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Canadian Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XVI. TORONTO AND MONTREAL, JUNE, 1899. No. 6.

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Canadian Journal of Fabrics

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

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CONTENTS OF THIS NUMBER:

THE COTTON MILLS OF CANADA.

The publication of the fourth edition of the Canadian Textile Directory affords an opportunity for reviewing the progress of cotton manufacturing in Canada. Although the first mill in this country was built as early as 1844, it was not till about 1860 that cotton manufacturing became a permanent industry. It was stimulated by the great disturbance of trade and the extraordinary rise in prices of manufactured goods brought about by the American civil war. Under the stress of this great conflict, not only cotton manufacturing, but the growing of raw cotton itself, languished in the United States; while on the Canadian side of the line peace and prosperity offered every security to investments in this field. By the time the war had closed in 1865, five cotton mills had been erected in Canada, their locations being Dundas, Merritton, Hastings, Montreal, and St. John, and their products being chiefly grey cottons, sheetings, shirtings, yarns, bags, batting and wadding. Their total capacity was about 40,000 spindles. When the war was over, trade began to resume its old channels in the United States, and prices fell to such an extent that a stop was put to further mill building in Canada, for some years. The census of 1871 showed only eight mills in the whole Confederation, of which five were in Ontario. The total hands employed were 745, and though the capacity of the mills was not stated in the returns, it is estimated at 95,000 spindles. In 1878 the Government inaugurated the National policy by which the duties on cotton goods were increased from 17½ per cent. to a rate ranging from 20 to 35 per cent., and this gave such a stimulus to home manufacturing that by the census of 1881 there were reported 19 cotton mills in Canada, employing in all 3,527 hands. As a matter of fact, five of the mills reported in this census were only under construction and not yet in operation in any department, and of the 14 actually running, the spinning capacity was 243,000 spindles.

The first edition of the Canadian Textile Directory, published in 1885, showed that besides those engaged in the manufacture of wadding and batting, there were in all Canada 25 mills, with 9,702 looms and 461,748 spindles. The second edition, published in 1889, showed the same number of mills, but with an increased capacity, namely, 11,282 looms and 519,700 spindles. When the third edition was published in 1892, the number of mills was still the same, but the capacity had increased a little further, there being then 12,288 looms and 546,700 spindles. The fact that for a period of twelve years there was no increase in the number of mills, and but little in the productive capacity of those already existing, may be accounted for by the over-investment of capital in mills turning out the same class of goods. For the common goods, most easily produced, the mills existing in 1882 could supply

a population twice that of Canada, and the owners were forced either to abandon their property or import machinery to diversify their products. The latter was the policy adopted by some, and by 1890 the Canadian mills were producing a very wide range of goods, some of a fineness and quality that were not thought attainable a few years before, and comparing favorably with any European or American goods of the same class. A further outlet for Canadian goods was found by shipments to China, the first experiment in which was made in 1886. Since 1890 these exports, which are nearly all of grey cottons, range from one million to nearly four million lbs. of these goods, running 3¼ to 3½ yds. to the pound. A start has also been made in exporting Canadian cottons to Japan and to Central Africa, and the success of this trade will be a tribute alike to the skill of Canadian operatives and the enterprise of Canadian manufacturers. Though there are three mills less in Canada than in 1892, the new edition of the Textile Directory shows a fair increase in looms and spindles in the past five or six years. For convenience of reference, we give the record in tabular form up to date, the figures from 1885 onward being from the various editions of the Canadian Textile Directory:

	No of mills	No of looms	No. of spindles
1865	5	. . .	40,000
1885 ..	25	9,702	461,748
1889.	25	11,282	519,700
1892.	25	12,288	546,700
1899.	21	15,401	638,212

These mills do not include such factories as the Magog Print Works, which, while operating eight calico printing machines, does not do its own weaving; nor do they include the batting and wadding factories or manufacturers of cotton laces, braids, twines or webbings. There are six establishments making cotton batting or wadding with a total capacity of 47 cards and about 15 pickers.

TECHNICAL EDUCATION.

WHAT A TORONTO CARPET MANUFACTURER THINKS.

In an interview with J. P. Murray of the Toronto Carpet Co., recently, the Canadian Journal of Fabrics gathered the facts which compose the following paragraphs. Mr. Murray has for years given much thought to the subject and has made a number of experiments along the line of technical education which have been of great interest and value:—

It is strange that so little progress is being made in Canada in the question of schools of art and design in connection with technique. Being a most serious and important adjunct to the productive interests of the country, they seem to be allowed to drift along, some running swiftly when backed by corporation moneys, but not returning any results, others moving with more difficulty on their own merits, but producing good workers. Why should our art education be left to the municipal or provincial authorities? This is a national question and has been in other countries and continues to be.

There are few industries that do not require skilled labor and artistic finish, and we should have a source from which to draw what is wanted in our own country. The schools of Philadelphia, New York, Cincinnati, etc., have made the United States manufacturers able to compete with the oldest houses of Great Britain, France and Germany in point of excellence of manufacture and design.

Italy has just established a tanning school, with complete curriculum, both as regards theory and practice. There are similar schools in Austria, Germany and England. We produce a lot of leather in Canada and should have at least a branch to teach the art of tanning in connection with every school.

Let any firm requiring to dye lose their principal dyer—and see the difficulties they undergo before they can get another. Dyers in charge of dyeing departments will not teach their underlings. Had we a school which the men at the tubs could attend in the evenings, not only would manufacturers be more able to develop new effects, but the knowledge that would be gained at the school would soon be in evidence at the kettle.

So far the production of glass in its many phases has not attracted the attention of capitalists in this country, while there are a certain number of glass factories. Would not the education of many glass workers induce a development of this industry, if not by those already in it, then by others.

THE ANCIENT ART.

Many beautiful bronze lamps are discovered in the ancient Roman camps, illustrating by these simple domestic articles the perfection to which art had been carried when nothing was considered too ordinary to be beautiful. Dr. Hill Burton, referring to the beauty of design and decoration on the commonest articles of Roman manufacture, says: "They afford traces of decoration sufficient to show an elevation in the ornamenting of common articles which the pottery of the present day is only now reaching and that rather by slavish imitation than by original development." The same historian also records that "a good many terra cotta candelabra or lamps have been found of that peculiar form which has in a manner become canonical through its matchless grace and simplicity, and has hence, ever since it existed in its purity, been contorted into ornamental service."

BOARDS OF TRADE CONVENTION.

A convention of Boards of Trade was called in Toronto, June 6th, to discuss the subject of Technical Education. In the council room of the Toronto Board of Trade there was an exhibit of some of the specimens of work done by pupils in the technical schools of Toronto, Ottawa, Hamilton and Whitby. Covering the four walls of the room were pen-and-ink sketches, water color designs for carpets, linoleums, cathedral windows, public and private buildings, drawings of engines from

models, etc. On the long table of the council room were specimens of modeling in clay, wood carving, and painting on china. Among those from other Boards of Trade were the following representatives: Fielden Crossley, O. G. Anderson, Woodstock; Alex. MacLean, Sidney B. Johnson, C. Ross, Ottawa; Wm Marshall, John Hoodless, Hamilton; T. H. Preston, Harry Cockshutt, Principal A. W. Burt, Principal Wm. Wilkinson, Brantford. Others also present were: Dr. May, Principal Rose, London Art School; Major Ellis, president Toronto Art School; A. G. Horwood, secretary Technical School Board, Toronto, and M. Living, 1st Technical School, Ottawa.

The chair was occupied by A. E. Kemp, president of the Board, who, in opening the meeting, explained the objects for which it had been called. It was the result of a special committee appointed by the Board. There seemed to be a general awakening along this line. Canada was well equipped for turning out professional men, but in industrial lines she was deficient, and far behind the Old Country, whom they could hardly hope to equal for many years.

W. F. Cockshutt, chairman of the special committee of the Board of Trade, was the next speaker. He thought the honor of introducing the question belonged to Brantford rather than to Ottawa or Toronto. There was great honor awaiting the man who devised a practical method. What was wanted was to bring practice and theory into unity, and then thoroughly equip the youth of the country for the battle of life. The cause which had led to this was the increase in the manufacture of goods and the improvement in machinery. For this purpose it was necessary to have the most skilled artisans if Canada was to compete with other countries. These men should be trained at home to take leading places in factories and do away with the necessity of bringing in foreigners. There were three main suggestions made: First, the introduction of elementary technical education as an adjunct to the Public school curriculum. It might only be an elementary form, but it would give the boy or girl an idea what they were fitted for; further, it would introduce a link of sympathy for labor and all engaged in it in all classes of society; secondly, the call for two or three technical schools in the province, placed on a scientific basis, teaching chemistry and treatment of metals and kindred sciences, with a mining section also. Thirdly, there should be free technical night schools for mechanics who could not find time to attend the regular schools. With regard to the matter of ways and means, he held that the Government should give a reasonable subsidy. Following that there would be plenty of room for liberal municipal grants and for generous private subscriptions. Both sexes were interested in the movement, and should be given equal voice in the matter.

Hon. Geo. W. Ross followed. He said that the young people of the country were disposed to prepare rather for the professions than for industrial pursuits He did not know that the schools were altogether to blame for this: the social conditions had, he thought, a great deal to do with it. He referred to the provision in the School Act giving boards of trustees the option of introducing manual training in the schools, and agriculture in the case of rural schools. The city of Kingston was the only case where the former provision had been taken advantage of. There were only very few instances where rural school trustees had ordered the teaching of agriculture in the sense that it could be taught in schools. The speaker drew attention to the School of Practical Science, founded in 1871, and on which some half a million had been spent as a general foundation, which had already been laid. All were agreed, however, that the time was ripe for a general advance along the lines of technical education. The old system of apprenticeship had ceased, and men and women were entering trades for which they were ill equipped, and a certain deterioration of products was a possible danger which must be guarded against. There was a growing demand for labor, scientifically trained by a course of education, as well as in the workshop, and other countries were meeting that need by the establishment of technical schools. Berlin spent $200,000 annually on her technical schools, and England more than two and a half million, in addition to municipal grants. Home-trained skilled labor was essential to the welfare of Canada, if she was to compete with the world in manufactures. The speaker next drew attention to the needs for artistic design, as well as merit in the quality of goods manufactured, and cited instances of increase in a country's trade through paying due attention to this need. He emphasized the fact that new and complicated machinery was constantly being introduced. It was the technical school which would give the Canadian boy a true insight into the working of such machinery, and enable him to fill a responsible position. It was most important to contrive some way to give employment to all artisans, and to this end it was necessary that Canada should be a manufacturing country. Enterprise and capital were the essentials, but it was also essential that skilled labor should be present also. It was of the greatest importance that the country should manufacture her own raw material, rather than export it, to be brought in again in manufactured form. With regard to the age at which a boy should receive a technical education he said that experience elsewhere proved that the technical education should go side by side with the regular. At 15 a course of scientific training might be superimposed on a sound elementary education, which after all was the bed-rock of all training. In support of this Mr. Ross quoted several eminent authorities.

He advocated manual training in the fourth, fifth,

and possibly in the third classes of the Public schools. He was not sure that there was enough commercial education in the High schools, but it was impossible to teach more than general principles, as systems in the business world differed largely. In chemistry, extended courses were given in the High schools, which were followed up in the university. Germany had been held up as a model, but in Germany it was original investigation by those of maturer years which gave her pre-eminence, and the Canadian boy was taken as far as the German youth. The reason that the High schools had not taken advantage of the Act, passed four years ago, enabling them to give technical instruction, was that the teachers had not much sympathy with that kind of instruction. What he would recommend would be that when a boy of 15 had acquired a sound elementary education, he should go to an industrial school, not a High school, where he would be right in the proper environment. With regard to such schools he was of opinion that they should be largely under local control to suit different conditions. They should be largely aided by the Government; no expense should be spared in equipment, and fully qualified teachers should be procured from abroad, or Canadians sent abroad to get the needful tuition to fit them for the position.

C. Ross, of Ottawa, thought no one who had traveled abroad could help deploring the lack of machinery for proper technical education in Canada, as compared with other countries. The question was, how were these schools to be started? He was in favor of making them national. In Belgium, Austria, and even England, technical schools were conducted under the department of commerce. The Dominion Government was what they ought to look to for the establishment of such schools. In the United States most of the technical schools had been endowed by private munificence, but Canada had not reached that point. There was a large influx of foreigners into Canada, which was, to a certain extent, a menace to the population, and he hoped that what was to be done would be done quickly.

T. H. Preston, president of the Brantford Board of Trade, disagreed with Mr. Ross. He thought the subject of education belonged properly to Ontario, and that they would get what they wanted very much more quickly than from the Dominion Government. He believed the question was altogether in the interests of the working-man. In Brantford they had considered the matter for some time. They found that there was a feeling among the mechanics against turning out workmen from the Public schools. Then there was the question of altering the curriculum of the higher classes, and making provision for boys and men whose ordinary education was not of the best. He would like to know from the Minister of Education whether the Government would give aid to any city proposing to start a school of technical education; secondly, whether they would give aid to night schools for technical education; and thirdly, on what basis would such aid be granted?

Mr. Ross was unable to answer the question at the time, but wished to say that he was not in favor of any technical school which did not make provisions for night classes. (Applause).

R. Y. Ellis, of the Ontario School of Art, was in favor of the appointment of a large committee representing wide interests to take the matter in hand, and get some definite results out of it.

John Hoodless, of Hamilton, did not want Dominion interference in the matter. He was under the conviction that technical education depended on more than the establishment of technical schools. Experts in Europe were of opinion that manual and technical education must be built up from the Public schools. He was also in favor of the appointment of a committee.

Principal Burt, of the Brantford High School, thought not the least important issue was the all-round development of boys and girls. The trouble was that the education system of Ontario was too one-sided. He had advocated that a better all-round system should be adopted, and disagreed with Mr. Ross in his statement that High school teachers would not sympathize with a technical course. He protested against any severance of technical education from the Public and High school education.

Ald. Hallam wanted practical results, not talk, and wished to know what the Government, municipalities, and Boards of Trade were going to do.

P. H. Burton was quite satisfied that the Minister of Education was fully in sympathy with the movement. He did not think they could do better than follow the Swiss custom. At the primary schools all were taught alike. In the secondary schools there were three classes, in professional, industrial, and commercial. There was not room for the higher education for everybody in Canada. Then he moved the following resolution: "That this meeting most heartily endorses the movement in favor of a broader and more thorough technical training in all its branches in this country, and pledges itself to forward the movement by all means in its power, and that the chairman do appoint a small committee as a nucleus." The meeting adopted the resolution and the president appointed the following committee. P. H. Burton, Ald. Lamb, J. D. Allan, A. M. Wickham, T. A. Hastings, A. N. Wickson, Toronto; T. H. Preston and W. F. Cockshutt, Brantford; O. G. Anderson, Woodstock; C. Ross, Ottawa; John Hoodless, Hamilton.

