run the wool, after it comes from the rinser and has passed through the squeeze rolls, through it; you will pick it up perfectly. This will save time, as one man can do all the picking for a 25 set mill, and save the time lost for breaking it up by hand before putting it in the kettle. This also makes poling easy, and your kettle can be poled double as much as when the hand breaking is done If, after extracting, the dyed stock is again put through the same picker, it will dry in half the time, and save at least one picking in the picker house This picking will not require any more labor, but will save it by saving time, and will make the work look more even, although it is not. Very even color can be obtained in this way, and if the wool is well graded the color will be almost perfect.

## THE ORIGIN OF THE IMPORT SILK TRADE IN JAPAN.

An interesting paper on this subject is published among the Transactions of the Historical Society We think it worth reproducing in an epitomized form. Among the articles brought to Japan by Chinese and Portuguese ships in the early days of foreign trade, observes Yokoi Tokifuyu, the author of the paper, raw silk was the chief. In those days Japan produced no silk of her own. Not until about the middle of the eighteenth century did Japanese begin to cultivate the silk-worm to any extent. Mr. Yokoi says that, when preparing a history of Japanese commerce, he was struck by certain facts connected with the silk trade in its incipient stage and thought them worthy of forming the subject of a separate paper, which he now publishes.

In 1602 a Dutch ship arrived in Nagasaki laden with raw silk. But it was just after the war which culminated in the battle of Sekigahara, and traders were by no means flush of money. The captain of the ship waited in vain for the arrival of purchasers and eventually was so distressed that he appealed to the Nagasaki bugyo for help. The bugyo proceeded to Kyoto and consulted Ieyasu on the matter The Shogun sent for ten merchants of Sakai and Kyoto, and pointed out to them that if the Dutch ship were allowed to go away without selling her cargo she would not return, and that the country would thus lose the benefits to be derived from foreign trade; he therefore advised them to make offers to the captain for the purchase of the silk. The Nagasaki merchants soon came to hear of the steps the Shogun had taken, and, anxious to share the profits of the trade, asked for permission to purchase a portion of the cargo. Their request was granted, and thus the merchants of the three above-named places formed silk purchasing companies, to which Ieyasu subsequently caused a charter to be granted. This charter, dated May 3rd, 1604, and appearing over the signatures of Honda Kotsuke-no-suke and Itakura Igano-Kami, forbids other parties to buy silk, prior to the conclusion of such purchases as the favored companies wished to make.

It is stated that the first silk buyers lost money over the business and that they appealed to Ieyasu to intercede on their behalf and persuade the Dutch to allow them to make good their losses by cheap bargains the following year, which arrangement was effected. Ieyasu appointed from among these merchants certain persons whose duty it was to superintend the trade. The proportions in which the three towns were allowed to purchase annually were 100 hyo* for Kyoto, 129 for Sakai-ura, and 100 for Nagasaki.

During the early part of the Kanyei period, the merchants to whom the monopoly was first granted made great profits, and consequently an urgent application from the traders of Edo induced Iemitsu in 1631, to grant them permission to purchase annually to the extent of fifty hyo for ordinary merchants and sixty for mercers.† The same privileges were granted in respect of the purchase from the Dutch of woven silk, crape, and other materials. Osaka next applied and obtained permission for ordinary traders to purchase raw silk to the extent of thirty hyo a year, and mercers to the extent of sixty. Charters were granted to other places subsequently, but the quantities allowed to be purchased were comparatively small.

In 1636 a proclamation forbidding Christianity was issued, and at the same time the following restrictions were put on trade. (1) On the arrival of foreign vessels an invoice of the cargo was to be sent to Edo, and permission received for the sale of goods. (2) Within twenty days after the price of silk had been decided, the quantity sold was to be paid for and delivered to the five chartered companies of Sakai, Kyoto, Nagasaki, Edo and Osaka. (3) Other goods were not to be sold till the price of silk had been determined. (4) The sailing of foreign vessels was not to be postponed later than September 20th, unless in case of vessels that arrived late, to which an extra fifty days was allowed. (5) Would-be purchasers of silk were to reach Nagasaki on or before September 5th. Traders arriving after this date were not entitled to purchase silk that year. (6) No sales of silk at Hirado were allowed prior to the fixing of the price for the year at Nagasaki. Judging by the number of presents given to the Shogun by the chartered companies, they must have realized very large profits.

In 1651 the silk trade regulations were withdrawn, and merchants were allowed to purchase how and when they pleased. But it was found that this freedom only tended to increase the profits of the Dutch, who, naturally enough, made good use of the jealousies of competing buyers, and stood out for high prices. Again the Government was applied to, and again it interfered, and the five original companies were reinstated in power. A new method of determining what should be the market price of silk year by year was adopted.

* 1 hyo=50 lbs. (Japanese weight, that is 160 me to each pound or 1⅓ lbs. av.)

† Mercers in other towns seem to have enjoyed special privileges under the Tocugawa regime.

On the arrival of the first vessel laden with silk the companies were required to send in sealed tenders, and the price per hyo was fixed by striking the balance between the highest and lowest bid. But the quantity allowable for each company to purchase was not fixed, as in former days, and this soon led to practices which the authorities deemed undesirable, and hence the old restrictions as to the quantity to be purchased were, in 1685, again enforced. It must be understood that the quantities given above were only proportionate and relative to the total quantity of silk annually offered for sale. However large the purchases which in any one year a company desired to make, it had to maintain its ratio vis-a-vis other companies, unless in rare cases, where, for some reason, another company wished to forego its rights.

The same year in which the above restrictions were enforced witnessed the passing of regulations limiting the total value of silk purchasable annually from China to 8,000 kwamme of silver and that from Holland to 50,000 ryo. At this time two government officials were appointed to superintend the distribution of the silk which arrived year by year among the various companies. The companies seem to have increased their membership and to have elaborated large organizations as time went on.

To take one instance. the Sakai Company originally consisted of some four or five traders, but in 1757 we find it had a membership of 150, with six directors, called toshiyori, and that it purchased during the year 5,000 lbs. of raw silk. The officers of the company were remunerated as follows.—The six directors received annually fifty pounds of silk and seven kwamme of silver; two silk inspectors, three kwamme of silver, clerks, 500 me; assistant clerks, 500 me; one servant, 250 me. From 1764 onwards Japanese sericulture grew apace and the import of foreign silk decreased correspondingly. The purchasing companies, though gradually diminished in size, were not dissolved, however, until 1859.

## LEATHER BELTS.

Leather, in the process of manufacture, previous to the application of grease, has little strength, and may be torn, according to thickness, much like brown paper. Grease causes such action of the fibers upon each other, that great strength comes back; in fact, the leather may be said to return to a condition akin to its original state as a hide. The ever-fertile mind of the American worker in belt leather has sought for new methods in the greasing process to gain in value of product, but to this day a universal method exists of using tallow and cod oil, these two are usually combined for the flesh side, while cod alone is used on the grain. They are allowed to slowly penetrate the leather which has first been thoroughly wet; the hides are hung in the open air, or in a drying-room, and as the water dries out, the grease penetrates, leaving, however, the stearine of the tallow, which latter is finally scraped off. The future manipulation consists in wetting and stretching, rubbing down, or stoning, finally, much working on the surfaces with a slicker and trimming. A just limit to the quantity of grease which belt leather shall have, has been well determined, to give to it a character of elasticity and toughness peculiar to no other material. It is an interesting fact that the best cod oil contains only a faint trace of an active acid. Also, in using tallow, the active acid principle, the stearine, is left upon the outside to be scraped off; thus, all which penetrates is of a neutral nature, and not injurious to the fiber. Belting is now made and carried in stock in large rolls, and by long standing it becomes dry. When a new belt is put to work upon pulleys there is a rigidity in its character not in keeping with our ideas of a minimum of power to be expended; ordinarily also, when a belt is put to its largest duty, there is more or less slipping. In the first making of iron-faced-pulleys, they were left rough, but pulleys were soon made as smooth as possible by finishing, a belief prevailing that a close contact between leather and iron gave the best adhesion, and then, too, if slipping occurred, less wear came to the surface of the leather. To provide for still better adhesion, pulleys are covered with leather, also with patent covering of paper. There have again come into use pulleys made with iron arms and wood rims, also all wood pulleys. To prevent the slipping of belts, or to make them more pliable and durable, various substances have been used; powdered resin to produce immediate adhesion, or castor oil to give pliability and adhesion. The first is proved by all experience to be very injurious to leather, causing it to harden and crack. Castor oil has been much used, but never with entire satisfaction, where all conditions of a belt are considered. Castor oil has an active acid principle; also, it is drying in its nature; its continued use saturates a belt and changes its nature from its legitimate state of elasticity and toughness—a belt thoroughly filled with castor oil is in a poor condition, when it comes to repairs. The writer has given much close study to the care of leather belts, with respect to a proper dressing to apply to them, and after eight years' experience, has produced a neutral compound, which thoroughly prevents slipping, while still leaving the leather practically as it comes from the belt-makers' hands. Its endurance is very remarkable, and the quantity necessary to prevent it from slipping is surprisingly small, it leaves nothing further to be desired. The writer does not hesitate to say that, with a polished faced iron pulley, the full value can be had from a leather belt. Whatever the conditions of use for belting, it should be positively kept free from machinery oil, and free from dust, as far as possible. Run the grain side to the pulley. Belts should be run as slack as possible, without, however, so much slackness that a flapping motion can exist, this keeps the fibers from undue strain, saves the laced joints, saves the bearings from unnecessary wear, and, perhaps, above all, prevents the shafting from being pulled out of line. The inquiry is made as to the exact cause of the electricity developed by belts. As I have observed that, in the extreme case of a dynamo belt, running over two-thirds of a mile per minute, no electricity is developed in the belt when my belt dressing is used, the question seems legitimately asked, if the electricity in belts does not come only with slipping.—Fiber and Fabric.

## THE BELGIAN SYSTEM OF CARDING.

Swire Smith, Keighley, England, who is considered a good authority on textile matters, recently referred to the competition of the Belgian yarn spinners, and to the 15,000,000 pounds of yarn they send annually to England. He and the late John Slagg, of Manchester, paid a visit to the town of Verviers, some years ago, in order to investigate personally this particular branch of competition. They were surprised with what they saw, the machinery being of the newest and most advanced types, and its adaptation most skilfully planned and arranged so as to turn out a maximum quantity of well spun yarn at a minimum of cost. This yarn was principally spun from the "burry" wools of the River Plate—a class of wool much rejected in England on account of excess of burrs.

They considered the Belgians much in advance in this particular line, and that this competition could not be despised, but was really serious, as the cost was so much less than their own yarns. There was great truth in that statement—a fact which compelled the writer to investigate the cost and system of production for himself, in order to combat this competition in the markets. Finding that he could use Belgian yarns to advantage, as the cost was 15 per cent. less than English, he became a customer and a buyer.

As it is our desire to explain the advantages and disadvantages of the various systems of carding wools, we will take the Belgian system first. The wool yarns are a specialty, and made chiefly from Buenos Ayres wools, or a mixture of those wools and noils, which means the short wools from combing. Buenos Ayres wools are more infested with burrs than any other class, and in the extracting of burrs by machines the staple gets broken, so that the wool is short in staple when ready for carding. Carbonizing the burrs is the most recent process, but both processes tend to shorten the staple, which is wiry and tough compared with any of the English colonial wools.