SAMPLE AND SHOW ROOMS AT ODESSA.

It was recently announced that, with a view to promoting American trade on the Black Sea coast, the United States Government had decided to appoint a number of commercial agencies in Southern Russia, where there will be a permanent exhibition of American products, and every possible facility will be given for their importation. The first of these agencies, which will be placed under Consular supervision, is to be opened at Odessa. In commenting upon this fact, a German newspaper offers the opinion that "when the Americans once secure a hold on the markets of the Levant, their vast resources, their business capacity and energy, and the vigilance of their Consuls will give them the lead in many classes of goods." In this connection it ought to be borne in mind that although the highly protective customs duties in force in Russia against incoming merchandise act as a strong deterrent to importers, yet if American firms should succeed in deriving commercial advantage from agencies and showrooms, there is no reason why other firms should not follow the example set them by their enterprising competitors in that market.

MOISTURE IN TEXTILES.

An esteemed contemporary says: It is a well known fact that all textiles when exposed to dampness absorb moisture in large quantities, and consequently increase in weight. When stored in a dry place the same textiles lose their moisture. The effect of this hygroscopic property is that the weight of a given lot of textiles varies from day to day, so that it is absolutely impossible to tell at any time the actual weight of that lot without testing it. It is easy to understand that these conditions have been, and still are, a source of great trouble to dealers. Let us suppose, for instance, that a lot of wool has been baled and weighed on a damp or rainy day, then kept in storage for some weeks and shipped in dry, windy weather. When the lot arrives it will have lost nearly all its moisture, and when it is weighed by the buyer every bale will appear to be short, complaint will naturally be made and trouble is likely to ensue. Under reversed conditions the lot will have gained. As may naturally be supposed such a state of affairs cannot be suffered to continue indefinitely. Wool is the fiber most sensitive to moisture, says a writer in a contemporary, varying as it may from 5 to 35 per cent. of its actual weight, according to the action of atmospheric influence. But as the price per pound for wool was less than for silk, it was in the silk trade that the matter was first studied, and in 1750 an establishment was founded in Turin, to ascertain the "condition" of the silks sold on that market. From this we have the term "conditioning." Actually a "conditioning house" is a laboratory in which tests are made to ascertain not only the percentage of moisture contained in a textile, but also the percentage of foreign matter (gum, grease, soap, oil, etc.), the size or count, the tenacity or strength, the elasticity, the amount of twist, etc. In fact, a conditioning house may be called an assay office for textiles. In some silk centres the practice of conditioning was extended to high grade wools used in mixed goods, then to ordinary grades, and at the present time all European textile markets possess at least one conditioning house. In order to have a basis for commercial purposes it is necessary to make a certain allowance for moisture, because we never find, in normal conditions, silk or wool absolutely dry. That allowance, or "reprise," is the quantity of moisture which is added to the absolute dry weight in order to obtain the conditioned weight; it cannot be the same for all textiles, for they do not contain the same amount of moisture when placed under identical influences. An International Congress met in Turin in 1875 and adopted the following reprises: Silk, 11 per cent.; wool (combed), 18¼ per cent.; wool (spun), 17 per cent.; cotton, 8½ per cent.; flax, 12 per cent.; hemp, 12 per cent,; tow (spun), 12½ per cent.; jute and Phormium, 13¾ per cent. of the absolute dry weight of the textile.

Those percentages are now applied in all conditioning houses in the world.

LONDON WOOLREPORT.

C. Balme & Co., in their report of the Third Series of Colonial Wool Sales of the current year, which opened on the 2nd ult., and closed on the 19th, state that of the quantity sold, approximately 95,000 bales have been taken for export, nothing having been purchased for shipment to America. The immediate cause of the very sharp rise in values which marked the series of sales which closes to-day was the notable advance in quotations for merino "tops" which began directly after the Easter holidays. The "terme" markets of Antwerp and Roubaix led the way, and Leipsic and Bradford followed suit. In spite of the known shortage of fine wools, manufacturers have for some time past been deterred from holding any but the lightest stocks by the sluggish state of the woolen textile trade and the repeated political disturbances of the last two or three years. They were not slow to realize that, with a clearer political horizon and more promising trade prospects, they might be caught understocked, and so the movement grew surprisingly in strength, until at the opening of the auctions, prices for tops stood at a higher point than has been reached since 1890. With a crowded sale room, values for merinos, whether greasy or scoured, ruled from the outset 15 to 20 per cent. above March parity. French buyers topped the market to begin with, but with the advent of free German and English competition later on and the keenest general animation, from 20 to 25 per cent. in excess of the final figures of the second series was frequently paid. Towards the end of the sales a rather more sober spirit pervaded the room owing to easier quotations for tops on the Continent, and the concluding prices of the auctions show practically no variation from opening rates. As was only to be expected, fine crossbreds have benefited very largely by the sharp demand for merinos. They shared the opening improvement to the extent of from 10 to 15 per cent., and gradually gained ground throughout, until at the close they are nearly 20 per cent. dearer than in March. The comparative

dearness of merinos and fine crossbreds has caused a larger amount of attention to be devoted to the coarser grades, which has relieved them from the neglect they have now suffered for some time past, and has brought about an appreciation of from 7½ per cent. at the beginning to about 12½ per cent. at the close of the sales. South African greasy produce has moved with kindred descriptions, and shortly after the opening marked an advance of 15 to 20 per cent., which remained good to the close, with the exception of some irregularity in the prices bid for wasting parcels. Fleece-washed wool, which was in small supply, was 10 to 15 per cent. dearer; white scoureds, which were exceedingly scarce, enjoyed a full 15 per cent. improvement. The few lots of super Western snow-whites offered realized fancy prices, as much as 2 1½ per lb. having been paid. A striking feature of the series has been the exceedingly handsome profits on re-sales in London of Colonial purchases, the margin between buying and selling prices amounting to an average of close on 35 per cent. in the operators' favor. Although merinos now stand at a high level of value compared with the average of the past ten years, there is no reason to suppose that their present position is unwarranted, while as regards the future, the outlook is favorable from the point of view of the growing influence of continued short supplies, of the prevalence of fashion for fine-wool goods, and of the likelihood of trade development uninterrupted by serious political complications. For the time being at any rate the prospects of fine crossbreds are more or less identical with those of merinos. The outlook for the coarser grades is more hopeful than for some time past, though at the same time the influence of large supplies, both actual and prospective, must not be forgotten. As compared with the closing prices of the previous series, we now quote :—

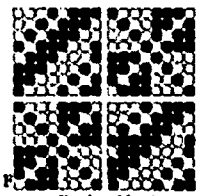
AUSTRALASIAN.			
Merino in grease, superior	2d	per lb	higher.
" " medium	1½d to 2d.	"	"
" " inferior	1¼d	"	"
" scoured, super	3d.	"	"
" " medium	2½d.	"	"
" " inferior..... ..	2d	"	"
" lambs' wool, superior....	1½d	"	"
" " medium and inferior..	1d	"	"
Crossbred grease, fine	½d. to 2d.	"	"
" " medium	1d	"	"
" " coarse	½d. to ¼d.	"	"
" washed and scoured, fine	2½d.	"	"
" " " coarse	1½d.	"	"
" slipe, fine	1½d.	"	"
" " coarse	¼d	"	"
SOUTH AFRICAN			
Snow white, super.....	3d.	"	"
" medium and inferior ..	2½d. to 3d	"	"
Fleece-washed	1d. to 1½d.	"	"
Grease, combing	1d to 1½d	"	"
" clothing.....	1d.	"	"

The next sales are fixed to commence on the 27th June, 19th September, and 28th November.

—The carpet makers of Saxony have formed a union; it takes in Austro-Hungarian manufacturers. Spinners have a very successful union. Knitters have failed to organize.

Textile Design

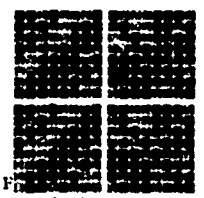
No. 1 is a small broken check. Twist yarns in two colours—sometimes named grandrille—and mixture shades are most suitable, but where the prevailing drabs, fawns and browns are required the design is available for piece dyes.



Design No. 1.

Warp, 2/36's. 4,836 threads, 67 in. wide in the loom. On 16 healds, straight draft. Reed, 4/18's. Weft, 1/16's. 72 picks per inch. Full slowly to 58in. to avoid bleeding the colors. Clear finish, 58in. wide. Weight, 18ozs. per yard.

Design No. 2 is a striped worsted trousering in two colors, producing a quiet and neat appearance.



Design No. 2.

Warp, 2/30's slate and 2/30's black. Warp, 2/30's (70's quality). 4,832 threads, 67-in. wide in the loom. On 16 healds, straight draft. Reed, 4/18's. Weft, black, 2/30's. 70 picks per inch. Clear finish, 26-in. wide. Weight, 30 ozs. per yard. Warping, 8 threads slate and 8 black, repeated.—The Textile Recorder.

PERMANGANATE OF POTASH AS A BLEACHING AGENT.

Potassium permanganate is a bleaching agent, the powerful action of which has for years been more or less applied in practice. As far back as 1866 Tassie du Motay and others recommended this body as suitable for bleaching purposes, and at the same time mentioned the fact that the permanganate process was successfully employed in several factories. In 1870 Pubetz, confirming in the Industrie Blaetter the earlier statements, considered the use of permanganate particularly adaptable to garment dyeing and described the bleaching method in detail. Quite recently Scurati Manzoni (Industrie Blaetter, 1889), again called attention to permanganate of potash as a bleaching agent and published extensive experiments for a practical method of applying it. We shall give a brief account of these researches, says The Textile Mercury, believing that at the present moment the potassium permanganate bleaching process has a claim to the interest of practicians, because the price of permanganate is at present much lower than at any time before. The price of the product has fallen 45 per cent. during the past ten years, and at this cheap rate mostly a very pure product is furnished, which contains about 95 per cent. permanganate of potash, while formerly often manganates of very low percentage of permanganate of soda were used for bleaching, which may have caused many failures. For this reason also new experiments in practice are recommendable. The two principal methods of bleaching with permanganate proposed are the oldest one which was worked out about twenty years ago by Tassie du Motay, Pubetz and others, and the new process of Manzoni.

1. After the older method, the tissues or yarns of cotton, linen, hemp, wool, etc., after being cleared with water, alkaline

solutions, or soap baths, are laid down in a solution of potassium permanganate, with or without an addition of sulphate of magnesia, until the bath is decolorized—that is, until the permanganate is decomposed. Brown peroxide of manganese is then precipitated upon the fiber, while a part of the permanganate effects the bleach. By this action free alkali is evolved; this in many cases, as in bleaching silk or wool, would act injuriously. To obviate this difficulty, the solution before entering the yarns, is mixed with sulphate of magnesia, which prevents the formation of the alkali, innocuous hydrate of magnesia and sodium sulphate being formed. After the tissues have been thus exposed to the action of the permanganate, the oxide precipitated upon the fibers must be removed; for this purpose the yarns are lifted from the bleaching liquor and washed in a dilute solution of sulphurous acid. Ordinarily the yarns must several times be alternately treated in baths of permanganate and of sulphurous acid, and finally the bleached material be washed clean. As regards the quantity of permanganate employed in this process, Pubetz says: "A bleaching bath containing, according to the nature of the fiber to be decolorized, 4 to 10 lbs. of permanganate of potash or of soda is sufficient to bleach 200 lbs. cotton, linen or hempen tissues or yarns." In the chapter on bleaching wool or woolen yarns, Pubetz further observes: "For 100 lbs. well-scoured wool, 4 lbs. permanganate of potash or of soda must be mixed with 1½ lbs. sulphate of magnesia. Usually a barrel of sufficient capacity is taken for this purpose, the solution of permanganate and of sulphate poured in, and the material to be bleached loosely laid down in it." As to baths, the following is remarked: "The sulphurous bath is prepared in a special vessel. As much sulphurous acid is poured into the water as is required to destroy the manganese oxide fixed on the fiber." The wool thus treated is washed clean in water and finally entered into a soap bath containing 1½ lbs. commercial soft soap mixed with sulphate of soda, 48 lbs. water, and ¾ lbs. spirit sal ammoniac (sp. gr. 0.9). On silk bleaching Pubetz observes: "The cleaning of silk in the form of yarns or tissues must be done very carefully. The silk being properly cleaned by soap baths, a permanganate bath is given, and, after being well drained from the liquid, the silk is entered in a sulphurous acid bath, when it will be bleached in a short space of time; finally it is well washed."

After the new method of Manzoni, the tissue, cleaned as usual, is at once treated with a solution of potassium permanganate to which sulphuric acid has been added; thereby the washing with sulphuric acid is saved and less permanganate used. Manzoni has proved the advantages of his method by the following observations:

"(a) In neutral solutions the reduction of the potassium permanganate takes place regularly, but slowly. (b) In alkaline solutions the reduction very probably takes place in two phases. In the first, the violet coloration of the solution changes to green when the cotton is entered, a partial precipitation of manganese peroxide upon the fiber taking place. In the second phase the green manganate very slowly loses its color, and the manganese remaining in the solution is very slowly deposited upon the fiber. (c) In acid solution the reduction takes place much more regularly and in a shorter time than in the other two conditions. The alkaline bath was prepared by adding caustic soda or caustic potash in the quantity theoretically required for the transformation of the permanganate into manganate; the acid bath contained an addition of as much sulphuric acid as is theoretically necessary to liberate all permanganic acid. The yarn which is treated in the acid or neutral bath is as strong as before, but that which has been in the alkaline bath seems to be rotten all through; it can be easily torn to pieces, particularly when the material is treated with 2 per cent. solution of permanganate, even before immersing it in the decolorizing solution of sulphurous acid, or even in dilute sulphuric acid. If as much sulphuric acid is at once added to the bath as is necessary to dissolve the manganese oxide formed by the reduction, the bleach can be obtained in one bath without prejudice to the strength of the fiber. This is, in fact, the case if a sulphuric acid bath (5° Be.) is employed, when the yarn is not first colored brown, but becomes white direct. If cotton yarn, which has been boiled or scoured with soda lye of 4 grm. per liter under 2 atm. pressure is operated upon, and then well washed, the yarn is perfectly bleached by an immersion of about five hours. It is necessary, however, to gradually add the permanganate as a concentrated solution, with stirring, in two or three portions, and to raise the temperature to 15° to 20° C.; ½ kilo. potassium permanganate is enough to obtain a good ordinary white upon 100 kilos. gray cotton yarn."