It is to suit this special class of wool the Belgian carding system has been devised, and it has certainly been developed to a success The counts chiefly spun are 14's, 16's, 18's and 20's woolen counts, the 16's and 18's predominating. Many spinners limit themselves to two counts, and seldom change a method which avoids a good deal of lost time and keeps the cards in perfect condition A set of carding machines comprises three single-cylinder machines, with eight rollers to each, and one doffer and one swift or fancy This is the system of Celestin Martin, the leading machinist in Verviers, who

also invented the condenser (frotteur) with dividing straps or tapes. The feeds are blanket or sheet feeds between the first and second and also between the second and third machines, but quite different to the Blamires feed, being of circular action, and requiring to be broken off in blanket form after a given number of revolutions. The short-stapled wool makes this system a necessity. The card wire is set in a vulcanite cloth, with a thick layer of "wool felt" to support the wire up to the bend of the tooth. This is equivalent to the old system of flocking cards formerly prevalent in this country, and gives a firmness and strength to the wire much greater than in English cards As a matter of fact, the tough fibers of this wool render this strength a necessity. Another important point lies in the fact that these machines are only 48 inches wide, a width obsolete in Yorkshire, but still existing in the West of England. Where pure wool is used and spun to fine counts, and evenness of yarn is required, this width still holds good, especially in the last machine of the set.

By the aid of Martin's patent condenser with driving straps, the delivery is ninety-six threads (and four waste threads) ready for the mule, on four spools of twenty-four threads each. From this delivery they spin direct at one draft to the small counts named. This avoids roving, and the yarns are as well spun as any to be found. The spinning mules are of English make. Excellent though this system may be in Belgium, it has been little adopted in England. One eminent firm of machinists paid $30,000 for the royalty alone of Martin's condenser, and soon sold the half share to a rival firm. Yet, so few have been sold that it is an open question how much they have lost by it

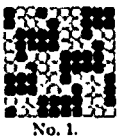
Full time in Verviers means night and day, and with two sets of hands working shifts of eleven hours each, they turn out the maximum quantity of work Wages are about one-third less than in England yet Verviers is said to be a high-wage town. What with raw material of a cheap grade, excellent machinery, long hours and cheap labor, and then a free and open market in England, is it any wonder they feel this competition in the latter country. Of course, this system of carding is not suitable for shoddy and mungo, and does not suit the Yorkshire trade, where it has been tried The yarns are largely used in Glasgow for wool shirtings, skirtings, etc

These goods can be warped and checked in great variety. Scotch wool skirtings, woven in rep weave, are made with these yarns, and may be seen in beautiful stripes, often combined with silk, in most drapers' shops The winceys of former days have also been displaced by those Belgian yarns, and the Angola yarn trade of the Huddersfield district has almost disappeared. It was stated by one witness from Huddersfield before the Royal Commission on the depression of trade that 50 per cent. of the yarn spinners in that district had failed in seven years Spanish stripes, formerly a prosperous branch of trade in the Leeds district, can be made from the same yarns, and that branch has apparently been transferred to Germany. Anywhere, and almost everywhere, in cases where long hours and cheap labor form a considerable cost in woolen goods, the English meet with the same competition.

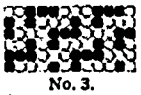
Worsted coatings have had the largest sale, and the most successful designs ever known are termed corkscrews. Being neat and stylish, they first found acceptance in the English markets, then in the American markets, and held sway for twenty years. The strike of the weavers in Huddersfield, about fifteen years ago, quickly shifted the coating trade to Bradford, and that town being depressed at the time it was a welcome introduction. The yarns having been previously, spun in Bradford, but woven in Huddersfield chiefly, the Bradford manufacturers quickly seized such an easy opportunity, and with wages 25 per cent. less than Huddersfield, concurrent with the introduction of the new fast-speed coating looms, Bradford soon took the lead in plain coatings, and the depression was shifted to Huddersfield, where slow looms and high wages had no chance against the new conditions in Bradford Yet, with these conditions in their favor, the Bradford manufacturers have failed to wrest the fancy trade and superfine plain trade from Huddersfield.

As the fates will have it, assisted by the vagaries of changeable tariffs, the depression has again shifted to Bradford, while Huddersfield manufacturers are again well employed. This result has been foreseen and predicted by the initiated, as it was quite evident that Huddersfield must come to the front again with the revival of the fancy trade. As a matter of fact, Bradford has been mainly dependent on Huddersfield and Leeds all along for the dyeing and finishing of its worsted coatings, as customers' contracts often, if not always, stipulated for a Huddersfield finish Surely this has been a compliment to, if not an acknowledgment of, the superiority of Huddersfield goods

# Textile Design


No. 1.


No. 2


No. 3.

No. 1.—3360 ends in warp; 52 ends per inch; 13s reed; 4 in a reed, 64 picks per inch, 64 inches in reed; 56 inches wide when finished. Weight, 22 ounces; 10 healds, straight draft

| Warp: | Weft: |
|---|---|
| Ends. | Picks. |
| 86 gray, 2-18s, | 78 gray, 2-18s, |
| 2 brown. | 2 brown. |
| 88 ends in pattern. | 86 picks in pattern. |

No. 2.—2700 ends in warp; 42 ends per inch, 10½s reed: 4 in a reed; 52 picks per inch; 64 inches in reed; 56 inches wide when finished. Weight, 13 ounces. 8 healds, straight draft.

Warp: 2-24s. Weft: 2-24s.

No. 3.—7650 ends in warp; 120 ends per inch; 15s reed, 8 in a reed; 16 picks per inch, 64 inches in reed; 56 inches wide when finished. Weight, 15 ounces; 12 healds, straight draft.

Warp:

Ends.

2 red, 2 42s.
8 dark slate,
4 light slate,
8 dark slate,
2 red,
4 light slate,
10 dark slate,
4 light slate, } 5 times.
8 dark slate, }
4 light slate, } 6 times
6 dark slate, }
4 light slate, } 5 times.
8 dark slate, }
4 light slate,
10 dark slate,
4 light slate.

236 ends in pattern.

Weft. Dark slate, 2-42s.

—B. J. of C.

## LATE PATTERN CARDS.

Benzo Chrome Brown 3 R, on cotton yarn, cotton cloth and loose cotton. Some fifteen patterns are shown dyed with different percentages of the above new dyestuff.

Diazo Indigo Blue B and Diazo Blue 3 R.—These are both new colors. Some six shades on skein cotton diazotised and developed in the usual manner, forming very fast cotton colors.

Alizarine Cyanine Green, and combinations on worsted yarn extremely fast to light (No. 663, 1898).—This card shows thirty shades on yarn, many of which never before having been produced, makes it a desirable pattern card Such colors as Alizarine Yellow 3 G, Anthracene Brown G, Alizarine Blue Black B, etc, were used, the fastness of which colors being excellent has resulted in producing perfectly fast combination shades

Alizarine Chrome and Diamond Colors On loose wool, dyed in one bath (No. 656, 1898) Owing to the number of baths and the large amount of time taken up in successfully dyeing alizarine and chrome colors on wool, the Farbenfabriken of Elberfeld have published a very valuable pattern card, containing over 100 shades, all of which have been dyed in one bath with the subsequent addition of fluor chrome and bichrome of potash. The first fourteen patterns are self-colors, various combinations of which producing the remaining hundred

shades. The quantities of dyestuff are boiled on for half one hour with 10 to 15 per cent. Glauber salt and 2 to 4 per cent. acetic acid. The bath being then somewhat cooled, bichrome and fluor chrome are added and slowly raised to the boil for three-quarters of an hour. Special directions given for dyeing carbonized wool. Any of the above cards will be promptly mailed on application to the Dominion Dyewood and Chemical Co., Toronto, sole agents in Canada for the Farbenfabriken, vorm. Friedr. Bayer & Co., Elberfeld, Germany.

## AMERICAN SILK ASSOCIATION'S ANNUAL REPORT.

The annual report of the Silk Association of America has now been completed.

The imports of silk and silk goods during 1897 are given, together with those of the two preceding years, for purposes of comparison. The ports of New York, Boston, Philadelphia and Chicago are covered by this report, which shows that the imports of manufactures of silk have been less than in most preceding years, while the importation of raw material has steadily increased until the volume thereof in 1897 exceeded all previous records.

| Articles. | 1897. | 1896. | 1895. |
|---|---|---|---|
| Silk piece goods.... | $12,842,282 | $10,707,171 | $15,098,145 |
| Satins ..... | 81,468 | 67,885 | 82,613 |
| Crepes ..... | 21,262 | 7,353 | 12,783 |
| Plushes ..... | 134,549 | 127,367 | 359,647 |
| Velvets ..... | 1,665,684 | 1,980,508 | 2,927,379 |
| Ribbons ..... | 1,386,766 | 825,482 | 1,459,379 |
| Laces ..... | 2,854,155 | 2,399,866 | 2,060,314 |
| Shawls ..... | 36,465 | 53,657 | 73,164 |
| Gloves ..... | 81,881 | 117,224 | 197,208 |
| Cravats ..... | 10,621 | 12,870 | 47,471 |
| Handkerchiefs ..... | 327,604 | 418,554 | 706,329 |
| Hose ..... | 42,971 | 87,924 | 87,378 |
| Threads and yarns.. | 918,097 | 671,332 | 1,031,582 |
| Braids and bindings | 871,112 | 556,844 | 551,381 |
| Silk and worsted .. | 168,152 | 119,688 | 165,789 |
| Silk and cotton .... | 1,709,523 | 1,549,917 | 2,460,939 |
| Silk and linen ..... | 13,626 | 26,296 | 1,308 |
| Totals..... | $23,166,218 | $19,734,938 | $27,322,809 |

Total imports and values of raw silk at all ports in the United States for the last five years ending December 31st, 1893, 1894, 1895, 1896 and 1897 :—

| | Bales. | Value. |
|---|---|---|
| 1893 ..... | 30,981 | $19,491,958 |
| 1894 ..... | 54,924 | 24,728,163 |
| 1895 ..... | 66,989 | 30,595,991 |
| 1896 ..... | 30,754 | 14,411,073 |
| 1897 ..... | 71,987 | 30,441,973 |

Imports of waste silk, pierced coccons and noils at all ports in the United States for the two years ending December 31st, of 1896 and 1897 inclusive :—

| | Bales. | Value. |
|---|---|---|
| 1896 ..... | 4,330 | $435 923 |
| 1897 ..... | 6,776 | 586,601 |

Imports of raw silk, etc , at all ports in the United States for the year ending December 31st, 1897, in pounds avoirdupois

| | Lbs. |
|---|---|
| Raw silk..... | 10,092,555 |
| Waste silk ..... | 1,649,866 |
| Noils ..... | 43,600 |
| Total ..... | 11,786,021 |
| Total value ..... | $31,028,574 |