So much about the methods thus far proposed for bleaching with permanganate of potash. It is desirable that the important suggestions presented to the practician by these researches be profitably utilized. With the low price of potassium permanganate and the small quantities of it required, especially after the new method, experiments in practice only can be recommended.

INTERNATIONAL SHEEP REGISTRATION.

The council of the National Sheep-Breeders' Association of England have adopted the following resolution: "That in view of the important interests involved, and of the great advantage that would accrue to breeders of registered sheep by the adoption of mutual arrangements for the transference of registered sheep from their record in one country to that of another; and also of the importance of devising means to prevent the substitution of unregistered sheep for registered sheep, etc., this council resolves that an international conference of representatives of the sheep-breeding industry throughout the world be invited to assemble at York in June, 1900, at the time of the Royal Agricultural Society's meeting in that city, for the purpose of considering the above or any other questions affecting the interests of sheep-breeders generally. That the secretary be and is hereby authorized to issue invitations to kindred societies in other countries to send delegates to the proposed conference; but in the event of there being no such society in any country, then the secretary shall send the said invitation to the Governmental authorities of such country, asking them to nominate delegates representing the sheep-breeding industry of that country. That the executive committee, together with the secretary, be constituted a special committee to carry out the foregoing resolution." Such a matter as the foregoing affects very considerably, although indirectly, the question of the world's supply of wool.

THE PRACTICAL EXAMINATION OF LOGWOOD.

So far no process has yet been devised for the determination of the actual amount and the character of the coloring matter in logwood extracts. As is well known these contain two coloring principles—haematoxylin, which dyes blues with chrome and violets with alumina mordants, and haematein, which dies black with chrome and iron mordants. Extracts prepared from fresh wood contain haematoxylin with a little haematein only, while if the wood has been subjected to an ageing process or the extract is oxidized then the latter will consist largely of haematein. The only manner in which logwood extracts may be examined for strength is by means of comparative dye tests, says the Dyer and Calico Printer, and such should be made with the sample under examination and

with samples of extract prepared so that they may contain haematoxylin and haematein. These comparative dye tests may be carried out in the following ways:

A. Wool is first mordanted with 3 per cent. bichromate of potash and 2½ per cent. tartar, working at the boil for one and a-half hour. After being thus mordanted the wool should have a pale green color. Next dyebaths are prepared containing ½ grm. of the logwood extract to be tested in one, and similar quantities of haematoxylin and haematein extracts in the others, and equal quantities of the mordanted wool, and placed in these baths. The dyeing is started cold, and the heat slowly raised up to the boil, at which it is maintained for one hour; then the wool is taken out and rinsed and dried, and when dry the colors or shades are compared. Haematoxylin dyes a dark but clear blue shade, haematein a blackish blue shade, and by comparing the shades obtained from these two extracts with that given by the sample under examination, an idea of the strength and character of the latter can be obtained. B. Another method is to mordant the wool with 10 per cent. alum, 2½ per cent bichromate of potash, 2½ per cent. copper sulphate, and 2½ per cent. tartaric acid. The mordanted wool is dyed as before. Haematoxylin dyes the brightest and clearest shades, while the haematein shades are darker and duller, and a comparison shows how the extract under examination compares with them. C A third method is to take cotton yarn, give a good boil in water, then prepare baths containing ½ gramme of the logwood extracts, enter each skein of cotton yarn in the cold, then warm up to about 180 deg. F., and work for two hours; then wring out and enter into a warm bath containing 3 per cent copper sulphate. Haematoxylin gives thus a drab, haematein a blue gray, so that the difference is marked. With a little practice working in this way it soon becomes easy to test logwood extracts.

ENGLISH TECHNICAL EDUCATION IN 1898.

The report of the City and Guilds of London Institute, just issued, supplies interesting information and data respecting the progress of technical education in England and her colonies. The following are extracts of the examiners' reports in the various textile subjects:

Wool Dyeing.—The questions in this subject were answered in a satisfactory manner Many of the candidates who failed to pass showed a fair knowledge of some branches of the subject. In comparison with last year, there was in most cases a marked improvement in the answers to questions relating to water. In the majority of cases candidates exhibited a weakness in their knowledge of detecting coloring matters in the fiber. In view of the importance of dyers matching whenever possible with the same coloring matters as those used in dyeing the pattern, more attention should be devoted to this subject.

Cotton and Linen Bleaching and Printing.—Although there was a considerable decrease in the number of candidates, the papers on the whole showed a decided improvement. This particularly applied to "bleaching" the number of failures being exceptionally small compared with previous years. In "printing," many candidates nearly gained sufficient marks to entitle them to a first-class certificate.

Wool and Worsted Spinning.—The first year's papers were very poor The second year and the honors were very much better and some of the papers were really excellent, showing careful and intelligent training

Wool and Worsted Weaving.—In the ordinary first year's course the questions were answered satisfactorily and the students who passed are well grounded in the elementary principles. In the second year's course the questions were not answered as well The following were the principal failings: (1) Indifferent knowledge as to the peculiarities of the shrinkage of different weaves. (2) Color. On this most important qualification of a good designer very little knowledge was shown. In the honors course the questions were not answered satisfactorily, and the practical work, with some notable exceptions, was most unsatisfactory. In the paper work the following were the principal faults: (1) Plans of double and treble cloths were made in a most confusing and indistinct manner. No one could cut a set of cards from many of the plans submitted. Red, blue and black pencils; crosses, circles, large and small dots, right-hand and left-hand strokes were in confusing abundance. The task of deciphering them was very difficult and tedious. There were some exceptions, in which the plans were clear and easy to check. In examination work pencils ought to be abolished, black and red ink, Indian ink, vermilion and thin gum water with a brush substituted Different schools ought to have one common system of plan making. (2) Color; very little knowledge was displayed, and in many papers great ignorance was shown. Unless students are well trained in color applied to design, they are unfitted for the position of designers. Rule-of-thumb work is no good; each student ought to have colors classified in his mind, and a knowledge of the general results when applied to any design (3) Departmental costings, dyeing as specified in the syllabus, effects of scouring materials upon colors, being an addition this year, were not answered except in two or three instances. Perhaps the teachers have not had time to take up these questions. An elementary knowledge would be very useful to students in after-life With some notable exceptions, the practical work turned out was far from satisfactory. One school in particular submitted the worst and most unsuitable colors possible, though the designs were very good. A lot of elementary work was submitted, such as six-shaft twills and common weaves in mixture coatings, four-shaft twills in four-and-four colored stripes and one-and-one checks. This is quite useless as a test of students' knowledge for honors. Two and three hundred patterns were sent in by some students in elementary weaves. The practical work in honors ought to be limited in quantity, and should consist of new weaves or combinations, showing some originality, and in three good colors for each design of fancies. Every pattern ought to be a good color, well studied to obtain the best effect possible, and some ought to be striped or over-checked with bright colors.

Cotton Spinning.—The chief point of interest in this examination was the effect of the change in the syllabus adopted. The object of the alteration being to enable a longer time to be given to the subject, it was natural to look for some improvement in the character of the papers worked. The papers worked for the first year showed only 174 failures out of a total of 521 worked In one or two groups of papers, however, there was evidence of slipshod preparation. Teachers should be reminded that the syllabus aims at thorough training, and that only those students who evidence a grasp of the subject can pass. The honors paper was framed to test the knowledge of the student of the practical part of the operation, and the result was very gratifying. The number of candidates taking this paper was smaller than heretofore, but the quality was much better. The second year's papers were relatively the worst, and more attention is evidently needed in this section.

Cotton Weaving.—The papers were on the whole very satisfactory, and bore witness to the wisdom of the change recently introduced into the syllabus. A rather large percentage of failures took place in the ordinary first year, which may not appear very satisfactory; but this is accounted for by the change in the syllabus, making the first year a very severe test, and one which the candidates may not in many cases have been specially trained for, i.e., a thorough detailed knowledge of preparatory processes.

Flax Spinning.—There was an improvement in the papers

returned, but a better return for the practical or working questions was needed; the want of modern working machinery models in the several training schools seems to be much in evidence.

Linen Weaving.—The ordinary grade was not generally satisfactory. The honors students were not so satisfactory in answering the questions asked, but their work was good.

Silk Throwing.—With reference to the honors papers, two were of special merit, showing a range of study over the whole of the syllabus prescribed, and the questions were clearly and concisely answered. No student, however, attempted the question on Indian silks, and I would therefore recommend attention to this branch of study. The use of this class of silk has increased in several branches of English manufactures, and hence its importance. In the ordinary grade papers, the great fault was the want of accuracy, particularly in names and technical terms, indicating need of more careful note-taking and the free use of black-board in demonstrating. I would suggest that local committees encourage students to greater care in this respect by one or more prizes for the best kept note-book at the end of each session. It would appear that most of the students are not well prepared for higher technical training until they have taken full advantage of the teaching in ordinary subjects in the continuation schools. Nearly the whole of the syllabus was well covered, and showed that a wide range of subjects had been taken up. The only exception was that of geographical production and distribution of raw silk.

Silk Weaving (Section I.).—The examination papers in silk weaving were very satisfactory. In the honors grade much excellent practical work was sent in, several of the ruled papers showing great merit. The questions in the ordinary grade were mostly creditably answered, but both in this and in the honors grade the candidates nearly all failed to analyze the fabrics submitted to them. This is an important matter, and should receive more attention in the future.

Silk Weaving (Section II.).—There was a decided improvement this year in both quantity and quality of the papers submitted for examination in the ordinary grade. A good many of the papers appeared to be written by sons of artisans, who are unable to commit their knowledge to paper, so labor at a great disadvantage as compared with sons of manufacturers, who can spend the whole of their time at a technical institute, and are properly trained for a paper examination. In the honors grade the practical work of the candidate put down for first prize was far in front of all the others, both in style of design and workmanship. It would be quite as well to encourage the candidates to produce more plain fabrics, as there is quite as much skill required to produce a good plain fabric as any of the rich brocades.

Jute Weaving.—Although both in spinning and weaving a number of candidates sat for the examination who ought not to have been presented, and who consequently failed, the general character of the work was rather better than of late years. There was less irrelevancy in the answers; and although some sketches were badly done, there were notable exceptions.

Lace Manufacture.—The quality of work was above the average of late years, although one or two students showed a disposition to over-elaborate their answers, with the result that they had not sufficient time to complete their examination forms. It is to be regretted that with the position that Nottingham holds, and the importance of the lace trade to it, so few students are found to submit themselves to examination.

F. W. Watkins, Hamilton; G. B. Ryan, Guelph; C. J. Catto, and C. A. Calkins, Toronto; W. McE. Flavelle, Lindsay, Ont., have been incorporated as the Merchants' Mantle Manufacturing Company, Ltd.; capital, $20,000; chief place of business, Toronto.

DYEING MERCERIZED COTTON.

Mercerized cotton has come so much to the fore during the last year or so, and the dyer is so frequently called upon to dye it, that a few practical recipes for producing some very useful shades and tints with direct dyes will be of interest, says The Textile Mercury. The process is practically the same as that used in the dyeing of ordinary cotton. There is this difference: owing to the greatly increased affinity for coloring matters of mercerized cotton over that of ordinary cotton, the dyebaths are more completely exhausted of dyestuff, and so deeper shades are obtained with a given weight of dye than is the case with unmercerized cotton. All the following recipes are for 100 lb. weight of cotton:

Bright Crimson—The dyebath is made with 3 lb. brilliant purpurine R, 10 lb. Glauber's salt, and 1 lb. soda. Work at the boil to shade.

Canary—Use 1 lb. Columbia yellow, 10 lb. Glauber's salt and 1 lb. soda.

Rose Pink—Use ½ lb. erika BN, 10 lb. Glauber's salt and 1 lb. soda.

Greenish Sky—Use ⅛ oz. chrysophenine G, ⅛ oz. Chicago blue 6B, 10 lb. Glauber's salt, and 1 lb. soda.

Dark Cream—Use ⅛ oz. toluylene orange G, 10 lb. Glauber's salt and 1 lb soda.

Blush Rose—A fine shade is dyed with ⅛ oz. erika 2GN, 10 lb. Glauber's salt and 1 lb. soda.

Black—First work at the boil with 2½ lb. Columbia black FF extra, ½ lb. Columbia green, 10 lb. Glauber's salt, and 2 lb. soda. After dyeing, top in a fresh bath with ½ lb. methylene blue BB.

Russian Green—A good shade of green is dyed with ½ lb. Columbia green, 20 lb. Glauber's salt, and 1 lb. soda.

Deep Rose—Dye with 5 oz. erika 2GN, 2½ oz. Congo orange R, 10 lb. Glauber's salt, and 2 lb. soda, after which top in a fresh bath with 1 lb. rhodamine 6G.

Orange—Dye with 1 lb. Congo orange G, 10 lb. Glauber's salt, and 2 lb. soda.

Olive Yellow—Use 1 lb. chrysophenine G, ½ oz. Zambesi black D, 10 lb. Glauber's salt and 1 lb. soda.

Gray—A nice shade of silver gray is dyed by using 1½ oz. neutral gray G, 10 lb. Glauber's salt and 1 lb. soda.

Brown—A bright shade is dyed with ½ lb. brilliant orange G, 6 oz. Columbia brown R, 10 lb. Glauber's salt and 2 lb. soda.

Pale Heliotrope—A nice shade of heliotrope is obtained by using 1¼ oz. heliotrope 2B and 10 lb Glauber's salt.

Maroon—Use 2 lb. Congo rubine, 10 lb. Glauber's salt and 2 lb. soda.

Dark Gray—A fine shade of silver gray is obtained by dyeing with ¼ lb. Zambesi black D, 10 lb. Glauber's salt and 1 lb soda.

Blue—Dye in a boiling bath with 1 lb. Chicago blue 4B, 10 lb. Glauber's salt and 1 lb. soda, after which top in a fresh bath with 4 oz. Victoria blue R.

Nut Brown—A bright shade of nut brown is got with 1 lb Congo brown G, 10 lb. Glauber's salt and 1 lb soda.

Deep Scarlet—Use in the dyebath 3 lb. diamine red B, 10 lb. Glauber's salt and 1 lb. soda.

Gray Blue—First dye in a boiling bath with 2 lb. Chicago blue RW, 10 lb. Glauber's salt, and 1 lb. soda. After rinsing off, treat in a fresh bath with 3 lb. copper sulphate and 2 lb. acetic acid.

Deep Chestnut—Dye in a boiling bath with 2 lb Congo brown G, 10 lb. Glauber's salt, and 2 lb. soda; then treat in a fresh bath with 3 lb. copper sulphate and 2 lb. acetic acid.