—"The Perfect Incandescent Light Protector" is a simple but ingenious device for the protection of the delicate "mantle" used in the Auer light. This apparatus, while an ornament to the lamp, is not only a protection to the mantle, but prevents the smudging of the ceiling from the soot of a gas jet. The inventors and patentees have appointed G B Fraser, 3 Wellington street east, Toronto, as their sole Canadian agent, and Mr Fraser will be glad to hear from responsible agents as to the disposal of local rights for this fast selling article

## LITERARY NOTES.

The June number of The Century has several features of particular timeliness Captain Alfred T. Mahan, recently recalled to active service as special adviser to the Naval Strategy Board, contributes a paper describing the reasons for the failure of the Spanish Armada, This is introductory to a general article on the Armada, illustrated by Varian, and written by William Frederic Tilton. Mr. Tilton's paper is chiefly based on the manuscript Irish correspondence in the London Record Office, and on the narratives of survivors and other authentic Spanish papers, gathered by Captain Duro, the historian of the Armada. Mr. Emory W. Fenn, who served as a major in the Cuban army, recounts his experience under General Garcia in an article entitled "Ten Months with the Cuban Insurgents." Mr. R. O. Crowley, formerly electrician of the Torpedo Division in the Confederate Navy, describes "The Confederate Torpedo Service," which he was largely instrumental in organizing. Mr. Crowley laid the mine which blew up the first gunboat ever destroyed by this means. Mr. Stephen Bonsal, formerly of the American Legation at Madrid, writes of "Toledo, the Imperial City of Spain," the illustrations being by Joseph Pennell. Accompanying a number of hitherto unpublished drawings by Vierge for Cervantes' masterpiece, William Dean Howells has an article on "Pictures for Don Quixote." Bret Hart contributes one of his characteristic Western stories, "The Passing of Enriquez," the central figures of which are characters already familiar to readers of The Century. "The Three R's at Circle City," by Miss Anna Fulcomer, is the description of a queer polyglot school that flourished in the Arctic regions. Another story in the series of "Gallops" by the new Century writer, David Gray, is called "Carty Carteret's Sister." Two illustrated papers make up "An American School of Dramatic Art;" one by J Ranken Towse, giving "A Critical Review of Daly's Theatre," and the other, by the late George Parsons Lathrop, presenting a pen picture of "The Inside Working of the Theatre." Andre Castaigne's illustration this month in "The Seven Wonders of the World" is a striking reconstruction of the Hanging Gardens of Babylon. Of special interest to women is Mrs. Amelia Gere Mason's "Club and Salon."

## TEXTILE IMPORTS FROM GREAT BRITAIN.

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

| | Month of April. | | Four months to April. | |
|---|---|---|---|---|
| | 1897. | 1898. | 1897. | 1898. |
| Wool ..... | £5,252 | £ 1,117 | £ 7,924 | £19,716 |
| Cotton piece-goods ..... | 27,606 | 28,475 | 162,112 | 193,542 |
| Jute piece-goods..... | 6,544 | 9,342 | 33,282 | 44,954 |
| Linen piece-goods ..... | 7,441 | 8,132 | 43,169 | 51,680 |
| Silk, lace..... | 345 | 346 | 2,393 | 3,694 |
| " articles partly of ..... | 1,136 | 656 | 7,141 | 8,180 |
| Woolen fabrics ..... | 8,219 | 8,713 | 79,765 | 83,036 |
| Worsted fabrics..... | 26,753 | 26,836 | 204,645 | 234,347 |
| Carpets .... ..... | 7,441 | 10,883 | 72,252 | 86,142 |
| Apparel and slops..... | 30,741 | 36,937 | 100,473 | 121,408 |
| Haberdashery ..... | 11,692 | 19,895 | 64,681 | 69,309 |

## THE LATE GEORGE UNSER.

By the recent death of George Unser in Toronto, a quaint figure is removed from the textile manufacturing trades of Ontario. When the northern part of Toronto was known as Yorkville, Mr. Unser operated the Yorkville carpet factory, once the largest carpet mill in Ontario, and running 30 or 40 looms at the time the writer first visited it. Mr. Unser, who was an Austrian and was a giant in stature, understood carpet manufacturing well, and turned out some substantial lines of goods, but unfortunately he had not much talent for the business department of his trade, and in addition to suffering repeated losses through agents and others, who took advantage of him, he had troubles with his employees, as well as some of his customers, through an

unfortunate infirmity of temper. When he started his factory he was worth a good many thousands of dollars, but losses upon losses reduced him till his plant was sold out as a result of "giving security" for a friend, and at the time of his death he was keeping a little curiosity shop at the corner of Davenport and Bishop streets. He brooded over his losses continually, and it was in the hope of getting him lifted out of his melancholy that his family induced him to start the curiosity shop. His daughter Lizzie, who helped him at the shop, had a sign put up, "Music taught by a native of Germany," but the poor old fellow was no longer "pleased with the concord of sweet sounds," but mumbled continually of his losses, and finally took to his bed and died, his last words being, "They robbed me of my property!" The old gentleman had many excellent qualities, and his case was a very sad one.

—Japan has begun in Sakai the manufacture of rugs, of which the warps and weft are cotton and the filling wool yarn, the latter being made from Chinese wool yarn, spun in Osaka. Fast dyes and beautiful shades are now being turned out that show a marked improvement over those of a year ago As yet the product is represented by a daily output of 120 yards, from 120 looms, operated by 480 weavers There are other rugs made from jute, the manufacture of which gives employment to 9,600 hands, mostly children between seven and sixteen years of age.

—Joseph Williams & Co., hosiery manufacturers, of Glen Williams, Ont., who have been in deep water for some time, have had a meeting of creditors. The liabilities were said to be about $8,000, with nominal assets of about $3,500. The principal creditors are Sykes & Ainley, woolen manufacturers, of the same place, who, it is reported, have taken over the plant and agreed to pay the other creditors 25 cents on the dollar. While the manufacturing plant is not of much value the estate has a good water power, from which the electric lights of the village are supplied.

—A new bi-product of the dairy is the manufacture of sizing to be used by paper manufacturers to put the glazing on fine quality papers Heretofore a fine quality of glue with other compounds has been used, but it was recently discovered that a much better and cheaper sizing could be made from skim milk. The Standard Co., of Newark, N J., has now made a five-year contract to furnish this to some large paper manufacturers The skim milk is put in a vat, treated with chemicals and heated until curd is formed, then the curd is washed and pressed, and shipped to the headquarters plant, at Owego. There the curd is ground fine, and put in a large and improved drying kiln, where it is dried in about twelve hours, then bagged and is ready for shipment.

## GIGGING.

In gigging a fabric one of the things that must be taken into consideration is the material of which the fabric is made. If cotton happens to enter into the composition of the cloth, no matter whether it is carded into it along with the wool or whether it is woven in as warp or filling yarn, the gigging can be most satisfactorily done when the cloth is essentially free from moisture. Extracting should be well undergone before the cloth goes to the gigs. When the goods are to have a clear worsted finish the cloth wants to be about the same as to contact at each cylinder The last or finishing cylinder may properly have a little sharper work in it, but only a little, and the intention is that the nap may be in this way laid out a little more straight and even than by the action of the first cylinder. All goods of these grades need all the time that can possibly be given to them on the old teasels or on the less sharp kind of work, whatever the kind of gig is employed. It is necessary always to work the cloth up slowly as to tension and as to pressure on the points at the place of contact. After an hour at this point, the flocks may be carded away and the goods given still another hour After this the gigging should be pretty nearly complete Examine the goods carefully, and if the warp threads are covered up by the felt, as can be seen by stretching the cloth over the finger, then a better grade of work must be added and another hour of work will be required To finish up with, a little sharper work in the finishing cylinder, and half an hour or so of a run on it, will fully meet the requirements of the case.

One of the things that meets the man who handles the gig is the difficulty and danger of streaked goods—goods with a streak running through the face or nap appearance of the cloth Streaks due to gigging are not so common where wire gigs are employed, but with the old teasels they could always occur whenever cloth was allowed to run too long on one cylinder, or whenever the changes in slats were infrequent or were made in so few slats at a time that they really failed to affect the real quality and character of the cylinder and its work. It often serves very well to escape streaks in gigging, if instead of changing two or three slats at a time in the cylinder, we change, say, a whole half of the cylinder at once. If the work is not too much sharper than that which is taken out, it cannot possibly cause any real harm. When gigging with teasels, it is a very common thing to discover that cloth will not stand the use of very sharp work, and the inevitable result is tender goods. This is an indisputable fact, and our course is to make use of sharp teasels, only upon the strongest and sturdiest fabrics that we have to handle; then, after the teasels have reached a lighter stage, we can change and put them on the lighter goods. The work on the heavy cloth fills up the teasel with flocks and limbers up the points so that the degree of sharpness is very soon reduced.

It sometimes happens that with the very nicest sort of treatment which can possibly be given at the gigs, we yet fail to derive the finish we want, and in getting the finish that we do get, we find that we have succeeded in making the goods tender in the bargain. It always takes a liberal gigging to get the face clear and soft and right in all respects, and when the needed gigging has been undergone, the cloth turns out tender after all. There is only one remedy for this so far as we are aware, and that is to change the course of procedure slightly and let the goods get partially sheared before they are finally finished up on the gigs. After partial gigging, take the cloth and give several runs on the shear. Then finish up with a few runs on the gig, thus completing all the gigging which is required Finally, complete the shearing and it will be found that a more desirable finish is obtained with less gigging and with little or no danger of tender goods. Caution and judgment will have to be exercised in cases of this sort, for it could not safely be practiced on all finishes or on all fabrics. One of the most troublesome evils that comes to the attention of the gigger is the unevenness in goods, which gets its formation in the fulling mills. A cloth that binds at the selvages, or hangs loose at the selvages and tight at the centre, is a very difficult thing to handle. All sorts of methods to stretch and straighten the goods have to be resorted to, and yet the result will not be entirely satisfactory. The only hope usually is to try to have the matter remedied in the preceding stages of manufacture.

The importance of the way a piece is gigged, perhaps more seldom than any other process, scarcely ever appeals to the uninitiated. We sometimes get hold of a suit of clothes that looks dirty and dusty all the time. We may brush and brush it, and yet in five minutes after the most vigorous application it looks just as dirty as ever. Such a condition is generally due to inadequate gigging and cleaning up of the face fibres. A loose mat of fibres on the surface is sure to catch and hold dust particals, while if this mat or pile is gigged down till it is worked out, and then followed by a shearing, the dust will have no chance to cling and annoy the wearer. Taken as a general thing, if a man desires to possess a really valuable suit of clothes, what might be called a nice suit, a suit for the better kind of wear, he will get a cloth which has been well gigged The thorough gigging carries along with it usually all the better and value-producing processes. All steam-finished fabrics, doeskins, beavers, etc., have a better grade of gigging, and hence the result is a finer finish and a more desirable cloth.—Boston Journal of Commerce.