Dark Gray—The dyebath is made with ½ lb. Zambesi

Black F 10 lb Glauber's salt and 1 lb soda After dyeing, treat in a bath with 1 lb copper sulphate and 1 lb acetic acid

Seal Brown—Dye the cotton in a boiling bath with 3 lb chromanil brown 2G 10 lb Glauber's salt, and 1 lb soda; then treat in a fresh bath with 3 lb copper sulphate, 1 lb bichromate of potash and 2 lb acetic acid

Black—Dye the cotton in a boiling bath with 8 lb chromanil black BF, 10 lb Glauber's salt, and 1 lb soda: then treat in a fresh bath with 3 lb copper sulphate, 1 lb bichromate of potash, and 2 lb acetic acid

Gold—First dye the cotton with 2 lb tolulene orange G, 10 lb Glauber's salt, and 1 lb soda; afterwards treat in a fresh bath with 3 lb copper sulphate, 1 lb. bichromate of potash, and 2 lb acetic acid

Dark Blue—Dye with 3 lb Zambesi blue BX, 10 lb Glauber's salt and 1 lb soda at the boil for an hour; then rinse and diazotize in a cold bath containing nitrite of soda and hydrochloric acid, afterwards developing with amidonaphthol ether.

Dark Brown—Dye first with 3 lb Zambesi brown 2G, 10 lb Glauber's salt and 1 lb soda; then diazotize with sodium nitrite and hydrochloric acid and develop with tolulyene diamine

Black—Dye in a boiling bath with 4 lb. Zambesi blue BX, 1 lb. Zambesi black D, 10 lb. Glauber's salt and 1 lb. soda; afterwards diazotize with sodium nitrite and hydrochloric acid and develop with toluylene diamine and betanaphthol.

CRAPE EFFECTS ON WOOL.

BY E. SIEFERT, IN THE BULLETIN OF THE MULHOUSE SOCIETY.

The success of the crape effects on cotton obtained by means of caustic soda has led to the attempt to produce similar effects on woolen tissues. Nevertheless, so far no practical process has been discovered. There is certainly a patent which proposes to print a mechanical reserve on woolen, gum solution for instance, then to pass through a concentrated acid, sulphuric, phosphoric, etc. Nevertheless, as far as I know, tissues craped in this way have not been put on the market, which proves the non-success of the process. It is some time since A. Zetter, in making attempts to obtain these effects on woolen muslin in a more practical manner, noted that various substances had the property of contracting woolen on steaming.

It is difficult to detail these substances, for they are of very different kinds Nevertheless they are, generally speaking, acids, acid salts, or substances which can act like acids; several of them are energetic reducing agents I may cite principally the bisulphites, stannous chloride, the chlorides of zinc and calcium, tartaric and citric acid, and finally resorcine. As a rule all these substances have to be employed in very concentrated solution. With certain of them, tin salt for instance, it is impossible to obtain the contraction without great deterioration of the fiber. Others, for instance the bisulphites, tartaric and citric acid, the chlorides of zinc and calcium, and more especially resorcine, allow the effect to be obtained with less tendering of the fiber. The operation nevertheless still remains a delicate one. A rather too prolonged steaming, slightly too much pressure, and the tissue is damaged

I have noted the contracting action of sulphocyanide on woolen, and this is very energetic with little damage to the goods The risk of damage, nevertheless, is not the only difficulty Two conditions must be fulfilled to obtain a good result. First of all the steam must have access freely and equally to all the parts of the piece, and seeing that anything beyond the desired action is just what leads to damage, a part of the stuff, the selvedge for instance, must not be craped before the other part has been steamed, as would be the case if the rolled piece were steamed Moreover, although the effect finally obtained on the wool has more resistance to washing than the analagous effect obtained on cotton, in the act of contracting the wool can only surmount a very feeble resistance, whereas cotton steeped in caustic soda contracts with great energy. Therefore if the resistance opposed to the contraction of the tissue be ever so little too much, this contraction will not take place at all. To give an idea of the little energy of the contraction, I will give an example. If a pattern of woolen muslin, printed with a streak of sulphocyanide, is hung up with free play in a steamer, and then steamed much longer than would be necessary, the lower parts of the pattern will be strongly craped, but the effect will gradually die out towards the top, and a yard or so from the bottom will be absolutely nil, the mere weight of the tissue and of the color preventing the contraction from taking place. It will be seen, therefore, that no system of steaming in use will serve to obtain a fine and regular crape effect.

Coloring matters may, of course, be added to the sulphocyanide color Tin salt may also be added and various effects may be got by printing it on to a tissue dyed with a color which it will discharge The woolen thus contracted behaves in the presence of coloring matters differently to simply bleached wool. It has more affinity for the acid coloring matters, and less for the basic colors. The shrinking varies from 15 to 20 per cent.

REPORT ON SIEFERT'S WOOLEN CRAPING PROCESS.

By Camille Schoen and E. Grandmougin.

With the printing color indicated by M. Siefert, we obtained the results he describes. The printing color used was:

1,500 grammes sulphocyanide of calcium
1 litre gum tragacanth water.

Print on to woolen muslin and steam, avoiding all tension, for about five minutes. To obtain color effects the acid coloring matters may be used.

Sulphocyanide of barium acts in the same way. On the other hand sulphocyanide of ammonia, used either alone or with a metallic oxide, does not contract the fiber. Siefert mentions the well-known fact that concentrated acids contract woolen fiber. It has also been proposed (Knecht, Farber Zeitung, 1897), to print on the acid, then to pass through chloride of lime, and to mill the woolen thus locally chlorinated, the chlored wool having lost the property of felting. It may be possible to produce patterns successfully by these processes, but the operation on a large scale would present great difficulties and does not seem to have been used.

Siefert's process on the other hand will be satisfactory on a commercial scale, and will give good results. The substances having the property of contracting wool are very diverse, but it is to be remarked nevertheless that they seem to be substances having an absorptive character like the chlorides of zinc or calcium for instance, or are reducing agents like tin salt, the bisulphites and hydrosulphites. It is not certain, therefore, that they act in the same manner. In the case of tin salt a solution of 150 grammes to the litre will contract the wool, whereas with chloride of zinc a concentration of from 60 to 70 deg Be is necessary, that is to say at least 1,000 grammes to the litre It seems reasonable therefore to believe that some of these substances act like concentrated acids by robbing the woolen fiber of its water, whereas others act like reducing agents, perhaps also taking sulphur from the fiber. The oxide of tin used alone will not crape woolen, but needs the addition of a substance with an acid character. The attack on the fiber varies with the substance used. Tin salt, which crapes perhaps the most easily, has an excessive tendering effect, whereas the sulphocyanides on the other hand do little harm. Used with precaution chloride of zinc does not damage the fiber.

When metallic salts are used a dissociation takes place on

steaming. In the case of the chlorides hydrochloric acid is freed, and the metallic oxide remains on the fiber, which it is easy to prove by dyeing with alizarine. Siefert has also noticed that the fiber undergoes a modification by the action of the craping substances. Its affinity for coloring matters is increased, just as in the case of cotton mercerized with caustic soda or chloride of zinc. The steaming acts in a great measure simply by the elevation of the temperature and hot air at the same temperature produces an analogous effect. The humidity of the steam, however, keeps the fiber supple, and thus facilitates the craping. Moreover, it prevents too great a concentration of the color on the fiber, and therefore avoids tendering the goods.

It is to be noted that the sulphocyanides will crape woolen even at the ordinary temperature. A pattern left to itself begins to shrink at the end of several days. In fifteen days the effect is plainly noticeable, without, however, being so marked as that obtained by the action of steam.

A very important point is to steam absolutely without tension, for, although the crape effect once produced resists tension very well, it does not do so at the moment of its formation. In fact the least resistance may prevent the craping, or at any rate make it irregular.

OF GREAT VALUE TO THE TRADE.

The World has just received a copy of The Canadian Textile Directory, being the fourth edition of that work. The volume contains a full list of all the manufacturers and dealers in the textile and kindred trades of the Dominion and Newfoundland. The comprehensiveness of the work will be understood when it is mentioned that the directory includes the following subdivisions: The manufacturers of cottons, woolens, knit goods, carpets, silk, jute, flax, felt, rubber and asbestos goods; clothing, men's furnishings (haberdashery), ladies' wear, buttons, feathers, job-dyeing establishments and laundries; furniture, upholstery and upholsterers' supplies; sails, tents, awnings, window shades and wall papers; manufacturers and dealers in hats and furs; paper and pulp mills; dealers in raw wool, furs and cotton; with principal dealers in dyestuffs, etc. It gives lists of manufacturers' agents, commission merchants and wholesale and retail dealers in the dry goods and kindred trades of Canada. Also, statistics, tables of imports and exports, customs tariffs of Canada, Newfoundland and the United States, the Canadian Boards of Trade and Textile Associations, rates of sterling exchange and other information. Biggar, Samuel & Co., 62 Church street, Toronto, and Fraser Building, Montreal, are the publishers.—The World, Toronto.

The Canadian Textile Directory for 1899 has just been issued by Biggar, Samuel & Co., 62 Church street, Toronto, and Fraser building, Montreal, who are also publishers of that well-known monthly textile magazine, The Canadian Journal of Fabrics. This directory is recognized as an authoritative handbook of cotton, woolen and other manufactures in the textile and kindred trades, including lists of manufacturers' agents, wholesale and retail dealers of the Dominion, the paper and pulp mills and the furniture and upholstery trades. It also contains Canadian statistics, the customs tariffs of Canada, Newfoundland and the United States, etc. Price, $3 per copy.—Boston Journal of Commerce.

We have received from Biggar, Samuel & Co., Toronto, a copy of the fourth edition of the Canadian Textile Directory. The information given in this work is very full. It not only supplies lists of the manufacturers of textiles, but also of producers and jobbers of furniture, proprietors of steam laundries, dealers in furs, in clothing and men's furnishings, and also of the retail dealers of the British Possessions in North America. The work will be found of great use to all who are interested in doing business with Canada.—Dry Goods Economist, New York

"The Canadian Textile Directory. Fourth edition, fourteenth year. Toronto and Montreal: Biggar, Samuel and Company. Price, $3." This is a book of reference of great value to the trade. It embraces the manufacturers of cottons, woolens, knit goods, carpets, silk, jute, flax, felt, rubber and asbestos goods; clothing, men's furnishings (haberdashery), ladies' wear, buttons, feathers, job dyeing establishments and laundries; furniture, upholstery, and upholsterers' supplies; sails, tents, awnings, window shades and wall papers, manufacturers and dealers in hats and furs; paper and pulp mills, dealers in raw wool, furs and cotton; with principal dealers in dyestuffs, etc. It gives lists of manufacturers' agents, commission merchants, and wholesale and retail dealers in the dry goods and kindred trades of Canada. Also, statistics, tables of imports and exports, customs tariffs of Canada, Newfoundland and the United States, the Canadian Boards of Trade and Textile Associations, rates of sterling exchange and other information. The volume contains 560 pages, and is well printed and bound. The information given has been gathered with a good deal of difficulty, and is presented in a most convenient and satisfactory manner.—Mail and Empire, Toronto.

Foreign Textile Centres

MANCHESTER.—The trade has once again emerged early this month from a series of holidays. These, however, have affected the commercial more than the industrial department. The alterations that were made a few years ago in the spinning and weaving centres, which had the effect of consolidating the local holidays and allocating them to convenient seasons, have had a beneficial effect. The district playtimes will, however, soon commence, and continue in close succession until the end of September. Only, however, in connection with two or three of the larger districts will they make any appreciable impression on the market.

OLDHAM.—Not much improvement can be reported in the state of the local fustian trade.

LEEDS.—There is a fairly good market for specialties in summer suitings and trouserings, owing to the decided improvement in the weather. Merchants' stocks have been reduced, and recently manufacturers have booked a moderately large number of repeat orders. Prices are very firm. The largest buyers of worsted and fancy coatings of wool Venetians and checks and of striped trouserings are London and Midland houses, and there are encouraging enquiries on home account for winter cloths, says The Textile Mercury, mixture overcoatings being already ordered largely at prices which do not show much change from last year. New spring goods were again very prominent and, instead of the pale blue shades which have been in vogue, subdued tints of green have been adopted for suitings and many kinds of women's goods. Some of the Continental buyers have already given considerable attention to these novelties and have ordered patterns of every variety. Makers of fine Melton cloths are almost at a standstill, mainly in consequence of German competition. Union cloths are selling fairly well, and Indian requirements of these continue large. It is announced that certificates of origin are no longer required for British woolens imported into Italy. The strike of the textile operatives at Brunn (Austria) is rapidly driving the trade of that centre into the hands of Yorkshire manufacturers. Brunn has for many years supplied Continental markets with woolens

BRADFORD.—The great excitement which characterized the recent series of colonial wool sales in London was pretty certain

to be followed by a period of quietness here, and this inactivity was apparently increased by the Whitsuntide holidays occurring immediately on the close of the sales. Spinners have, as a rule, now supplied their immediate necessities as far as fine merino wools are concerned, but very few of them have more than covered their sales of yarn with raw material, and it is said that some spinners have sold considerably more yarn than they have covered for at rates much lower than those ruling to day. The loss of merino sheep by the drought in Australia is an undoubted fact, and some districts seem to have suffered almost beyond the hope of recovery, and it is surmised that flock masters will in future neglect these districts altogether and devote their attention to producing mutton and crossbred wools in more favored parts of the continent of Australia. Prices of both merino wools and fine crossbreds may be quoted quite firm in this market, says The Draper's Record, and probably a seller of low crossbred tops would be able to make ¼d. per lb more to-day than he could have done a fortnight ago. Within the recollection of many now connected with the drapery trade who hail from country districts, the beginning of June was a time of great excitement there, for nearly every country lane was alive with flocks, either going to be washed or returning to be shorn. The farmers were looking forward to reaping nearly as important a harvest as that of the corn, and the farmer's wife and daughters always looked forward to a new rig-out when "the wool was sold." The importance of the clip of English wool is now, however, a matter of very minor importance, and a farmer can only get on the average about 6d a pound for his wool, which leaves very little margin for special personal expenditure. This great change has been mainly brought about by the great increase in the production of crossbred colonial wools, which readily take the place of all classes of English wools, except the purest lustre wools. There does not, therefore, seem much likelihood of the prices of ordinary English wools increasing to any great extent, and it will be risky speculation for British farmers to hold on to the produce of their flocks. The market for raw mohair and alpaca continues to be exceedingly firm, and some purchases of new Turkey mohair are reported from the source of supply at rates actually higher than the recently advanced rates current here. All spinners of mohair yarns, too, continue to be very busy, and report a good enquiry both on home and continental account. In piece goods the unusually wet and cold weather which preceded and continued quite through the holidays has had an adverse effect on the demand for summer dress fabrics. Even the few fine days which there have been during the present week have, however, caused quite a distinct improvement, and it is likely that the season's business will extend further into the summer than usual. Stocks are unusually light here, and there will be quite a dearth of the 50 off lines which are looked up carefully before the summer sales commence. The demand for Blister crepons for the United States shows no signs of abatement, and makers and dyers of these goods are being pushed for deliveries. The tendency in favor of "Tweedy" makes of costumes for the coming autumn trade seems to be more pronounced and some Bradford novelties in this way are meeting with a very good reception.