## THE MOST HON. THE MARQUESS OF DUFFERIN AND AVA.

Not only those who are competing in the 'Witness' Canadian Song Competition, but every one who remembers Lord Dufferin as Governor-General of Canada, and who has followed his brilliant career since then as Viceroy of India and Ambassador to the great capitals of Europe in most critical times, as well as the host of autograph collectors, will be interested in the following autograph letter. Any of our subscribers can enter the competition referred to, and both gold and glory await the successful competitors. Full particulars of the handsome money prizes offered by the 'Witness' for the best Canadian National Song, can, no doubt, be had by addressing Messrs. John Dougall & Son, Montreal. The competition closes on Aug. 1, instead of May 1, as previously announced, and we understand it is open to all without entrance fee.

The judges of this patriotic contest are Dr. S. E. Dawson, Queen's Printer; Professor Murray, McGill University, Montreal, and Prof. Clark, of Trinity University, Toronto, who are to select the best ten songs, from which Lord Dufferin will pronounce on the three best.

Clandeboye.
Ireland
April 9. '98

Gentlemen,

I beg to acknowledge the receipt of your letter of March the 25th, and in reply to say that I shall be very happy to undertake the task with which you propose to entrust me, of acting as judge in the Canadian National Song competition. I trust that the pieces sent in will be worthy of the Dominion.

I have the honour to be, Gentlemen,
Your obedient Servant
Dufferin and Ava

Messrs
John Dougall & Son
The 'Witness' office
Montreal

## METHODS BY WHICH ODD LOTS OF YARN CAN BE UTILIZED.

A colored goods manufacturing concern, to be worked on a satisfactory remunerative scale, must have all details carried out with a view to the strictest economy. The yarn room and the warping room of a mill are often the scenes of laxity, and accumulations of varied lots or small quantities of disused counts and colors are found to be of considerable dimensions in a short space of time. The accumulations may be the leavings of completed orders, occasional miscalculations, or the yarn may come from the dyers in a state not satisfactory for the particular work for which it was intended, and a second supply correctly dyed leaves the first quantity on hand. This first quantity is often returned to the dyer, and the price taken off his account; but in other cases the yarn is left on hand to be used at the mill. A few manufacturers rid themselves of these accumulations, observes a writer in the Textile Recorder, by making a warp from the oddments of warp yarn, and picking it with oddments of weft. This cloth, with its often objectionable combination of colors, is sold to the female employees, who wear it over their aprons; but any intervention of this kind tends to create a loose, slovenly disposition, which should be studiously avoided in manufactories where neatness of work is essential. Also, this method of using up the odd yarns detracts from their selling price as compared to their use in marketable cloth. Striped goods allow of the introduction of a considerable quantity of threads of odd yarns at the edges of the colored stripes. Threads of indigo much lighter in shade than the body of the stripe would pass muster if placed at the edge of a blue stripe at the positions where it borders on to a stripe of white. Threads of from two to four counts finer than the body counts are used in these positions; also blue stripes edged with dark green may be inserted without any conspicuous results.

When cloths are built with a preponderate amount of weft, colors of even greater distinction may be safely introduced in the warp. The alien threads should be placed at regular intervals across the cloth, and not used lavishly at the commencement of a warp, compelling the use of another kind at the finish, as any irregularity serves to make their introduction more conspicuous. The Oxford weave of cloth allows of the introduction of these threads if heavily wefted; but if only lightly wefted it is dangerous to venture far, because the two threads working together occasionally change position, and a thread which is light and intended to edge the white stripe may occasionally come second in position, and appear rather prominently. Sateens and similar warp-faced cloths should be treated cautiously, as they show up the imperfections of the warp so clearly; but designs containing narrow stripes of two or more threads may be treated in so far as these stripes allow.

In figured fabrics the weave of the cloth must be taken into account when introducing alien threads, because the weave has considerable influence in covering or disclosing the variations. In some weaves the edges of the stripes are thrown up very prominently, while in others they are

subdued more than in the plainer weaves. It is of great advantage to the management of the preparation department if the person in charge has some knowledge and experience of the woven cloth, because, in addition to the placing of odd threads in positions least inclined to show them, any tendered or soft-sized yarns might be placed in positions the least likely to carry the strain of the warp, or be subject to an undue amount of friction in weaving. In the dobby Harvard shirting the figured stripe is often principally composed of the calico order of weave and requires a well-sized and strong thread, because the figured stripe threads interweave frequently, and, as a natural consequence, take up more yarn than the ground portion, and bear all the strain in pulling round the weaver's beam. Another design may have a figured stripe working four picks up and four picks down, this stripe would work slack and take a more tender or soft-sized yarn, or if a four-end matting is used a tender thread would be easily carried through its work along with three threads of ordinary strength

The accumulations of weft yarns also require vilgant attention, especially in cases where self-colored cloths are manufactured Spotted hanks or weft yarn, not even in color, would show their imperfections very clearly if woven into self-colored cloth, but these can be used in many small checked patterns without risk or injury to the cloth. If the weft is too fine for a suitable checked cloth, another thread (the counts of which will bring up the imperfectly dyed yarn to the required counts), may be doubled with the fine counts. A twill checked cloth is often treated with odd weft in this way, as it is fairly well covered with the warp. The advantage of using oddments of weft is the safety with which they may be used, because a few picks may be inserted as a trial before proceeding to weave a quantity. Dark green and indigo, prune and indigo, and other mixtures have been inserted (instead of a coarse indigo weft), in a twill cloth, and still the difference in appearance is very slight.

A novel mode of using very coarse indigo weft in a twill cloth is to place one pick in a bar instead of two, as originally intended. This is done in an ordinary check loom provided with a dobby, by placing one pick in the cloth and the return pick on the top, all the healds are depressed in order to allow this to take place. When the next bar of indigo is required, the first pick is sent over the warp and the second pick is inserted in the cloth. The shuttle is arranged to put a quantity of drag on the coarse weft sufficient to take up the loose weft on its second return, also the temples require to be set a good distance back to prevent them gripping the loose weft Soiled, white wefts are often used in the small white bars of checked pattern, an extra shuttle being employed for this purpose. The designer may be of great service if he is in touch with the practical work of the mill, because when arranging new cloths he can keep an eye to the introduction of those colors and counts of weft which are likely to accumulate from other cloths in course of manufacture, and especially when these are of solid color, as previously mentioned the accumulations are generally large when the best results are acquired. In order to double the yarns (which are required to be used instead of a coarser yarn), one of the winder's pirns may be arranged to wind the weft from two pirns placed in a vertical position, a little tension being placed on the threads in their course. These threads will require very little attention as the weft is very unlikely to break during the unwinding from the pirns. The system described necessitates twice winding of the thread, but the extra expense is more than recouped by using the weft to greater advantage If persistent advantage was taken of every opportunity for using up the accumulations of odd warp and weft yarns and every attempt was made to keep down the causes of accumulations the yarn room of many manufacturing concerns would be less crowded, and better order, system and economy obtained.

## TESTING THE FASTNESS OF THE DYE.*

The demands made on the permanence or "fastness" of dyes are manifold. Since, however, absolute permanence is unattainable, the term has to be somewhat limited and qualified with the designation of the influence to be withstood, such as light, air, wear, washing, etc. Dyes for military cloths, which when in wear are exposed during the greater part of each day to the influence of light and air and frequently rain, must stand different tests as regards fastness, to such as are applied to goods like valuable silks, which are rarely exposed to the sun's rays, are but seldom worn, and then only in an artificial light. In curtains and carpets the capacity to withstand the action of light is the chief essential, whereas in underwear the colors must stand the effect of soap in washing, and in the case of stockings it is necessary that the colors should not come off whilst in wear. No special fastness towards light is demanded of colored linings, but on the other hand they should not stain in wear, and must be able to resist the action of perspiration, and the same applies to mattress and corset fabrics, etc. One requirement frequently made in respect of dress materials, is that the color shall not fly under the influence of street mud. In requiring fastness of color, regard should be had to the material of which the fabric is composed. In the case of shoddy or inferior woolen goods, that are only intended to wear for a short time, expensive, permanent colors that would last longer than the cloth itself, will not be needed. On the other hand, a correspondingly high quality of material and capacity of resistance to light and air are rightly demanded in the case of military cloth, which is exposed to a great deal of rough wear. So far as the dyes themselves are concerned, they can be determined on the fabric with a greater or smaller degree of facility, the examination necessitating, however, some acquaintance with dyestuffs and methods of dyeing.

Reference is here necessary to a very common error, viz., that the same dye is equally permanent on all fibers. A consideration of the different chemical constitution of the fibers will explain why indigo carmine, for example, is very fast on silk, but not at all so on cotton. Another circumstance of frequent occurrence should also be mentioned, viz., that a fast color when used in a diluted condition for dyeing light shades, a good example of which is afforded by the alizarine colors, which are faster on wool than any other dyes, but which are less permanent when used for the production of mode colors than for dyeing darker and richer shades. The test for permanence in dyes are applied as follows:

(a) Washing Fastness.—Colors to be proof against washing must be able to stand both the mechanical friction as well as the action of the alkaline liquid and high temperature of the operation. If, under these conditions, the color remains almost or quite unaltered, and does not stain other colored or white fabrics washed in contact with it, it is said to be fast under washing. For the purpose of testing this quality, colored yarn is plaited with white yarn, or a cutting of the fabric under examination is taken, and immersed in a solution of 5 grams of soap in 1 litre (0.8 oz. per gallon) of distilled water, and pressed therein for two or three minutes at 40°C. (hand temperature), then left for twenty minutes in the solution, rinsed and left for another twenty minutes in the rinsing water, to be finally wrung and dried. If the color ought to be particularly fast the soap solution is heated to 55°C., and the treatment repeated several times over. This test is applicable to fabrics, whether composed of wool, cotton or a mixture of both.

(b) Fastness under friction.—Colors on stockings, hosiery yarns, corset stuffs and other fabrics intended to be worn next the skin, must be permanent under friction, and must not rub off, stain or run, i.e., the dyed materials must not give up their color when worn or in rubbing contact with white or light colored articles of clothing or the human epidermis. The test

*(From "Technical Testing of Yarns and Textile Fabrics," by Dr. J. Hrezfeld).

consists in rubbing the material by hand on white—not too smooth—paper, or, better still, on a white, unstarched cotton fabric. In order to obtain reliable, comparable results, the rubbing must be equal in all cases and friction surfaces of as near as possible the same constitution should be employed.

(c) Resistance to Perspiration.—In addition to fastness under friction, power to withstand the action of perspiration is also required, more particularly in stuffs coming in contact with the human skin, and having to absorb the excretions therefrom. This action is intensified by the warmth of the body, by friction, and above all by the fact that the perspiration in the absence of air is obliged to dry with all its constituent matters on the absorbent fibers, and that by the frequent repetition of this process the acids of perspiration (acetic, formic and butyric) become so concentrated that they act destructively on the fiber. The effect of perspiration on stockings which are repeatedly worn during prolonged journeys on foot, can be estimated. For testing a color it has been recommended to place a piece of the dyed material on the back of a horse beneath the saddle and examine the effect of a brisk ride, or the test may be performed as follows. A bath of dilute acetic acid—containing about 6 cc. of 30 per cent. acetic acid in 1 litre of distilled water—is prepared and warmed to a temperature (37° C.) corresponding to that of the body. In this the sample is *dipped and rubbed vigorously with the hand, being* then dried, without rinsing, at 20° to 25° C. between parchment paper. This operation is several times repeated, and the more frequently this is done the nearer will the test approximate to actual conditions of wear.

(d) Fastness against Rain.—This quality is more particularly required in silk materials for umbrella making. The skeins of silk intended for the manufacture of such fabrics are tested by plaiting them with undyed yarns, and left to stand all night in cold, distilled water. The water should not be more than slightly discolored, whereas the white yarn should not be stained in the least. For woolen yarns this test is occasionally made more stringent, the yarn is plaited with undyed yarn to a queue, and then boiled for ten minutes in water. When wrung and dried the color should not have deteriorated, nor should the white yarn be stained.

(e) Resistance to Street Mud and Dust.—This quality is specially exacted for ladies' dress goods, and is tested as follows:

1. Sprinkling the moistened sample with lime and water, drying and brushing.

2. Sprinkling with 10 per cent. solution of soda, drying brushing and noting any change of color.

3. Ammonia Test.—Immersing the fabric in concentrated ammonia for three minutes and observing the color both in the damp and in the dry state.

4. Ten grams of soda are dissolved in 1 litre of water and mixed with 10 grams of lime—previously slaked and reduced to milk of lime by the addition of water—and 12 cc. of ammonia. After stirring well up together, the mixture is left to settle, the supernatant liquid poured off, and the residue employed for steeping the sample for five to ten minutes, after which the latter is dried without rinsing and is finally brushed, any alteration in color being noted.

(f) Fastness to Weather, Light and Air.—Every shade of color succumbs to the influence of the sun, light and air, although in some cases it is only after prolonged exposure that fading becomes noticeable. The degree of permanence can only be determined by exposure to light, to which end one-half of the sample is covered with a closely surrounding, but readily movable paper wrapper, and the whole suspended in the open air in such a position that it is fully exposed to the sun's rays, but sheltered from rain. The object of the paper wrapper is to enable (by removing it at any time), the degree of alteration effected by the exposure to be ascertained. In order to establish a time standard of the fastness to be expected from any dyestuff under these conditions, normal check tests are made with one or two colors of known permanence, e.g., Turkey red or a medium indigo blue on cottons. The samples should be examined daily in order to ascertain the exact time when alteration begins. In the case of Turkey red this will be on the twenty-fifth or thirtieth day, and between the twelfth and fifteenth days for indigo, in summer, or double these periods in winter time. The fastness of other colors can then be estimated in comparison with these. Attempts have been made to set up standard degrees of fastness, according to which colors that remain without appreciable alteration after an exposure to direct summer sunlight for about a month are classified as "fast," and those undergoing appreciable change under the same conditions as "fairly fast." "Moderately fast" colors are those altering considerably in fourteen days, and, finally, those more or less completely faded in this latter term are designated as "fleeting." A "light test" apparatus for quick determinations has been devised by Ferd. Victor Kallab, of Offenbach, Germany. The samples to be tested are suspended vertically in the apparatus and continuously exposed to the sun's rays, the position of the apparatus being changed in conformity with the apparent movement of the solar orb. The action of the rays is strengthened by concentration on a small surface by the aid of a lens 200 m. m. (8 in.) in diameter, and *with a local length of 420 m. m. (16½ in.).*

Professor von Perger, of Vienna, Austria, proposes a testing apparatus consisting of a plano convex and a bi-convex lens, the former with its flat surface turned towards the light, serving to parallelize the rays of an arc lamp, situated at the focal lengths of the lens, which rays encounter the second lens placed in their path at a suitable distance away. A metal disc placed at a point between the second lens and its focus receives the sample to be tested. In estimating the capacity of a dye to withstand weather, the country where the material is to be worn must be taken into consideration, since the climate and seasons of various latitudes exert a considerable influence on the rate at which a dye will fade from one and the same material. Thus it is certain that, for example, the color will be more strongly affected in a given time on the sea coast than in inland districts, and that dark colors are not so durable in southern countries as in northern climes. Permanence is, furthermore, influenced by the material on which the color is dyed; on poor material, e.g., shoddy, the same degree of fastness cannot, by reason of the price, be expected as in stuff of better quality. Finally, it will be noticed that deep, full colors do not fade so rapidly as light shades.

(g) Resistance to Ironing and Steaming.—Stuffs, especially for men's wear, which are to come under the hands of the tailor, and corset materials, should not lose their color when ironed, or, at any rate, the color should recover its original appearance after short exposure to the air. This is tested by hot ironing a sample or by drying it on a hot metal plate. In the same manner, capacity to withstand steaming is demanded of many cloths, this latter property being determined by steaming a sample laid between the folds of a larger piece of steamed cloth, during which operation the color should remain unaltered.

## BLEACHING MIXED GOODS.

The cotton mixed into a woolen fabric was undoubtedly, at first meant to be unsuspected and unperceived, and very possibly fulfilled these expectations successfully for some time to the material profit of the first "genius." Eventually his scheme was found out by his competitors, whom he had been underselling, and they in turn began to reap the reward of their business enterprise. Meanwhile, the public was treated to a season of very cheap woolens, but these halcyon days had to come to an end, probably through the candor of some manufacturer of the old, ruggedly honest school, and the goods were thereafter sold on their merits alone, and deprived of the halo

of a higher pedigree than was due them Prices had, meanwhile, through competition, dropped to a level commensurate with the cost of the goods, but the public had grown to like the many good qualities of the mixed ware: the fine appearance, the comfortable "feel," the fact that they did not shrink, etc. It is but natural that there should have also been drawbacks, and among these the worst was the poor wearing quality —short life—coupled with bad colors, which grew more unsatisfactory with time, says a writer in the American Wool and Cotton Reporter.

The wearers of these goods were surprised to see in how short a time it was necessary to replenish their supply of underwear, or how quickly light colored stuffs had to be laid aside on account of defects which had developed in the body of the material as well as in its colors. They could not get one-half the wear out of the goods because they became weak and apparently rotten long before either cotton goods or woolen goods would show signs of old age.

It did not take manufacturers long to locate the fault in the bleaching. They had bleached both ingredients, the wool as well as the cotton, with chloride of lime; the animal fiber had been partly rotted by the chlorine, and in wear, soon disintegrated; or, the material had been whitened in the smoke house, or with bisulphate, in consequence of which the cotton had been partly decomposed, and soon gave out. The remarkable part was that mills did not at once hunt for a better bleaching process, but it is a fact that even now on this side of the Atlantic, there are yet a great many factories who turn out mixed goods which have received their death sentence even in their cradle.

Germany, on the other hand, though it was the last country to take up the manufacture of this class of goods, was the first to try to overcome these faults. At the start they experimented with very weak, but numerous baths of bleaching powder, or with a series of smokings, with very indifferent success. Then "grassing" (influence of ozone on the goods while spread on meadows) was resorted to, and magnificent results were obtained, both as to color and as to strength. This method, however, was too cumbersome to satisfy this age of activity and quick processes, and a chemical was hunted for which would supply the ozone artificially. It was found in hydrogen peroxide, and this superb, though expensive, bleach served for many years to produce the snowy and durable fabrics which we meet on the Continent.

However, competition increased, and prices were forced down; it became necessary to cheapen all stages of manufacture until the bleaching represented the most expensive period in the manufacture of mixed goods. At this point the chemical factories of De Haen in Hanover, and Koenigswarter & Ebell, in Linden, introduced peroxide of sodium as a less costly substitute for hydrogen peroxide. It was found that the same and better results could be obtained with the new comer, as after the peroxide of sodium powder had been dissolved in acidulated water, it furnished a bath of hydrogen peroxide, but with elastic limits; it was possible to produce bleaching solutions of any strength desired, if need be, much above the strength of concentrated hydrogen peroxide, and at about one-half the cost. Moreover, there was no loss of strength in the powder; it occupied only a fraction of the space, and freight charges were but one-fifth of those on hydrogen peroxide. The German bleacher was quick to realize these advantages, and peroxide of sodium has now very generally supplanted hydrogen peroxide in the old countries for the bleaching of mixed goods.

Before we enter deeper into the actual bleaching of mixed goods with the peroxides, let us for a moment digress to the extremely important subject of preparatory cleaning.

In handling the peroxides we are not dealing with bleaching powder or sulphur, at, say, 2c. per pound, but with chemicals enormously dearer per pound weight, though nearly as cheap in bleaching units. Where it will not harm to carelessly waste a pound here and a pound there of the former, with regard to the latter every possible economy must be practised. Although satisfactory results cannot in any case be expected from bleaching uncleaned goods, yet, as far as the cost of the agent is concerned, the goods may be thrown into the lime bleach but half cleaned, trusting to the chlorine to act a lazy man's part; that is, making the lime bath strong enough to eradicate the dirt, oils, etc., naturally not to the advantage of the goods. In employing the peroxides, it will not, as in the case of the lime bleach, harm the goods to rely on the chemical to do the cleaning, but it will be mighty expensive. If the peroxides have no other object in life than to teach the science of economy and carefulness in the too frequently loose and slovenly methods yet prevailing in a good many dye-houses, they will have sufficient reason for existing.

To thoroughly clean mixed goods of the dirt, foreign matter, and oils, which have been taken up in the preceding processes, they should be treated as though composed entirely of wool. The cotton part will thus be thoroughly cleansed, yet without damage to the wool or silk fibers. Any approved process for cleaning woolens is available, but we do not think it amiss to once more lay stress on the importance of using good soap—potash soap.

We now come to the bleaching itself, and, as the hydrogen peroxide method has been sufficiently described, we at once proceed to explain the peroxide process. Peroxide of sodium is a strong alkali, which, if decomposed, for instance, by means of dilute sulphuric acid, forms glauber's salts and hydrogen peroxide. The glauber's salts remain in solution, and need not be further considered, while the bath of hydrogen peroxide, after the addition of a small quantity of an alkali, is ready for the bleaching. In doing so it parts with a portion of its oxygen, which latter combines with the coloring matter of the material to be bleached, that is, oxydizes it. A sharp distinction should be made between "oxydizing" and "reducing" a color. In both cases decolorization takes place; if "oxydized," the coloring matter is decolorized, and presumably becomes soluble and is washed out; in any event the color does not again lose its oxygen under natural conditions, and therefore it remains permanently invisible.

If the color is "reduced," as in bleaching with sulphur fumes or their equivalent, sulphurous acid, bisulphite of soda, oxygen is extracted from the color, it becomes invisible but not soluble, and therefore remains in the goods. Upon exposure to the atmosphere the previously lost oxygen is replaced by oxygen drawn from the air, and the color compound once more becomes visible. Thus straw hats, bleached by "smoking," after a short time regain their yellow color to a large extent, while, if bleached with peroxide, they remain white.

The best practice seems to be to add the necessary acid, sulphuric, oxalic or acetic, to the cold water in a wooden vat, then stir in the peroxide—small quantities at a time—until the bath is exactly neutral, after which a little silicate of soda or ammonia produces the alkalinity called for for quick bleaching. If the bath be made alkaline by an excess of peroxide, this excess produces caustic soda, which, so far as the woolen fiber is concerned, should be avoided.