HALIFAX.—The following is the Chamber of Commerce trade report for May: Wool.—The market for wool has worn a cheerful appearance during the month. Merinos show less excitement now but keep steady in price. Woolens.—Owing to the decided advance in all classes of wool there are better prospects for this branch of trade than for some time past. Most manufacturers are working to order. Worsted Yarn Spinners are being fairly well employed especially on old contracts. Specifications for new business are coming forward rather slowly. Prices for merinos and fine crossbreds are improving but are still much out of line with the price of wool and tops.

ROCHDALE.—Business was resumed after the closing of the mills for the holidays, but owing to travelers being off their journeys, there has been very little fresh business. The more favorable weather is expected to bring repeat orders for cricketing, tennis and other similar flannels; but as the prices for wools for the manufacture of these descriptions of goods are more especially advanced, makers will want a substantial increase on the prices which they took at the commencement of the season.

KIDDERMINSTER.—Spinners are a little busier than for some time past, particularly those employed on the finer qualities and counts. The orders are largely for home consumption, and in some instances they have been able to secure advanced quotations. There is still a good trade being done in bright goods although these spells of cold weather tend to check business in this department. The sales which closed at London and Liverpool a short time ago, were on the whole successful. The quantity offered has not been as large as at some former sales and no doubt this can explain the keen competition which has at times been witnessed, particularly among the American and French buyers, who have paid higher prices than usual for several blends. The country wool fairs are open, and will continue well on in July. It is believed that the clip will be a fair average one, and that though prices which the holders will obtain may not be as large as last year, they will be better than what appeared possible in the early part of the year when the bottom had been reached. There has of late been no doubt an inclination to anticipate wants in the wool trade. Consumers firmly believe that the lowest point has been passed, and with a better general condition of commercial affairs in the country, an improved tone is distinctly perceptible in the wool market, though it is more than probable, as indicated above, we are in for a range of low prices, despite the somewhat hardening tendencies indicated at the London and Liverpool sales.

NOTTINGHAM.—The wretched climatic conditions prior to and at Whitsuntide had a very unfavorable effect on business and it is to be feared that a long time will elapse ere the leeway is made up. Fortunately, since the holidays the weather has become more settled, and perhaps in a little while trade will take a change for the better. Reports from both America and Canada continue very reassuring, says the Draper's Record, and manufacturers here are hoping to get their share of the business that is passing. A fair number of orders also come to hand from some of the other colonies. Fancy millinery laces in cotton and silk are not selling so briskly as could be wished, and no particular novelties have made their appearance. Valenciennes continue in most favor at home and on the Continent. Renaissance and Victoria laces also meet with some attention, as do Torchon laces, insertions and nets. Not much activity is observable in the demand for Maltese, Brabant and Bretonne laces. A moderate enquiry is to be noted for Oriental laces, and for Point de Paris, Malines and Duchesse laces. The bobbin net, light tulle and mosquito net branches are still busy with orders placed in advance. Prices are still high, and there are no indications of any early decline. There is not much doing in heavy foundation nets, and there is not a full demand for silk nets. Corset and antique nets are in steady request. Spotted nets, zephyr tulles, and Mechlin nets are unaltered in value, and stocks are kept low, the actual output being principally for bona fide orders placed in advance. The demand for caps, aprons, ruffles, and other fancy goods was prejudicially affected by the bad weather before the holidays. A few novelties sold freely, but the general demand left much to be desired. Silk veilings continue in moderate request. There is, however, much competition in this branch. No improvement is discernible in the Swiss embroidery, everlasting trimming, and crochet edging branches. Honiton braids, beadings and purls are still

selling in different materials and colors. There is a steady enquiry for lace curtains, window blinds, and furniture lace. Finishers are kept busy dealing not only with the goods produced in this city, but with the large quantities made at outside places which are sent here to be finished and sold. If bright, hot weather sets in and lasts there ought to be a big demand for lace curtains, window blinds, and antis. A good demand is experienced for merino and fine cashmere stockings and half-hose. Buyers have to pay advanced prices, though orders are placed with some hesitation. Natural wool and merino combinations are dearer. Merino and cashmere vests show no falling off in price. Although there is a large output of these goods for the home trade and for shipment, there is not sufficient to keep all the machinery profitably employed. In nearly all the cotton branches there are complaints as to the state of trade.

LEICESTER.—The hosiery trade is brisker as regards sorting-up orders for light fabrics, while specialties have begun to move much more freely. As regards contracts for autumn and winter fabrics the prospects are much brighter, and merchants are covering freely as a measure of precaution against a further advance in prices which seems almost certain to follow. The yarn market is very strong, with an extending turnover, and spinners have been compelled to advance prices for all new contracts. All offers at old rates are declined as unprofitable. The best cashmere yarns are being largely used up, stocks are very small, and the upward tendency of prices is very decided. In lambs-wool yarns there is now a much larger turnover, and prices are decidedly strong, while fancy yarns are a better trade, both for home and export markets.

SOUTH OF SCOTLAND.—Trade in the South of Scotland tweed districts continues in a satisfactory state. Good orders have been booked recently, and the outlook is most encouraging. It is quite evident now that the taste of the public has veered round to the genuine Scotch tweed.

KIRKCALDY.—Floorcloth and linoleum manufacturers are doing a very good business, and an exceptionally good demand exists for inlaid linoleum cloths. Linen manufacturers continue very busy. The home trade has quieted down a little, chiefly on account of stock-taking; but some further American orders have been placed, and the trade over the district is very steady.

BELFAST.—The market continues very firm in every department, with a full average business passing. The weather of late has been very favorable for the flax crop, and young braids look healthy. The spinning end of the trade is characterized by slightly increased enquiry, and orders are forthcoming to a substantial amount. Prices keep very stiff. The manufacturing branch is in a strong position, and producers have no difficulty in accounting for full output, leaving them foresold for a long time ahead. Prices are hardly quotably changed, but have a strong upward tendency. White goods for home consumption are selling steadily, if not briskly. The general shipping trade keeps quite satisfactory.

LYONS.—There was hardly any demand for spot silk recently, and the quantities handled by the conditioning house, which were naturally much smaller than during the preceding weeks, consisted almost exclusively of deliveries against former contracts. The present lull did not, however, come unexpected, nor is it more pronounced than at the corresponding period in former years, as it always repeats itself at the opening of the crop season. The mills are evidently liberally provided with raw materials and avoid making new purchases, the more so as the ordering business for silk goods is rather slack. The prices, however, held firm and have withstood so far all the efforts made by the mills to force a slight reaction. There is an impression that fall orders have been held back owing to the advanced prices and that a slight recession would stimulate the demand. But the position of the holders is uncommonly strong, as they hold but little stocks, and the attitude of the market is therefore likely to remain unchanged for a time. The impending silk crop seems to be progressing favorably. Conflicting reports from the different districts were received during the week, of which the least favorable admitted that the output would equal last year's production, while the majority predict a material increase. The opinion with regard to the effect of an abundant crop on the movement of the prices remains, however, much divided; but it is generally conceded that a hesitating policy is the only one which can be soundly followed under existing circumstances.

MILAN.—A fairly active demand was evident lately, but the volume of deals remained small owing to the difficulty to agree on prices. Bids were generally lower, but the holders seem determined to maintain the former price level, and toward the end of the week the market became very quiet. The sentiment has slightly changed, buyers generally looking for lower prices owing to the favorable prospects of a larger crop; but their views are not being shared by the producers, who insist that the cocoons will fetch higher prices than for a number of years, and that the higher cost of production will prevent any reaction in the prices of silk. Dullness will therefore be the feature of the raw silk market during the few weeks which still separate us from the end of the crop season. The Piedmontese markets were quite lifeless during the week, but were ruled by the same conflicting sentiments, holders remaining extremely firm, while buyers show no disposition to renew their purchases except at lower figures.

ZURICH.—The prices are nominally the same as before, and while holders proclaim that they are not prepared to take any lower bids into consideration, the mills expect that the prospective larger crop will not remain without influence on the prices of raw silk. Deliveries against former contracts continue and are readily being accepted; but a review of the demand is not expected before the latter part of June, the mills generally being well supplied with raw materials.

ARTIFICIAL SILK.*

The production of artificial silk after the system Chardonnet, writes The Confectionaire, has developed itself into an important industry, of sufficient profitableness to provoke a competition which tries to produce silk by a different process. In general very erroneous ideas are entertained regarding the starting point of the original invention, since it is thought to be based upon the observation of purely mechanical procedures. De Chardonnet, it is thought, found that the silk-worm eats the leaves of the mulberry tree, which it converts into silk; components of silk must, therefore, be contained in them in one form or another. Of what, now do these leaves consist? Answer: Of cellulose. Ergo, it follows that silk must be obtainable from celulose. This argumentation, conclusive as it seems to be, if carried further, would result in the erroneous conclusion that silk is nothing else than cotton. In both of them chemical transformation takes place which is almost completely unknown to us. Doubtless the mulberry leaf can by a little worm be converted into silk. Divers phases of this process, as for instance the trituration of the matter by the organs of mastication, have come to our knowledge, and we have also detected the chemical composition of the fibrils and are now able to distinguish them from flax or wool, but the essence of the secretions peculiar to silk worms, the action of the glands, remains still hidden in darkness. After the foregoing arguments, therefore, the problem to solve could only be an exact imitation of the natural process. From the chemical standpoint only trifling

*From Brunner Monatschrift fur Textile Industrie.

difficulties would obstruct the road to exact imitation, since indigo, vanilla, etc., are artificially produced exactly identical with the extracts of the plants, not only in the laboratory, but on the large scale in extensive industrial establishments. From the mechanical standpoint the copy is entirely worthy of the original. The realm of the vegetable fibers is based upon cellulose, which presents itself in its purest form in the lint which surrounds the seeds of the cotton plant. But it forms also the ribs of leaves, it is found in the stalk and in the wood; a wagon pole, a handkerchief, a sheet of paper, a dress, are forms of cellulose.

The most important part of Chardonnet's invention is the decomposition of cellulose to a pasty mass which can be drawn out in extremely fine threads, like the secretions of the silk worms. The kind of the original matter is of no consequence, provided it is freed from all woody substances. Flax, hemp, oats, straw can be worked up into a pulp, as in the manufacture of paper, but, if the price admitted, combed cotton would be the best raw material. The problem is now to decompose cellulose, which is the more difficult as no substance is as yet known that is able to act decomposing upon it. Neither water nor acid, neither alcohol nor ether, nor any other substance can effect the required transformation. The inventor reached the aim by a circuituous route, converting the cellulose into nitro-cellulose, which process takes place as follows, viz.: In large earthenware vessels, of about 40 l capacity, are 4 k. dry lint stirred into a mixture of 35 l sulphuric acid and nitric acid, and left to stand for about five hours, observing extreme caution as regards heat and water. On emerging from the vessels the fiber must not be destroyed nor altered, but present only that degree of disaggregation which allows to later on draw it out. According to the degree of alteration which the acids effect upon the contents of the vessels, colorations are produced which under polarized light vary between gray and green, light yellow and orange, violet and blue. For the production of silk blue must be reached, while yellow and other colors are sufficient when the object is to produce gun cotton with explosive properties, or collodion for photographic purposes. Blue being reached, the action of the acids is interrupted. An alteration of the fiber, which appears only a little rougher, is outwardly scarcely perceptible. Nevertheless, great caution is necessary that the mass in this condition be not placed too near to a fire. The nitro-cellulose thus obtained is soluble in a mixture of alcohol and ether; the product of dissolution is known as collodion. That product however, which is used in the manufacture of silk is a specialty which is obtained by dissolving 22 k. nitro-cellulose cakes in 100 l alcohol and ether. The decomposition is effected in a vessel working like a hydro extractor, in which the cotton was converted into a thin pulp. Before spinning this pulp into threads another purification is required, as the slightest hardness can become fatal to the extremely delicate spinning glasses and to the threads themselves.

The process which follows of spinning the artificial silk, is carried out by means of very small glass tubes of 8-10 mm. diameter for whose supply a special accessory industry had to be created. Specially trained workwomen are employed to microscopically ascertain the circumference of the very thinnest tubes the industry is able to produce, these are connected with stronger and more elastic tubes and soldered together by pairs which are then set in metallic frames and fastened upon hollow studs radiating from a large steel cylinder. Over 12,000 of these so-called silk glasses (verres a soie) perform this work in one factory. An uncommonly strong pressure is required to force a mass so viscid as that obtained by the described process, continuously and in endless lengths, through the diminutive openings. The cylinder which is tested for 100 atmospheres, operates continually under a pressure of 45 atmospheres and discharges from the tubes a round, white, nearly invisible elastic silk thread. In testing its tensile strength a weight of 20 to 25 kilograms is sufficient to break a thread of one millimeter diameter. The natural thread is certainly finer and stronger, as the cocoon thread measures 0.007-0.030 mm. in diameter and can carry 4-15 g according to quality, a cocoon thread of one kilogram in length weighs between 170 and 440 mg. The artificially obtained threads, emerging from the tubes, are wound upon spindles, and, according to the commercial demand, twisted together (thrown) at the rate of 10 to 36 into one. Arrived at this point, the inventor seemed to have an open field, when a new objection was raised, and that well founded, by the great inflammability of all articles made of artificial silk. New experiments were instituted.

As foregoing pointed out, nitration is resorted to for the purpose of decomposing the cellulose. Once converted into fibrous material, it should be possible to free it from the nitric acid, and thereby again to obtain cellulose pure. The first denitrizing experiments, however, not only freed the thread from the superfluous components, but deprived it of the indispensable gloss. Finally Chardonnet succeeded in employing certain sulphurous compounds with the desired effect; and that is his well-guarded manufacturing secret. The thread is now difficultly inflammable; but as the sulphur gives it a yellow color, it had to undergo a bleach with potassium chlorate and nitric acid. We have now before us a utilizable but colorless artificial silk. In the first stages of manufacture the pulp was dyed. This method, however, proved unpractical, as corresponding quantities of pulp were required for each of the different colors. To-day it has become feasible to let the thread absorb aniline dyes, whose colors are as rich and brilliant as those of the natural silk. The artificial silk was already exhibited at the Paris Exposition of 1889, and ten years were required to make the invention industrially valuable; the factory at Rancon produces now 150 k. per day. Oriental silks used to fetch up to 45 francs per kilogramme; various circumstances, however, have caused a considerable reduction of prices, so that Japan now sells its silks at 23 francs per kilo; and in order to protect the silk industry of the country against the depressing influence of prevailing conditions, the Japanese Government has decided upon an export premium amounting to 9,000,000 francs annually, at 12 francs per kilogramme. The artificial silk, on the other hand, had to bear a duty of 4.50 francs on the alcohol which is used in its manufacture, and 600 francs went daily up the chimney. Fortunately the new industry has been released from this depressive condition and has considerably gained in extent. Since four years 70,000 k. artificial silk have been sold for the manufacture of trimmings, upholstery goods and other tissues.

There exists a smaller factory at Spreitenbach, and another at Nobton, England. But even in this branch competition is not slow. A new article has made its appearance—the gelatine or Vanduara silk, which has recently been submitted to the dyeing department of the Yorkshire College, Leeds.

Despite these successes, criticism will not be silenced. The gelatine silk, it asserts, softens in cold water and dissolves in hot water. In a silk dress of the Chardonnet system the lady wearing it takes the risk of being consumed by flames, and in a Vanduara dress she must not expose herself to rain. But the never-resting science of chemistry a few months ago discovered that formaldehyde is a means to insure the insolubility of gelatine silk not only in water but in most of the acids. Gelatine is very easy to dye; passes through the glass tubes as smoothly as collodion; the machines send out the gelatine threads by kilometers. One workwoman can daily reel off several hundred cocoons, each yielding 300 to 1,200 meters of raw silk, while one man can get through with a length of artificial

threads which equals that contained in nearly 24,000 cocoons. The prices come for natural silk to 50 odd francs, for collodion silk to 23.50 francs; and for gelatine silk to 12 francs.

But what about the solidity of the three kinds of silk? The champions of artificial silk assert that so little natural silk is worked into the tissues that are passed for all silk that it is hardly worth the trouble to test that small quantity as to strength. The dyers, who receive one kilogramme silk to dye, are by the commercial usages that have been sanctioned in the course of time, compelled to return the same or even a greater weight of silk. This, however, can, in view of the loss which the raw silk suffers in the dye kettle, only be achieved by charging the tissues, that is, making them absorb considerable quantities of foreign, heavy substance, whose principal component is oxide of tin.

CLEANSING WOOL.*

The beginning of the successful manufacture of wool into yarn and fabrics is the proper cleansing of the fiber from all impurities, or extraneous matter, without injury to the scales or cellular structure of the fiber itself. The physical properties of the fiber should be preserved during all of the processes through which it passes, from the initial cleansing to the finished product, if perfect results are to be obtained. Although this is self-evident, it is none the less true that little attention has been given to the preservation of the essential characteristics of wool by the manufacturer, but that its earliest and most vital treatment is given into the hands of ignorant persons, who are still further obliged to use methods known to be deleterious in their effect upon the fiber. Most of the wool that is used for our woolen goods is received into our mills with from 30 to 70 per cent. of extraneous matter, which, however essential it may have been for the healthy growth of the fiber on the animal, must be removed before the wool can be utilized in any of the processes of manufacture. This foreign matter consists of dirt and the natural perspiration, known as yolk, or wool grease, from the body of the animal.

Heretofore, manufacturers have contented themselves with simply securing the fiber cleansed from all impurities, without any thought being given to the valuable properties that are contained in the yolk. Though this latter has long been recognized as being of great importance for commercial and pharmaceutical purposes, its several parts have not been utilized to any great extent, because the methods for its collection and separation involved too great an expense, though efforts have been made to bring this on to a profitable basis for the last forty years, at least, during which time mechanical devices have been invented for cleansing wool with volatile liquids of the hydro carbon class. There are important desiderata to be considered in freeing wool from its impurities. The scouring process should be as mild as it is possible to make it for the efficient removal of the grease. In order to do this, there are only two known methods—the emulsion and the solvent. The former has usually been employed in connection with an alkali, as soda ash, the fatty matter in the wool forming an emulsion with an alkaline solution. This process has been in long use, and is familiar to every manufacturer, the only advantage of which is its cheapness and safety from fire. Its disadvantages are numerous, and have been frequently called to the attention of those using it, as liable to be of great injury to the fiber, in seriously impairing its physical structure. So subtle, however, has been the destructive nature of the alkali upon the fiber that it has remained unobserved, except when subjected to examination under a microscope. Double has been the detrimental effect of the alkali if used at a high temperature, which is very apt to be the case when the operation of scouring is placed in the hands of ignorant help, as is usually done. Caustic alkalies, such as are used for scouring wool, cannot be used effectively, except in a solution at a high temperature, which can readily become so intense as to completely dissolve the wool. Not infrequently this is carried to such a degree that partial dissolution does take place. The temperature of the alkaline soap bath used in scouring wool should never exceed 110° of heat, if all of the valuable properties of the fiber, especially the lustre, are to be preserved. Now, it is known to be a fact that the temperature is more often used in excess of this. The essential qualities of the wool fiber, to the manufacturer, are its softness, strength, lustre, and elasticity. All of these are detrimentally, if not perceptibly, affected to a more or less extent by the use of caustic potash or soda, or any alkaline solution. On the other hand, they are not affected, but preserved, by the hydro-carbon, or volatile liquid, process, which also leaves the fiber unimpaired as to its felting properties, simply because its physical structure is not changed.

The difficulty heretofore experienced in the practical working of any plan for the utilization of hydro-carbons for cleaning wool has been because of its mechanical inefficiency and method. It is a well-known fact, however, that wool cleansed by hydro-carbons works with considerable less waste, and can be spun into finer counts than when cleansed with soap and water. Quite a number of inventions have appeared in recent years for overcoming the difficulties attending the use of volatile liquids for cleansing wool, but none of them have proved successful, to our knowledge, unless it be the one to which we shall especially refer, as the invention of John F. Morse. Even in the late publication of Knecht, Rawson and Lowenthal, reference is made to the numerous attempts towards the cleansing of wool by a volatile solvent, which, although theoretically giving good results, not only with regard to the washing but also to the complete recovery of the by-products, have been tried and found to answer well only on a small scale. "On a large scale, practical difficulties have always shown themselves, in consequence of which not one of the methods has hitherto been able to hold its own against the old process of washing with soap." From our personal investigation of the Morse process, we have no hesitation in saying that the main difficulties in the use of volatile solvents have been overcome to a sufficient extent to make it commercially successful for the cleansing of wool, and for the separation of the by-products for economical utilization for pharmaceutical and other purposes.

The great drawback in the use of the solvent process, heretofore, has been the danger from fire or explosion. This danger removed, makes the process the cheapest and the best that can possibly be devised, so far as chemistry has enabled us to see. In the Morse process, if properly carried out, this danger has been, we are satisfied, wholly eliminated. By the use of the hydro carbon, or solvent, process, we desire to impress upon our readers that no deleterious effect on the fiber need be feared. The fiber cannot, by any conceivable means, become impaired through any carelessness on the part of ignorant workmen, and the manufacturer, therefore, has his wool given to him in a condition as perfect as the nature of the fiber will permit. With these conditions, it is readily seen that a fabric can be produced that is susceptible to a finish with all the natural characteristics of the wool preserved. The manufacturer will obtain, by using wool that is thus cleaned, less waste, greater fineness and strength of yarn, no loss in the natural lustre of the fiber, greater purity of colors, greater suppleness, or, in other words a more perfect production. All of the advantages above referred to in the use of hydro-carbons for cleaning wool we believe are represented in the process for treating wool which we have been privileged to carefully examine in its practical operations, as carried out by the Morse Wool Treating Company, of Norton, Mass. By this process wool can be treated in the open

*Textile World.

state or in the original package, as may be most desired. By the Morse process the wool is conducted into what is termed a treating cylinder, into which is introduced a refined hydro-carbon solvent, filling the cylinder, after a vacuum has been created, thoroughly penetrating the mass of wool and extracting all of its wool grease. The removal of the air from the cylinder eliminates all possible danger of fire or explosion. The vacuum also enables the solvent to perform its functions more effectively. While in the cylinder, the solvent is subjected to a cold expansion process of great efficiency, for the purpose of permeating every part of the wool mass, no matter how compact it may be, whether baled in the original package or otherwise. After the solvent has performed its functions, it is drawn from the cylinder, carrying with it the wool grease to separating stills, where it is vaporized and afterwards condensed, and delivered back to its original starting point. All foreign matter, including wool grease, obtained from the wool, is collected and separated, and the grease barrelled for shipment, to be afterwards manipulated for pharmaceutical and other purposes. After the wool has been treated with the solvent it is removed from the cylinder and passed through a deodorizing process, where it is subjected to a treatment of steam combined with air blown through it sufficiently to break the steam. This leaves the wool in a remarkably sweet condition, and in this shape can be shipped to the manufacturer that sent it, to be afterwards washed, or the Morse Wool Treating Company will perform all of this operation, if desired. If the wool, however, has been treated in the original package, and is expected to be returned in that form, the deodorizing process will have to be done at the mill where the wool is used This process can be effected with inexpensive machinery, that hardly need be taken into consideration, so far as its cost is concerned, by the manufacturer.

BLEACHING OF TEXTILES

For the past few years, says The Textile Record, there have appeared in various scientific and trade papers numerous articles which relate directly to bleaching, and include many that are of direct interest and value to the practical bleacher. During this same period there have appeared a number of papers that have been written by many thoughtful observers upon the subject of the comparative bleaching efficiency of chlorine as the type of old bleaching processes, and of peroxide of hydrogen or of peroxide of sodium, as types of the newer methods, and which have, perhaps, caused many bleachers and others using these various substances to regard them as being widely different in their nature and properties.

We hear on some sides references to oxygen bleaching, in comparison to chlorine or sulphur bleaching, and it is probable that a large number of readers have formed opinions as to which is the real bleaching substance, without having a very clear conception as to the element, or group of elements, that causes the effects that the bleacher is in search of. We may be pardoned if we depart slightly from the regulation article on bleaching, and endeavor to clarify the atmosphere, so to speak, and make clear to the casual reader, or skilled workman, the operations that actually take place in the bleaching baths, without being guilty of regarding any one bleaching agent with partiality

If we examine closely the substances which are ordinarily offered to the bleacher, we find that they are tinted by certain coloring matters which are natural to the substances themselves, and which it is our object to remove, thereby leaving the fibers white, or as nearly free from color as possible. To do this satisfactorily, use must be made of certain substances known as bleaching agents and which include a variety of chemicals, the most important can be enumerated on the fingers of one's own hand, and include bleaching powder, sulphur in its various forms adapted to bleaching, and the peroxides of barium, sodium and hydrogen. Each of these substances is well adapted to a certain group of bleachable bodies, but it can hardly be stated that any one of them can be looked upon as the "universal bleach," for the reason that there are practical difficulties which must be overcome, the cost of which would, undoubtedly, preclude the possibility of its adoption, for cost in bleaching is more and more looked after with a very sharp eye by the man who pays the bills. If we take a look into the old-time methods of bleaching, which are practised even to this day by the housewife who has a grassy plot upon which to spread her washed and rinsed linens, etc., so that they may benefit by the combined bleaching influence of the sun's rays and moisture, we see that an obscure chemical reaction is suffered to take place, and as a result of which the whitening of the goods takes place. This bleaching effect is due entirely to the oxygen which is set free in a nascent state, and which at once attacks the coloring matter which it is desired to remove, and it is the same oxygen that is the basis of bleaching by whatever process used.

Bleaching with "chloride of lime" bleaching powder may be regarded as the type of chlorine process, but if we examine into its details we may see that what was formerly regarded as the substance that did the actual bleaching was none other than oxygen, and not chlorine. It may be a surprise to many persons who use perhaps tons of bleach in a year, to learn that the substance itself has absolutely no bleaching action whatever, and the same remark may apply with the other substances that have been mentioned in connection with the subject. To understand this with some degree of thoroughness, let us examine somewhat closely into the composition of "bleaching powder," and follow its preparation from the chemical works to the bleach house. In the first place, good "fat" lime is taken and moistened with a quantity of water, only sufficient to change the lime, CaO to the condition of $Ca(OH)_2$, that is, to slake it with the smallest quantity of water necessary to complete the reaction, and for this purpose about 37¼ per cent. of water, calculated to the weight of the dry lime, is necessary, so that the finished slaked lime will contain about 22¼ per cent. of water in its composition. This lime is now spread out on trays or shelves, and placed in large chambers made of lead, through which chlorine gas is allowed to pass, during which operation the lime absorbs a certain quantity of the gas, and is changed thereby into the well known commercial product, which has, according to some chemists, a composition represented by the following formula:

$$Ca(OCl)_2, CaCl_2, 2H_2O,$$

which means that our resulting compound contains calcium hypochlorite, $Ca(OCl)_2$, calcium chloride, $CaCl_2$, and two parts of water, $2H_2O$, of which only the calcium hypochlorite is of value to the bleacher, and will only be considered by us. If this substance is now dissolved in water to make a clear or nearly clear solution, it is decomposed as follows:

$$Ca(OCl)_2 + 2H_2O = Ca(OH)_2 + 2HClO,$$

which shows that calcium hydrate and two parts of hypochlorous acid are set free—$2HClO$, and it is this latter substance that yields the oxygen from its own group in the presence of organic matter to do the bleaching, while a residue of hydrochloric acid remains behind in the bleach bath thus: $2HClO = 2HCl + O_2$, and this is the entire chain of reactions that occur from the formation of the initial substance to the finish of the bleach, showing that chlorine, as a chemical element, has no direct bleaching action, but merely serves when in combination with other chemical elements, as a carrier of oxygen. The same remarks apply with equal force to peroxide of hydrogen, a substance which occupied a prominent place, and does yet, as a

bleaching agent of recognized usefulness. In this instance, however, we are free from any considerations involving the use of chlorine, for this substance does not enter the process at any stage. Peroxide of hydrogen is made by a process which is rather complicated to one who is not a chemist, and its description need not be given here, although it may be found in any of the standard works on chemical technology. The finished commercial product is always a very dilute solution of the peroxide of hydrogen, H_2O_2, and of varying degrees of purity, although none of these are likely to impair the results of the bleaching operation unless it is iron, and this is not very likely to be present, owing to the nature of the manufacturing operations Peroxide of hydrogen always comes on the market containing a small amount of mineral acid, usually sulphuric; this is added so as to preserve the solution against deterioration, and which must be neutralized by some alkali, perhaps ammonia, soda or silicate of soda, before the full efficiency of the bleach will be apparent.