After entering the goods the bleaching solution is slowly heated by means of a lead coil, to a "wool" heat, say 120 degrees F., the goods turned at intervals and treatment continued from one to five hours, according to the color of the goods. Then lift, drain back into vat, and give warm wash, which takes away the glauber's salts, passes through a sour bath containing ½ per cent. of oxalic acid; wash again very thoroughly and dry. To the bath should at once be added one-third of the acid previously used, to avoid further evolution of the bleaching oxygen, and after cooling off, the solution is again neutralized with peroxide, and after adding the

alkali, is ready for the next batch of goods. According to how clean the goods are when entered, this process can be repeated a number of times, however, adding a smaller quantity of the chemicals each time. The goods dry to a very brilliant white, possess all the strength they did before bleaching, and actually improve in color at every washing. The color, as explained above, is forever removed, yellowing with age is avoided; no foreign odor is present, and if the goods are to be dyed, less dyestuff is necessary, and the color goes on very evenly and thoroughly. A very similar treatment produces magnificent results on silk and linen, but of these at another time. We close by giving an approved bleaching formula:

For 100 pounds of wool and cotton mixed goods, take three pounds, four ounces oxalic acid, two pounds peroxide of sodium, ¼ pound silicate of soda or ammonia.

## THE INVENTOR OF THE LOOM.

Lord Masham, the principal of the famous Manningham Mills in Bradford, has expressed his desire to commemorate the services of Cartwright, the inventor of the power loom and combing machine, and in connection with this project, to replace the Old Hall, in Lister Park, with a more worthy building. He expressed his willingness to place £30,000 to £40,000 at the disposal of a Bradford committee which should be appointed to consider his suggestions. Alluding to Cartwright's discovery, he characterized the invention of the power loom as one which even transcended the discoveries of Watt and Stephenson. He considered he owed his success to Cartwright's ingenuity, and he was anxious to show his gratitude in a practical form. The revolutionary effect of the invention also fully warranted a national movement for a statue, and he hoped that some effort would be made in that direction also. Edmund Cartwright, D.D., the inventor of the power loom, was born at Marnham, Nottinghamshire, in 1743. In 1784 he paid a visit to Matlock, near which town Arkwright's spinning mills were situated. Here he said that Arkwright "would have to set his wits to work to invent a weaving mill," and argued that it would not be more difficult to make a weaving machine than it had been to construct the automatic chess player. On April 4th, 1785, he took out a patent for his first power loom, which however, proved inadequate as a substitute for the hand loom. The machine was improved, and further patents were taken out in 1786 and 1787. He built at Doncaster a factory of his own for weaving and spinning. He also invented several wool combing machines. His inventions were not a source of profit to him, and he found himself deeply in debt, from which he was extricated in 1809 by a Parliamentary grant of £10,000. He died at Hastings, October 30th, 1823.

## THE DYEING OF SHODDY.*

BY G. E. HORLZ.

There is no more difficult branch of dyeing wool than that of dyeing shoddy, especially when in the loose condition. This of course is brought about by the very heterogeneous nature of the article, manufactured as it is from woolen tissues of all kinds and colors. Moreover it contains cotton, the proportion of which is unknown and may be large or only small, but still has an appreciable effect on the nature of the dyeing operations. As presented to the dyer, shoddy is of various colors, sometimes black, at others of a dark brown, then slaty, perhaps dark red or may be dark green, while others are of a mottle character from the presence of fibers of a variety of colors. In regard to what can be done with such material, the shoddy dyer must bring to bear that knowledge which is born of experience. Naturally he cannot expect to dye light or bright colors on shoddy that is already of a dark color, although he may successfully dye bright shades on a light colored shoddy and dark shades on a dark colored shoddy. Although much may be done in the way of attempting to destroy or discharge color from shoddy, yet too much cannot be done in this direction, for the dyer must have some regard to preserving the nature of the fiber, and violent attempts to destroy color from shoddy might result in the destruction of the material itself. Boiling with 3 per cent. of bichromate of potash and 6 per cent. of sulphuric acid is a good plan, there is not alone a discharge of the color but mordanting of the fiber with chrome, which is beneficial in many instances. Boiling the goods with 8 per cent. of their weight of sulphuric acid is also a good plan, taking care to rinse well afterwards.

Boiling also with 4 per cent. of oxalic acid and 4 per cent. of sulphuric acid is a good plan. The dyer should, when he gets a batch of dark colored shoddy, test a small portion in each of these ways to see which gives the best results, and he will then be able to see what he can do with the batch he has before him. It is hardly necessary to point out that, after using these stripping baths, the shoddy should be well washed in water to remove acids. It might be worth while, before proceeding to dye light colored shoddies, to boil them up with soda to remove any grease they may contain and enable them better to take up the colors afterwards.

As shoddy may contain both wool and cotton, the shoddy dyer will find it worth while to use those colors belonging to the direct series of dyes, which will dye wool most satisfactorily, as such dyes also go on to cotton and will cover up very well any cotton fibers the shoddy may contain. In the accompanying recipes such dyestuffs are used and the proportions are calculated for 100 lb. weight of goods.

Colors on Dark Colored Shoddies.—The mere act of stripping these often leads to the production of a useful color. Thus a dark grey stripped with sulphuric acid may turn a gold brown, or with bichromate of potash and sulphuric acid a light olive brown.

Blue Black.—Strip with sulphuric acid and then dye in a fresh bath containing 2 lb. Formyl Violet 10B, working at the boil for one hour.

Dark Blue.—Using a shoddy which is not very dark, make the dyebath with 1½ lb. Formyl Violet 10B, 1 lb. Diamine Dark Blue, and 20 lb. Glauber's salt, working at the boil for one hour.

Dark Brown.—Strip with sulphuric acid, then dye in a bath containing 1 lb. Diamine Catechine G, and 1 lb. Diamine Brown N, working for one hour at the boil.

Black or Dark Shoddy.—Make a dyebath with 3 lb. Union Black S, and 20 lb. Glauber's salt, and work at the boil for one hour.

Dark Crimson.—Strip with bichromate of potash and sulphuric acid and dye in a fresh bath with 2 lb. Diamine Red 5B, at the boil for one hour.

Dark Chestnut.—Strip at last, then dye in a new bath with 1 lb. Diamine Catechine G, and ½ lb. Diamine Brown M.

Dark Black Blue.—Strip with bichromate of potash and sulphuric acid, and dye with 2 lb. Formyl Violet 10B.

Bronze Green.—Strip as above, then dye with 1 lb. Diamine Green B, and ½ lb. Thioflavine S.

Dark Claret.—Strip with sulphuric acid and dye in a fresh bath with 1 lb. Diamine Green B, and ½ lb. Thioflavine S.

Bright Blue on Cream Shoddy.—Prepare a dyebath with ½ lb. Alkali Blue B, 1 lb. borax and 10 lb. Glauber's salt. Work for one hour at the boil, then pass into a bath containing 2 lb. sulphuric acid to raise the blue, then rinse and dry.

Rose on Cream Shoddy.—Make the dyebath with 1½ lb. Rhodamine B, 10 lb. Glauber's salt, and 2 lb. acetic acid. Work for one hour at the boil. If the dyebath be not exhausted, add some bisulphate of soda.

Bright Crimson.—Make the dyebath with 2 lb. Diamine Fast Red F, 10 lb. Glauber's salt, and 2 lb. acetic acid, working for one hour at the boil.

*In the Dyer and Calico Printer.

Green.—Prepare the dyebath with ½ lb. Thiocarmine R, ½ lb. Milling Yellow O, 10 lb. Glauber's salt, and 5 lb. acetic acid, working at the boil.

Violet.—In the dyebath use 2½ lb. Formyl Violet S4B, 10 lb. Glauber's salt, and 5 lb. acetic acid.

Olive Yellow.—Make the dyebath with 1¼ lb. Anthracene Yellow C, 1½ lb. Diamine Fast Yellow B, 10 lb. Glauber's salt. Work for one hour at the boil, then add 1 lb. acetic acid, working for ½ hour longer.

Dark Olive Brown.—Make a dyebath with 1½ lb. Diamine Catechine G, 1½ lb. Diamine Fast Yellow B, ½ lb. Union Black S, and 20 lb. Glauber's salt. Work for one hour at the boil, then add 2 lb. bichromate of potash and 1 lb. acetic acid and work for ½ half hour longer.

Bright Yellow.—Use in the dyebath 2 lb. Milling Yellow O, and 10 lb. bisulphate of soda.

Bright Green.—Use a dyebath made from ½ lb. Diamine Green G, 1½ lb. Thioflavine S, and 20 lb. Glauber's salt. After working for one hour at the boil, add ½ lb. fluoride of chrome and ½ lb. acetic acid, working for ½ hour longer.

Pale Olive Green.—Use in the dyebath 1 lb. Diamine Fast Yellow B, ¼ lb. Diamine Blue HW, ½ lb. Anthracene Yellow C, and 20 lb. Glauber's salt, fixing afterwards with 1 lb. fluoride of chrome, and 1 lb. acetic acid.

These recipes will perhaps be sufficient to show the lines on which the shoddy dyer may work.

## Foreign Textile Centres

MANCHESTER.—Makers of Burnley prints are quiet, and calico printers are not doing well in the foreign branches. The plague news has a very serious effect upon the Calcutta trade, the exodus of natives from the city being so serious that business is almost at a standstill. This is a very serious drawback at the present time, when the Bombay trade was just commencing to recover after a prolonged period of stagnation. Any gain resulting from the improvement on the Bombay side of the peninsula now promises, by the irony of fate, to be destroyed by the shrinkage in Calcutta. Dundee, however, may snatch some advantage from the plague, provided the exports of raw jute are not interfered with. Many of the Bengal jute mills, the deadly opponents of Dundee, are having trouble with their workers, and business has been much hampered by the scarcity of labor. The prompt disappearance from Calcutta of many members of the Marwari trading community has roused the ire of the British residents.

LEEDS.—The Leeds clothing trade is for the time being busily engaged in getting out orders for the Whitsuntide holiday trade, but after this rush is over there is not much work in view for later delivery. In the heavy woolen districts, with the exception of a few clothing orders, there is not much improvement to be noted, but a few makers of medium tweeds and serges are fairly busy. In Morley the trade in dress mel-tons is hardly up to the average, but a few special novelties in ladies' cheap costume cloths are doing well.

HUDDERSFIELD.—Makers of the best fancy woolens and worsteds continue busy on home account, but makers of medium and low goods are still complaining, and the United States demand for worsted coatings is still unusually small. As the season advances the demand for good white blankets for home use is improving slightly, and there is a steady trade doing in colored blankets and rugs. The Yorkshire flannel trade, although quiet, is showing some signs of improvement, and some of the early merchants are asking for deliveries, which are quite up to the average.