When textiles, say wool, are immersed in a neutralized and slightly alkaline bath of hydrogen peroxide, a decomposition is at once noticed, and myriads of minute bubbles of gas are seen to be attached to the fibers. These bubbles are oxygen, and it is due to their being set free in the bath, and in contact with the fibers, that the bleaching effect is obtained. A point to be borne in mind when considering oxygen as a bleaching agent in the cases we have given is, that oxygen, without any substance to oxidize is incapable of bleaching, for bleaching, theoretically and practically, is but an oxidation of the coloring matters of the fibers acted upon. It not only "oxidizes" the coloring matter, but renders it soluble in water, so that the remaining traces can be washed out with water, and it is this very important point that enables bleachers to assert that the goods which leave their hands have a permanent bleach in contradistinction with the excellent bleach obtained with sulphur, which is not permanent. A word regarding the meaning of oxidation in its use in bleaching and similar reactions. It implies the addition of oxygen to the compound to be acted on, thereby making an oxidized product, but it also implies the splitting off of the element hydrogen and its substitution with oxygen. In this latter instance two parts of hydrogen are displaced by one of oxygen. Referring again to the subject of peroxide of hydrogen, the composition of which is represented by the formula H_2O_2, the decomposition of which will show that water H_2O and oxygen O are set free, and it is this one atom of oxygen that is responsible for the bleaching.

As is now well known by almost every bleacher who has ever used it, peroxide of sodium has no bleaching properties when strictly considered in accordance with chemical facts, but it must first be decomposed by some acid into a sodium salt of the acid used and peroxide of hydrogen, and it is this latter substance that yields up its oxygen as described above. The advantage that peroxide of sodium has over the liquid peroxide is that, being a solid, it enables the bleacher to prepare at a moment's notice a bleach bath of almost any strength desired, and, besides, a can of it represents the bleaching efficiency of many gallons of the other chemical. Comparing the possible injury to fibers that may be bleached by bleaching powder—say, for instance, cotton, which is almost universally bleached with it—we occasionally hear of the fibers being tendered. This has been frequently ascribed to the chlorine in the bath, but it is, in fact, due entirely to excessive oxidation, and the only safe remedy to apply is to remove the goods from the bleach bath as soon as they are white, for prolonged immersion in the oxidizing liquors will only act injuriously.

ANALYSIS OF UNIONS.

For the estimation of cotton and wool in unions Kapff indicates the following method, which is published in The Textile Recorder: To remove and determine fatty matter, 5 grams of the sample are first extracted with ether. The residue placed into a mixture of three parts of hydrochloric acid and 100 parts of water previously heated to the boil, treated for fifteen minutes, washed, dried for two hours at 190° C, and exposed to the air for twelve hours before weighing. The loss in weight indicates weighting material, coloring matter, and the like. The residual fibers are now separated by treatment with 250 cc. of boiling 2½ per cent. caustic soda. The undissolved cotton is collected on a filter, washed first with pure water, then with dilute acid, again with water, dried for two to three hours at 100° C, exposed for twelve hours, and weighed. To the net weight thus obtained 4.5 per cent. must be added before calculation to compensate for the loss experienced by the cotton fiber in the alkali.

THE ANALYLIS OF ANILINE OIL AND SALT.

Though these products are now supplied, as a rule, in a state of considerable purity, doubtful cases still occur where closer examination appears desirable. With aniline oil, the first factor to be looked into, says the Journal of the Society of Dyers and Colorists, will be the boiling point. Distillation of the sample will for that purpose have to be resorted to, when simultaneously moisture and other impurities are revealed. A good oil should boil within very narrow limits and 80 per cent. of the sample, at least, should pass over within ½° Cent., the thermometer, with the bulb completely immersed in vapor, indicating about 183° Celsius. During distillation, the sulphur compounds, nearly always present in small quantities, decompose, with liberation of sulphuretted hydrogen. A piece of lead paper immersed in the vapors should only turn light brown; if it turns black, abnormal quantities of sulphur are present, and a direct estimation thereof becomes advisable. To this end the oil is boiled at a reflux condenser for some hours, whilst a current of carbonic acid is passed through it and carries the liberated gases into a measured quantity of standard silver nitrate. Finally, the precipitated sulphide of silver is removed by filtration and the solution titrated; the amount of silver precipitated is thus found indirectly, and a simple calculation reveals the weight of sulphur liberated from the oil. As already stated, the determination of the moisture is made simultaneously with that of the boiling point. If 100 cc. of oil are dealt with, the first 10 cc. of the distillate are collected in a narrow graduated cylinder. Add 1 cc. of saturated brine, shake well, allow to settle, and read off. To the figure thus obtained, however, 0.3 per cent. has to be added to secure a correct result. The moisture should not exceed 1 per cent. and will, as a rule, be found well within this limit. The density of the sample is always taken after expelling the moisture; at 15° C. it should lie between 1.0265 and 1.027. A very important factor in the oil is solubility; it should dissolve completely in very dilute hydrochloric acid without any trace of precipitation or cloudiness. The direct estimation of the toluidine, ortho- or para-, is best carried out with standard bromate of potassium according to the method introduced by Reinhard for the analysis of crude aniline oil, and which for the present purpose has to be somewhat modified. The method is based on the well known fact that under equal conditions aniline absorbs three, toluidine but two molecules of bromine.

The same impurities found in aniline oil are also to be looked for in aniline salt, but in this case the appearance of the article permits at once fairly reliable conclusions as to its quality.

Large flat crystals indicate a pure oil, whilst powder or small staircase-shaped crystals justify suspicions that toluidine in serious proportions is present. Separation of the oil with alkali and distillation, however, soon settle that point. Moisture in the salt is readily determined by placing a weighed quantity for some time in a desiccator. A much more important point is acidity, as the presence of free mineral acid may in printing cause considerable annoyance. The following method, somewhat delicate of execution, gives otherwise excellent results: Dissolve 5 grs. of the salt in 10 cc of distilled water; to this solution add 5 drops of a solution of crystal violet, and compare the change ensuing with that taking place when the same amount of coloring matter is added to a solution of 5 grs. of absolutely pure aniline hydrochloride. If there be any difference in color, that is, if the solution in question be bluer, or even green, run in 1-10 of a normal aqueous solution of aniline oil until the difference in color disappears. The amount of free mineral acid in the sample is thus directly expressed.

ANTHRACENE CHROME BLACK (PAT.)

Besides the Anthracene Acid Blacks which have met with great success in fast wool dyeing, W. J. Matheson & Co., Ltd., have taken up the manufacture of two new black dyestuffs which in their properties are claimed to even surpass Anthracene Acid Black. They have named them Anthracene Chrome Black F and Anthracene Chrome Black 5B, of which Anthracene Chrome Black F, pat., is the most important one for wool dyeing, yielding a solid black on yarn, loose wool, slubbing, on piece goods and hats. Anthracene Chrome Black 5B is of principal interest for the hat industry and especially for dyeing stiff fur felt hats; it also renders good service for shading Anthracene Chrome Black F. In wool dyeing only the one dip method is applied for dyeing black whilst in combinations with Alizarine or wood-colors for mode shades, brown, etc., Anthracene Chrome Black may like Anthracene Acid Black be dyed on a chrome mordant. Charge the dyebath, depending on the hardness of the water used, with 5 to 10 oz. oxalate of ammonia per 100 gallons liquor, stir well thus precipitating all the lime contained in the water, add 5% acetic acid and the requisite quantity of dyestuff and enter the goods when the bath is nearly boiling. Boil for ½ to ¾ hour, then add in two portions, 4 to 7% bisulphate of soda or 1½ to 2½% sulphuric acid, depending on the depth of the black required, and after exhaustion of the bath treat the goods simmering with 1 to 1½% bichrome in order to completely develop the black. The chroming may also be done in another bath which is especially recommendable if the dyebath is to be preserved for further use. In this case charge: (a) the old dyebath with the dyestuff and about 1 oz. of oxalate of ammonia per 100 gallons and exhaust it with bisulphate of soda or sulphuric acid as indicated for the first lot; (b) the chrome bath with 1 to 1½% bichrome, 2% muriatic acid, and replenish the same for subsequent lots with ¾ of these quantities. If only a few lots are to be dyed consecutively it is best to first boil the wool for 20 minutes without any further addition in order to exhaust the bichrome, then to add the dyestuff and some cold water and to chrome after having exhausted the bath with bisulphate of soda.

The stated quantities of bisulphate of soda and sulphuric acid are those used for a normal volume of water and have to be increased if the quantity of water is unusually large. An excess of these ingredients as well as too strong boiling during the chroming are to be avoided, as otherwise the shade would suffer. Under normal conditions about ½ to 1% more bisulphate of soda than dyestuff is required, thus for 5% Anthracene Chrome Black, 5½ to 6% bisulphate of soda. Even a greater addition of acid does not effect a complete exhaustion of the bath, it always retains a slightly reddish coloring which turns into a gray during the chroming.

Anthracene Acid Brown G and R are principally used for shading and saddening and Anthracene Yellow BN and C for giving a greenish hue to the black. For piece goods also levelling dyestuffs such as Cyanole, Fast Acid Green, etc., may be used. The properties of the dyestuffs:—No artificial black dyestuff equals Anthracene Chrome Black F in beauty of shade. It very nearly approaches logwood black and contrary to most other chrome blacks it possesses the excellent property not to change in artificial light. The 5B brand is considerably bluer in tone and consequently not covering quite as well. The Anthracene Chrome Blacks may be counted amongst the dyestuffs fastest to light and are in this respect but little inferior to Naphthyl Blue Black N, which is claimed to be the fastest to light of the known black dyestuffs. The resistance to washing, milling and alkalies of Anthracene Chrome Blacks satisfies even the highest demands. Even in very strong milling they do not bleed on to white cotton, or only very imperceptibly. Fastness to acids is very good; a great advantage of these products is that the black does not change its shade even in prolonged boiling in an acid bath. Fastness to carbonization:—The products stand carbonizing, the shade of the black scarcely changing. Their fastness to water is a very good one; even during prolonged boiling white wool is not tinged or only very slightly. In fastness to sponging respect the dyestuffs are remarkably good. They resist very severe steaming without the shade being influenced, and should also fully answer in cases where goods are subjected to potting. Their fastness to stoving is very good, which property still enhances their value, as all other blacks which are fast to milling change their shade towards red or brown in stoving. Levelling and penetrating:—The Anthracene Chrome Blacks dye very level and easily penetrate the fiber. Even on so-called skin wools, on which it is difficult to obtain level dyeings, they dye quite level, cover perfectly and do not show reddish points. The dyeings are very good in fastness to rubbing. The products are completely fast to both ironing and perspiration. Dyeing may be conducted as well in copper vessels as in wooden vats.

ARSENIC IN WOOL.

The question has been raised more than once in these columns as to the maximum quantity of arsenic which might be permitted in a given area of woolen material without injury to health. The occurrence of arsenic in undyed wool in very minute quantities is referable, not to any process of manufacture, but to the fact that sheep require to be dipped in arsenical wash in order to destroy "tick." Other washes free from arsenic are also employed but their effect does not appear to be so satisfactory, for in addition to effectually destroying parasites an arsenical dip improves the fleece. Unfortunately it is impossible by several scourings and by other processes with which the elaboration of wool is concerned to remove absolutely the arsenic. It appears to adhere most tenaciously to the fabric, and since it resists all attempts at extraction by ordinary means the probability is that the minute trace of arsenic thus left in the wool does not lead to injury to health. The fact that the arsenic is held so closely would seem to indicate that a compound is formed which is quite insoluble, in which, therefore, the arsenic has been probably rendered non-injurious. It is, indeed, not improbable that the trace which occurs is combined with the sulphur of the wool, and sulphide of arsenic is innocuous. Wool is said to consist chiefly of an albuminoid sulphur-containing substance termed keratin, and it is not unreasonable to suppose that the residual trace of arsenic contained in wool after the most drastic washing is the insoluble compound of arsenic with sulphur. If such be the case there

can be little objection to this excessively minute trace, which can only be discovered by an exceedingly delicate chemical analysis. In Sweden there is a law against the sale of woolen fabrics containing arsenic in any quantity beyond a minute trace. The question remains, What is a minute trace? The limit fixed is 0.0009 per cent. On one occasion a carpet was condemned because it contained one-thousandth part of a grain of arsenic in 16 square inches. It is difficult to conclude that such a minute trace of arsenic could cause any harm, especially as it most likely exists, as we have just pointed out, in an insoluble and not easily volatilized form. It can hardly be concluded that a minute trace of arsenic which resists all attempts at extraction by powerful scouring processes can give rise to injury to health. The question is an important one and one which has given rise to considerable trouble in the English woolen trade. As far as we know no definite evidence has been forthcoming of injury having been caused by the occurrence of this residual trace of arsenic in wool. Obviously some limit should be placed upon the amount, and it seems to us that this could easily be arrived at by estimating the average amount of arsenic which remains in wool after repeated washing in strong extractive agents.—The Lancet, London, Eng.

TEXTILE PUBLICATIONS.

In order to accommodate readers of The Canadian Journal of Fabrics, the publishers will be pleased to mail any book in the following list on receipt of the publisher's price, duty free. Books on technical and practical subjects, not in this list, can be obtained and mailed at publisher's prices. In ordering, please give full address, written plainly:

Worrall's Directory of Cotton Spinners, Manufacturers, Dyers, Calico-printers and Bleachers of Lancashire, giving the mills of the British cotton district, with number of looms and spindles, products of the mills, cable addresses, etc.....$2 00

Worrall's Directory of the Textile Trades of Yorkshire, comprising the woolen, worsted, cotton, silk, linen, hemp, carpet, and all other textile mills, giving looms and spindles, and the various lines of goods manufactured, etc 2 00

Worrall's Textile Directory of the Manufacturing Districts of Ireland, Scotland, Wales, and the counties of Chester, Derby, Gloucester, Leicester, Nottingham, Worcester, and other centres not included in preceding works, with capacity, products of mills, cable addresses 2 00

The Wool Carder's Vade-Mecum, by Bramwell; third edition, revised and enlarged; illustrated; 12mo..... 2 50

Technology of Textile Design, by Posselt..... 5 00

The Dyeing of Textile Fabrics, by Hummel..... 2 00

Textile Calculations; very complete; by E. A. Posselt... 2 00

LITERARY NOTES.