KIDDERMINSTER.—"Repeats" are coming in fairly well, but the cool weather is hindering a good deal of business. Travelers are keeping in touch with customers. The season so far is described as satisfactory in volume, good Brussels showing a distinct advance. Spinners are now quiet; instructions come to hand slowly. The clip is very late, but the fleeces to hand are of excellent quality and of quite an average weight. *Prices remain unchanged.*

NOTTINGHAM.—Prior to the holidays, as is usual at these periods, there was much activity displayed in the lace market to get orders cleared off as far as possible. Some extensive shipments were made to the colonial and distant markets, but business with parts of North and South America is in an unsettled state in consequence of the war. The demand from some continental centres was only moderate, while the home inquiry in most cases, was not up to expectations. This week business has hardly got into full swing yet, and naturally manufacturers and warehousemen are to a certain extent affected by the unsettlement of trade consequent on the holidays. Manufacturers of made-up goods have been busier than of late. Fancy ties, streamers, aprons, blouses and other fancy goods have moved in good quantities, and spotted nets and streamers are extensively employed. There has been a good inquiry for chenille nets and veilings. *Honiton braids, beadings* and purls have sold at home and abroad for trimmings and for manufacture of point laces. The Irish, Swiss, and embroidery trimmings branches appear to have lost their former vitality. Bobbin nets and mosquito nets for export and embroidery have sold extensively. From appearances there is every indication of continued prosperity in all the plain branches. Brussels, Mechlin, and Zephyr tulles have been in average request, and prices keep high. There has been only a moderate demand for hat nets, Paris and rice nets and stripes. Spotted nets are in strong request for making-up and millinery purposes. Corset nets and laces are in moderate request. Competition is severe in silk nets and veilings; nevertheless these goods have moved in good quantities. Many lace curtain manufacturers complain that the actual demand is below the possible production, and that the outside competition is very severe. There is a steady inquiry for these goods, and finishers find plenty of employment, although a lot of the goods passing through their hands are not manufactured in this city. Fancy articles in antis and toilets have met with a moderate demand. Frilled window blinds are moving for the home and a few other markets. There is a good home and colonial demand for merino and cashmere hose. Cotton stockings and socks continue slow on sale, and prices keep unprofitably low. Fancy cotton and mixed half-hose have been in average request. Merino, cashmere, and natural wool vests and combinations are firm in value. There is a steady though not a full sale, owing to the closing of some markets. The fancy silk branches have been only moderately employed.

BRADFORD.—Up to the commencement of the Whitsuntide holidays there was no improvement in the tone of the wool trade here. Prices of the finest classes of merino wools are still quite firm, and as there has recently been more inquiries for worsted coating yarns and also for fine warps and weft for dress goods purposes, and the local supplies of both raw material and tops are not large, it is probable that the prices of these fine wools will be fully sustained. Although there is not as yet any defined upward movement in cross-bred wools, the unusually low level of prices to which both raw material and tops of this class have fallen has induced makers who devote special attention to these wools to produce new makes of dress goods and coating serges, which are of such wonderfully good value and possess such an attractive appearance and good wearing properties, that it seems certain that new business must result. There can be no doubt that the very low prices ruling in this class of material are largely accounted for by the re-imposition of the heavy-weight duties on imported fabrics sent into the United States, and

also by the long-continued depression of trade in the Continental centres, where two-fold cross-bred yarns have been consumed in large quantities for braid and other purposes. English wools continue very quiet, and there is no likelihood of any change before the earliest of the wool fairs for the sale of the new clip of wool, which commenced at Doncaster in the second week of June. Both mohair and alpaca in the raw state are quite firm, and collectors at the sources of supply consider that the present ranges of prices are so low, that they are prepared to hold for a longer time than usual in hope of a rise, under the impression also that both users and merchants on this side have been pursuing a "bear" policy on the local market. Spinners complain that users of all classes of worsted yarns are still disinclined to follow the upward tendency which the prices of colonial wool have taken this year, and that business in this department is very stale and unprofitable. In both mohair and alpaca yarns there is rather a better inquiry on continental account, and there is no falling off in the use of mohair yarns in the home market both in the form of warps for crepons and in the form of weft for plain and figured mohair goods.

ROCHDALE.—Not much new business has been transacted recently. Those merchants who have not completed their arrangements for the coming season are gradually doing so. The prospect, so far as the total quantity is concerned, is likely to be about the same amount as that of last year. Prices, however, are very unremunerative, and unless the manufacturers should find some relief in the value of the raw material during the year, business must necessarily be unprofitable. The Yorkshire goods trade was of a sluggish character. Prices were unchanged.

SOUTH OF SCOTLAND.—The dullness in the South of Scotland tweed trade, which has been referred to, continues. Orders are not plentiful, and consequently a number of looms are idle. At present prices are low, but they cannot be maintained in face of the firm rates for wool and yarns. Wool is expected to still further advance.

DUNDEE.—The failures recently announced in the linen trade continue to exercise a most depressing effect on the market generally. This may be accounted for by the fact that buyers are inclined to wait in case any stocks may have to be realized, in the event of the concerns in question being wound up. The unsatisfactory state of affairs of the industry in Ireland also casts a gloom over the trade in this district; whilst the idea now gaining ground that the war between the United States and Spain may not be so speedily terminated as was at one time expected, adds to the general depression.

BELFAST.—The market for brown cloth shows little appreciable change. Thirty-eight inch power loom linens for bleaching continue to sell steadily at late rates. The activity in the demand for damasks and household goods is fully sustained. Town-made goods are still in poor request. Unions are passing freely into consumption, and prices remain firm. Handkerchiefs are much the same. A quiet, steady business has been transacted during the week in bleached and finished linens. Cross Channel demand has been of a sorting-up character. The shirt and collar factories are ordering freely of white linens. Tailoring linens are in moderate request. A steady satisfactory business is passing in damasks and house hold goods. Trade with the United States shows little change. A fair number of orders have been received, and advices indicate that the war will not depress business to any great extent, but on its termination it is expected there will be a decided spurt. Canadian trade is going ahead, and a steady business is done in Australasia. South American trade also is improving. Orders from the Continent are about up to the average of recent weeks.

## WOOL MARKET

TORONTO.—The bulk of the Canadian fleece wool has come on the market during the past month, and at present the market is rather dull. Some large dealers are hardly taking any wool, and all are doing much less. Fleece is quoted at 16 cents, but the dealers say that this price is not justified by the facts of the case, and that there will require to be a very great expansion in the United States market before possible prices there for Canadian wools will justify such prices here. There has been considerable competition among country buyers, who have in many cases paid more than 16 cents, and now find themselves unable to turn over their purchases without loss.

MONTREAL.—There is more demand for fine wools, and prices are firm at former quotations, viz.:—Capes, 14 to 16½c.; Natal, 16½ to 18c.; B.A., from 26 to 34c. Manufacturers are very busy, and they say orders are coming in freely, but advance is hard to get on their product. Canadian fleece is being bought from the farmers, 11c. for greasy, and 17c. for washed.

## FABRIC ITEMS.

H. Samuel, dry goods, Sherbrooke, Que., has removed to Montreal.

J. H. Rogers, furrier, of Toronto, is opening business in Winnipeg about July 1st.

A final dividend of 5 cents, making a total of 55 cents has been declared by Assignee Barber in the estate of A. Cohen, dry goods merchant, of Chatham.

Collins & Co., dry goods, of Kincardine, Ont., have assigned to J. G. Hay. At a meeting of creditors, held in Toronto, the firm were given a short time to make a satisfactory offer.

—Many manufacturers of woolens are anticipating a considerable falling off in production after July 1st, when the second 12½ per cent reduction of duties on British goods comes into effect.

Among the commercial effects of the Spanish-American war has been the sharp advance in the price of rope. Sisal rope is now quoted 9¾ cents, and manilla is on a basis of 11 cents per pound. A month ago sisal was quoted at 7¾ cents, and manilla 8½ cents per pound. Values have been forced up by several causes outside of the present belligerency. First, there is the blockade at Manilla, which threatens to shut off the supply of manilla hemp from the Phillipine Islands, second, the unusually heavy crops in agricultural countries, creating an active demand for binder twine, and third, the short crop of sisal in Mexico. These factors combined have caused a rapidly advancing market. The strength of hemp has been marked during the past year, and within that period prices have in the case of Manilla advanced 100 per cent., and in sisal 150 per cent in primary markets.

—The annual meeting of the Canadian Colored Cotton Company was held in Montreal on May 25th, and, on the whole, the meeting was inharmonious. Those present were. T. King, D. Morrice, D. Morrice, jr., A. Roy, J. Grenier, Hon. A. W. Ogilvie, C. O. Dixter, L. Lichtenheim, W. Weir, F L. Beique, C. D. Owen, A. C. Clark, P. R. Gault, P. C. Spragge, S. H. McDowell, W. B. S. Reddy, Jas. Crathern, Jos. Wilson, Geo. Caverhill, Ald. Neild, Hill Campbell, Jas. Rodger, M. Thompson, W. J. Morrice, R McDonald, M. L. Henderson, A. Skaife, J. T. Molson, Wm. McMaster, S. H. Ewing, J L. Marler, and Ald. Clearihue In the absence of A. F. Gault, C. D. Owen presided. The financial statement showed a profit on the year's business of $110,000, which was thought unsatisfactory, in view of the large output and general improvement in business. Before proceeding with the election of officers, it was announced that A. F. Gault had decided to retire from the presidency. David Morrice was chosen to succeed him, and C. D Owen was re-elected vice-president. The two remaining directors. T. King and D. Morrice, jr., were also re-elected, while W. J. Morrice was selected to fill the vacancy on the board, caused by Mr. Gault's retirement.

Alexander Fisher, formerly of Galt, Ont., has obtained a position in the carpet house of John Bamfield, Winnipeg, the only establishment, it is said, of the kind in Manitoba.

The partnership existing between Cressman & Hallman, dry goods, merchants, Berlin, Ont., was dissolved last month, E. S. Hallman retiring. E. C. Bowman has gone into partnership with Mr. Cressman and the new firm is known as Cressman & Bowman.

—The Farber Zeitung describes a simple and quick manner by which the testing and mixing of a new tint may be accomplished. It is called the dry process, for it is simply by using gelatine or glass plates, which are dyed in all primary and secondary, and some mixed colors for this purpose, with all the gradations from light to dark of each color. If two or more of these colored plates are put together and held against the light, the effect of the blend of colors can be seen immediately. Suitably arranged in a receptacle, these colored plates are the simplest and most convenient means of producing any desired color mixture and testing the effect at once.

## 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 G. Horton, Almonte, Ont., has begun business as a carpet weaver.

The grounds about the Brodie Mills at Hespeler, Ont., have been beautified by the planting of trees and flowers.

Thos. Rolph, Galt, Ont., has succeeded W. Scrimger as master mechanic in the Rosamond Woolen Co 's Mills, Almonte, Ont.

Henry Scott, recently with Brodie & Co., Hespeler, has started in Guelph in the knit goods business, and is running three hand machines on hosiery.

The Guelph, Ont., Carpet Mills, formerly the Armstrong Carpet Co., are running full capacity, and are turning out some handsome new patterns.

The Island of Manitoulin, Ont., is becoming quite a wool producing centre. From two small villages alone last season, 30,000 lbs. were shipped.

Miss Schofield and Wm. Baird, loom fixer in the Gillies, Son & Co.'s woolen mill, were married recently at the home of the bride's mother, Carleton Place, Ont.

M & J. Adams are now sole proprietors of the Guelph Fringe Co , having recently bought out the interest of Mr. Taylor, of Guelph. They manufacture a good class of cotton, woolen and silk fringes for upholsterers' use, also double cloth rug fringes and buggy fringes. Messrs. Adams also contemplate the manufacture of Smyrna rugs at an early date.

The Minerva Manufacturing Company, of 46 Richmond street west, Toronto, was offered some time ago liberal terms to remove to St. Therese, Que., but upon being promised an assessment of not more than $45,000 for the next ten years in Toronto, has decided to remain there. The company has bought the McMaster building on Front street, where it will enlarge its business, expecting shortly to employ 250 hands.

The Elora carpet factory is not in operation just now, and it is not likely it will start up again in Elora.

The C. Turnbull Co., Galt, Ont., has let the contract of its new mill building, which will be 133 x 60, to Kribs & Co , Hespeler.

The Waterloo Woolen Co. has completed a large order for Klondyke goods, which they filled for the Sanford Manufacturing Co., Hamilton.

It is reported that the carpet factory of McPherson Bros., Guelph, Ont., will shortly be amalgamated with the Guelph carpet mills.

The Guelph, Ont., Woolen Mills Co., Ltd., have been awarded the Government contract to supply drawers for the N.W. Mounted Police, to extend for three years.

The shoddy and flock manufacturers of Ontario are particularly busy just now, their great difficulty being to get sufficient stocks of raw material.

M. B. Perine & Co., Doon, Ont., are erecting some new additions to their extensive twine mills at Doon. The capacity of these mills now is one ton per day of various kinds of twine.

Joseph Ruddy, who is leaving the Slingsby Woolen Mills, Brantford, Ont., of which he has been secretary-treasurer, in order to take up a position at the Brantford Starch Works, was presented with a clock by the mill employees.

An effort is being made to form a joint stock company in Guelph for the purpose of establishing a large modern tannery for the manufacture of sole leather. H. Swackhamer, of Acton, formerly with the Beardmore Co., in their Acton tanneries, has succeeded in interesting the Guelph Board of Trade.

Letters patent have been issued incorporating the Fraser Hat, Cap and Fur Manufacturing Company, of London, Limited, capital $20,000, in $100 shares, the following being the provisional directors: A. W. Fraser and J. B. Allenby, F. W. Fraser and W. V. Onslow, and N. Provost, all of London, Ont.

Walter Scrimger, master mechanic in the Rosamond Company's mills, Almonte, Ont., has accepted a position as traveler for Clare Bros , Preston, Ont. Before leaving Almonte Mr. Scrimger was presented with a complimentary address and a purse of $100 by the citizens and leading employees of the mill.

Early one morning recently two men endeavored to effect an entrance to the storeroom of Jas H. Wylie's Golden Fleece Woolen Mills, Almonte, Ont.—for a second time within a week—by prying up the windows. B. Weedmark, the watchman, saw them and ordered them away. Refusing to leave, Mr. Weedmark fired a couple of shots at the pair, who took to their heels.

T. A. Code, Perth, Ont., is again making extensive improvements on his woolen mill. The old dyehouse has been removed to the north side of the main building, and in its place is being erected a new boiler house. As the mill's capacity is to be increased, it was necessary to procure a larger boiler, hence the change. The new smokestack will be brick and about 75 feet high.

—It is stated by a New Brunswick journal that the capacity of the Dominion Pulp Company's mill, at Chatham, is to be doubled, so that it will within a short time turn out 30 tons of pulp per day. At the Mispec pulp mill, says the same paper, the contractors are anxious to push the work forward with all possible despatch, so the firm asked the masons, who are union men, to work ten hours a day in order to facilitate the work, and offered to pay them for the extra work at union wages. The men refused, and the Messrs. Mooney are, in consequence, looking for non-union men who have more sense and more enterprise.

Operations are to be begun immediately on two additions to the *Berlin Felt Boot Factory.*

M. Erb & Co., Berlin, Ont., have been awarded a three years' Government contract to supply gloves to the Northwest Mounted Police.

The Queen City Oil Company, Toronto, has moved into its handsome new offices in the fine buildings just completed at the corner of King and Yonge streets, Toronto.

The Kingston Hosiery Co., Kingston, Ont., is shipping largely from the output of the new hosiery machines which are turning out large quantities of very fine hose.

Wm. McCullough, who has been appointed manager of the Paton Mills, Sherbrooke, Que., has arrived from Tillicoultry, Scotland, where he managed J. R. Archibald's woolen mills.

Andrew Nicol, employed in the Magog, Que., print works, had his arm caught in a cylinder right up to the shoulder. Though badly crushed, the doctors expect to be able to save the arm He was taken to the General Hospital, Montreal.

The Government has amended the tariff, and made the duty on rubber belting 25 inste ' of 20 per cent., as it had been reported to the House by a clerical error when the tariff was brought down.

The Forbes Manufact uring Company, of Hespeler, Ont., and the Waterloo Woolen Company, of Waterloo, have put in double-bed Gessner presses, and one has been ordered for the Brodie mills, Hespeler.

The Sherbrooke Yarn Mill, Sherbrooke, Que., is now running full time on knitted goods, and has given up the production of yarns for the present. The new manager, W. H. Priest, who is also largely interested in the business, has made a number of improvements in the machinery of the mill, some of which are very ingenious and have materially improved the output.

The trend of the neckwear trade seems to be towards manufacturing in Canada. Until recently, E. & S. Currie were the only firm in this country making their own goods. Tooke Bros. added this branch to their business some time ago, and the Gault Bros. Co. are also equipping a neckwear factory. It is likely that in the near future Cookson, Louson & Co. will follow in the footsteps of the other houses named.

Alexander Hope, for the past two years manager of the Paton Mills, Sherbrooke, Que., sailed with his family from Montreal, May 28th, by steamer "Tritonia," for Glasgow. Before leaving Sherbrooke Mr. Hope was presented with a case of cutlery and an address by Mr. James Hall on behalf of the overseers of the Paton Mill. The directors of the company also presented Mr. Hope with a cheque for $500.

Alexander & Anderson, wholesale dry goods, who have been in business in Toronto for a great many years, have not been making money recently, and have consulted with their creditors. It is understood that they will liquidate the wholesale dry goods portion of their business and continue in the manufacturing of cloaks and mantles. A statement is being prepared for the creditors, who are chiefly Old Country and Montreal woolen and cotton houses.

The Trent Valley Woolen Mill Co., Ltd., Campbellford, Ont., is *running full time.*

A. W. Brodie, Hespeler, Ont., has been running his mills overtime for some time.

Gordon & Phillips, Chatham, Ont., are to establish a woolen mill at Tweed, Ont. It will be lighted by electricity

The old woolen mill at South Lancaster, Ont., was totally destroyed by fire June 3rd. Loss about $2,000; insurance, $600. The mill will not be rebuilt.

The village of Lancaster, Ont., is offering inducements for manufacturers to locate there. The shipping facilities, water supply, etc., are very favorable.

W. C. Maclaren, manager of the Ontario Glove Works, Brockville, Ont., has gone to Europe for the three months' tour of the chief glove-producing centres.

Miss Jennie Lamb, formerly with the Almonte, Ont., Knitting Company, is now forewoman in the finishing department of the Granite Mills, St. Hyacinthe, Que.

George Imeson, the new boss weaver in the Hawthorne Mills, Carleton Place, Ont., was presented with a handsome clock and a very kind address before leaving Glen Tay for Carleton Place.

Miss Emma Trojan, an employee of the Berlin Felt Boot Works Co., had her left arm badly lacerated recently, while employed in running a winder, by getting it caught between two cog-wheels.

The newest industry in Paris, Ont., is the manufacture of the shoulder brace, for which A. Copeman has applied for a patent A representative of the Ballingall-Copeman Company recently submitted samples to Toronto and London wholesale houses and secured good orders, which have since been supplemented by still larger. Machinery, now being made by P. Hay & Co., Galt, will be shortly installed, when the firm anticipate giving employment to from a dozen to twenty hands.—Paris Review.

Harry Jenkins, son of Samuel Jenkins, superintendent of the Electric and Operating Company, Brantford, Ont., met with a painful accident recently in the cotton mill, where he works. The youth, who is about 15 years of age, was fixing a mule, and had his head in the machine, when it suddenly started. The boy's head was badly squeezed, and a couple of holes inflicted by the protruding parts of the machinery. Had it not been for the plucky conduct of a young woman operative, who saw the affair and stopped the machinery, nothing could have saved him.

Negotiations have been going on for the last few months between some Galt business men and the proprietors of the Dominion Brussels Carpet Co., Elora, for the purchase and removal of that establishment to Galt. So far no definite agreement has been reached, and appearances indicate that the deal is unlikely to go through at present. The Galt men, a correspondent writes, were favorably impressed with the prospects of the industry, but as most of those taking hold of the matter had large businesses to look after, they found it difficult to give time and attention to additional enterprises.

Turnbull & Co., Ltd., Galt, Ont., is running overtime and is turning out a line of full-fashioned underwear, which is said to be fully equal to any imported lines on the market.

The Granite Mills, Limited, St. Hyacinthe, Que., are running full time, and are turning out some very fine lines of silk and wool underwear. The general manager is E. Ladewig, and the assistant general manager, H. Meyer.

Ontario letters patent have been issued incorporating G. O. Draper, Hopedale, Mass., machinist; A. F. Gault, merchant; S H Ewing, broker, R. R. Stevenson, manufacturers' agent, Montreal; Louis Simpson, Valleyfield, manager, and Samuel Finley, of Montreal, gentleman, for the purpose of manufacturing iron foundings and textile machinery, and machinery of any and every kind whatsoever by the name of "The Northrup Loom Company of Canada," with a total capital stock of $100,000. The works of the company will be situated at Valleyfield, Que., which town has voted a bonus of $10,000.



## CHEMICALS AND DYESTUFFS.

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

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

—It is a moot point whether the largest carpet now in existence is at the Carlton Club, London, or at Windsor Castle. Both of the carpets qualified to compete for the title are noteworthy, the former, it is asserted, having cost a sum equivalent to an annual income of £400—rather a large amount to be trampled upon—and the latter containing almost 60,000,000 stitches, and having occupied twenty-eight weavers during fourteen months to make.

—Johann Schumacher, of Wermelskirchen, Germany, has invented a dupe shaft attachment for looms that will produce a number of ribbons in one sheet of fabric covering the full width of the loom, which, when cut apart, have true selvages or edges that cannot be unraveled with the fingers. This is accomplished by providing a dupe shaft carrying a heddle surrounding a number of warp threads and having an eye adapted to carry a binding thread to and fro around the same, in this way producing a weave for each ribbon.

—The Endler process of bleaching cotton consists in impregnating the goods with an alkaline lye containing potassium chloride or similar compound, and then pressing and drying by heat, the effect of the chloride being to loosen and dissolve the gummy matter enveloping the cotton. The goods are starched in the machine and treated with the usual caustic alkalies (soda or potash), with an addition of sodium bisulphite and potassium chloride. They are subsequently put under heavy pressure and heated in the hot chamber for 30-60 minutes, according to their thickness.