The June Century is an out-of-doors number, abounding with full-page illustrations, including a frontispiece by Albert Sterner, representing Izaak Walton seated reading under a tree —and of course fishing as he reads. This is apropos of the opening article—a discursive essay on "Fisherman's Luck," by that redoubtable angler, the Rev. Henry van Dyke, printed with decorative page borders. Dr. van Dyke's essay is followed by a descriptive study of Niagara Falls by Mrs. Schuyler van Rensselaer, based on an unusual familiarity with this great natural wonder, and showing a keen appreciation of its "little lovelinesses," as well as of its grander aspects. Mrs. Van Rensselaer's text is supplemented by a number of full page and smaller pictures by Castaigne. Other outdoor papers in this number are Capt. J. C. Ayres' "After Big Game with Packs," an illustrated account of a hunting expedition in which pack-mules played an important part; "Out of Doors in Texas," by E. S. Nadal, author of the delightful "Notes of a Professional Exile," and "Out of Doors in Colorado," by H. P. Ufford. In the same out-of-doors category is "The Tramp and the Railroads," in which Josiah Flynt, the well-known expert in tramp life, presents in popular form the results of an investigation of the means adopted by a great railroad to abate the tramp nuisance on its lines—a work of importance to the public no less than to the railroads themselves.

The fifteenth edition of Worrall's Directory of the Cotton Spinners and Cotton Manufacturers of Lancashire, England, has been issued and fully bears out the reputation of that publisher for accuracy and fulness. The work gives full information of the products of the mills, with their capacity in looms and spindles, and includes the calico printers, bleachers and dyers. It is interesting to note that there are in Lancashire 1,700 cotton mills having a total of 638,972 looms and 42,190,910 spindles, or in other words, about as many looms as the mills of Canada have spindles. This valuable directory can be sent to subscribers through the publishers of The Canadian Journal of Fabrics at $2, which price includes duty and postage to any point in Canada. A directory of the same series covering the woolen and worsted trades of Yorkshire, and one of the general textile trades of other parts of England, Ireland, Scotland and Wales can be had on the same terms.

Dockham's American Report and Directory of the Textile Manufacture and Dry Goods Trade, embracing the cotton, woolen, silk, jute and linen manufacturers of the United States, Canada and Mexico, 1899; seventeenth edition, 33rd year; price, $6; six hundred pages, cloth. This very valuable work contains very accurate lists of the United States textile manufacturers, bleaching cotton dealers, dyers and finishers, the tariff, etc. This is one of the most valuable of the textile reference works which comes to our desk.

THE TEXTILE REVIEW OF REVIEWS AND INDEX.

We have received the prospectus of a new monthly journal to be published in London, the first number to appear next month, under the title of The Textile Review of Reviews and Index, the scope of its work being confined to publications, patents and advertisements connected with the cotton, flax, silk, wool and allied industries, and to furnish to its subscribers systematic classified indexes which will make available to them the latest information in that publication connected with the textile industries of the world. Nothing of this kind has ever been attempted. As the publishers state in their prospectus: "The publication now projected will enable masters, managers and foremen, each in his own particular department, to follow with ease, month by month, the progress of invention, discovery and specialized application. It will enable them to balance in their own minds the merits and demerits of competing inventions and ideas as easily as they balance their ledgers and stock books."

The Textile Review of Reviews and Index will consist of two parts—a systematic review of, and a classified index to, current information relating to all the great textile industries of the world. The Review will contain each month a concise report on general trade topics and technical matters. From time to time short articles dealing with particular machinery and processes of special importance will appear. The Index will supply each subscriber with a compact and complete guide to current information directly affecting his work, arranged under

departments and processes. The editor of this publication, George Prowse, has had over twenty years' experience in the management of manufacturing and dyeing businesses, and brings to his work a practical knowledge of what is most desired in a work of this kind. The publication is to be 24 pages demy quarto and the subscription price $2 a year. The address of Mr Prowse is 30 Great Russell street, London, W.C.

LONDON SHEEPSKINS SALES.

A sale of sheepskins was held in London, June 9th, and the offerings, which amounted to 4,900 bales, were all sold. There was a good attendance, and as the selections were of good quality, competition was active. Merinos and fine crossbreds were ⅛d. to 1d. higher, especially light condition merinos combings. Heavy condition clothing was a halfpenny dearer. Crossbreds were in good supply, and the home trade secured the bulk. The Continent bought a fair quantity of the finer grades. Following are the sales and prices obtained for clothing and combing: New South Wales, 427 bales at 3½d. to 7½d. Queensland, 50 bales at 4½d. to 8⅞d. Victoria, 1,344 bales at 5¼d to 8½d. South Australia, 728 bales at 3½d. to 6⅛d. West Australia, 682 bales at 3¼d to 8d. Tasmania, 432 bales at 3¼d. to 8¼d. New Zealand, 906 bales at 3¼d. to 7⅞d. Buenos Ayres, 115 bales at 3½d. to 5d. Punta Arenas, 186 bales at 4½d. to 6¼d.

TEXTILE IMPORTS FROM GREAT BRITAIN.

The following are the sterling values of the imports from Great Britain of interest to the textile trades for April and the four months ending April, 1898-1899

	Month of April.		Four months ending April.	
	1898.	1899.	1898.	1899.
Wool	£ 1,117	£ 1,529	£19,716	£5,128
Cotton piece-goods	22,318	29,950	183,354	214,469
Jute piece-goods	9,193	9,089	44,674	32,875
Linen piece-goods	7,824	9,490	50,918	65,543
Silk lace	333	2,221	3,681	6,470
" articles partly of	577	1,860	8,101	10,695
Woolen fabrics	7,781	13,269	81,671	97,914
Worsted fabrics	22,790	20,589	229,554	204,091
Carpets	10,689	14,246	85,939	8F,630
Apparel and slops	24,885	13,734	106,141	77,654
Haberdashery	17,587	8,710	66,483	65,390

FABRIC ITEMS.

H. Manchester, tailor, Ottawa, has assigned to E. R. C. Clarkson, Toronto. The liabilities are estimated at about $9,000

A. F. Gault, who has recently returned from the west, confirms the report that his firm will establish a branch at Winnipeg. He is greatly impressed with the Manitoba capital as a distributing point. It is said that a very fine business block will be built to house this addition to Winnipeg's wholesale business.

Plans have been prepared for the McIntyre estate by Hutchison & Wood, architects, Montreal, for building an eight-story warehouse at the corner of Craig street and Victoria square, Montreal, to be occupied, as was the building it is to replace, by S. Greenshields, Son & Co., wholesale dry goods. Stone is the material planned to be used throughout, the material corresponding to that adopted for the Grand Trunk offices to be erected on McGill street, and coming from Bedford, Indiana. The building will be 91 feet in height, and fireproof. As yet, however, nothing has been decided in the connection.

THE COLONIAL BLEACHING AND PRINTING CO., LTD.

Application has been made to the Dominion Government for a charter of incorporation for the Colonial Bleaching and Printing Co., Ltd., which intends to manufacture, bleach, dye and print cotton and other textile fabrics. The chief place of business is to be Montreal, and the capital stock is $500,000. The applicants are as follows: William T. Whitehead, manufacturer; Arthur W. P. Buchanan, advocate; Hector R. Bisaillon, gentleman; Edward H. Barker, advocate, Montreal, Que., and Wm. Merrick, chemist, New York.

THE WOOL MARKET.

Toronto—New wool is coming freely on the market, and dealers are paying for round lots, 14c. for washed and 8½c. for unwashed. Little or nothing is being done in pulled wools. We quote pulled, supers, 16 to 16½c.; and 19 to 20c. for extras.

Montreal—The Montreal wool market is unchanged; prices for all merino wools very firm. Cape greasy is quoted at 16½ to 20½c. per lb.; Canadian fleece, 16 to 17½c.; B.A. pulled 35 to 45c. for washed; Australian greasy, 24 to 26c.

THE HORSELESS DELIVERY VAN.

The Still Motor Co., Toronto, has completed a horseless delivery wagon for R. Parker & Co., dyers and cleaners, Toronto. This wagon is built on the lines of their regular delivery wagons, and is equipped with an eight-horse power motor, weighing about 120 pounds and a battery of 30 cells, the total weight of which is 486 pounds, and the total weight of the entire vehicle ready for running is about 1,200 pounds. Both battery and motor are made under the Still patents. It has been a question to what extent an electric wagon is of service when a grade of any height is to be ascended. The Parker wagon is made to ascend a grade of 20 per cent., while the best delivery wagons in the market, of American make, ascend nothing higher than an eight per cent grade. The capacity of the battery without recharging is about 40 miles, and the speed is regulated from three to fourteen miles per hour. This system of electric traction appears to have a future in doing mill cartage where mills are equipped with their own electric plant or are situated near a lighting plant. The cost of operation is very low.

ARRIVALS FOR NEXT SERIES OF LONDON WOOL SALES.

For the next series of London wool sales, opening June 27, the arrivals are increasing. Up to the end of May the gross total was 318,300 bales, 275,100 bales being Australasian and 43,200 bales South African. The direct forwardings continue large, some 73,000 bales of the former and 36,000 bales of the latter having gone to the Continent, Yorkshire, etc. The list, it will be remembered, is to close on the day that the gross total reaches 350,000 bales.

—Many of the large class of Japanese formerly employed in spinning by hand are now engaged in weaving textiles on hand-looms. It has recently been computed that more than 600,000 hand-looms are in use in Japan, and it is stated that they employ 890,000 women and 50,000 men. As these hand-looms are generally operated in private houses, giving a home character to the work, it can readily be seen why such slow progress is being made in the introduction of power-weaving machinery. The hand-looms now in use are called "battan" and are an improvement on those formerly used. They cost but about 5 yen each, and take up little room in a house, while a power-machine would require a separate building, and with the necessary power would cost, say, nearly 500 yen.

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 by-law granting $6,000 to the Toronto Rubber Shoe Co. has been carried in Port Dalhousie.

S. S. Clutton & Sons are offering for sale the one-set mill at Vienna Ont. There is a good water power, and the mill is said to be in thorough repair.

Geo. Morison has returned from Boston and resumed his old position as boss carder in the Hawthorn factory, Carleton Place—Almonte Gazette.

J. S. Lovell, W. Bain, R. Gowans, E. W. McNeill, solicitors' clerks, and R. Richardson, stenographer, have been incorporated as the Trent River Paper Co., Ltd.; capital, $150,000.

C. E. J. Hemming, H. K. S. Hemming, C. A. Masten, Margaret L. Hemming and Edith C. S. Hemming, Toronto, have been incorporated as Dominion Regalia Co., Ltd.; capital, $20,000.

The most recent move in pulp manufacture is the acquisition of 1,400 square miles on the Lievre river by the Dufferin Falls Pulp and Paper Company, which, it is said, will employ 300 hands.

B. Tooke, F. T. Tooke, W. A. Tooke, J. McNab, F. W. Stewart, Montreal, are to be incorporated as Tooke Bros., Ltd., shirt, etc., manufacturers, to do business in St. Henry, Que.; capital, $200,000.

Geo. Schlee, J. Kaufman, A. L. Breithaupt and T. Rieder, Berlin, Ont., L. S. Weber, Heidelburg, Ont., have been incorporated as the Berlin Rubber Manufacturing Company, Ltd.; capital, $95,000.

Marianna Harris, W. Harris, C. Harris, E. Harris and Rebecca S. Smith, Rockwood, Ont., have been incorporated as Harris & Co., Ltd.; capital, $25,000, to carry on the woolen manufacturing business of the late J. R. Harris.

M. B. Perine & Co., cordage manufacturers, Doon, Ont., lost a storage barn, June 5th; it being struck by lightning and burned down. Part of the contents were saved. The accident will not interfere at all with the company's business.

The Silk Association of America announces the death at Chicago of R. W. Hare, manager of the Nonotuck Silk Co. at Chicago for the past twenty years. The funeral services of Mr. Hare were held at his mother's residence in Philadelphia, 1329 Franklin street, on Saturday, the 3rd inst., at 2 o'clock p.m.

R. S. Fraser's warehouse, Lemoine street, Montreal, contains an immense stock of wools of a high grade, Mr. Fraser having just secured several large lots at very favorable figures. Mills and dealers requiring a supply would do well to write at once for prices, as this particular stock is of unusually superior quality.

The Montreal Cotton Co., Valleyfield, Que., is making some very extensive additions to its electric plant. It has at present installed four 600-h.p. three-phase generators, manufactured by the Canadian General Electric Co., Ltd., and has just placed an order with the same company for a large 2,000 h.p. generator of the revolving type, togther with switchboard panels complete. It has also ordered two 85-k.w. exciters, these having sufficient capacity for furnishing exciting current to the full equipment of generators. Upon the completion of this additional installation the Montreal Cotton Company will have the largest and most up-to-date isolated power plant on the continent.

The Canadian Colored Cotton Mills Co., Hamilton, Ont., is building an addition to its present premises

E. M. Trowern, Toronto, has been appointed assistant secretary of the Canadian Manufacturers' Association

The bunting manufactured by the Montreal Cotton Co is dyed fast colors and is made in a great variety of shades.

The Brown & Wigle Co., Kingsville, Ont., recently shipped 700 pairs of blankets direct to Dawson City. They were put up in 44 bales of double canvass, with waterproof lining, and completely filled one car.

The Coaticook, Que., woolen mill, owned by Trenholme & Philip Armitage, was destroyed by fire June 9th. The fire started in the picker room. Some machinery and stock was saved. The building is a total loss; partly insured for $4,000, damage $8,000.

An appointment which will create interest among many members of the dry goods trade is that of George Hardy, well known as having long been selling agent for the Dominion Cotton Company, to be now agent at Toronto, of the Montreal Cotton Mills Company.

The Dominion Brussels Carpet Co. is removing from Eloia to Sherbrooke, Que., where the town has placed the Gardner Tool Co.'s buildings at its disposal. The company expects to have its Sherbrooke mills in running order early in July

The Rosamond Woolen Co., Almonte, Ont., is enlarging its premises by the erection of a large four-story stone addition to the mill, on the site of the office building which has been torn down. A new two-story wing is building to accommodate the office staff.

H. E. Stearns, Montreal; P. E. Hayes, Pawtucket, R.I.; M. Koch, Montreal; E. Ilg, New York; R. Henderson, Montreal, have applied for incorporation as the Montreal Quilting Company, Ltd.; capital, $50,000, to manufacture quilted, sewn or tufted goods and garments of all description, and stair pads carpet linings and articles for clothing; chief place of business, Montreal.

The consolidation of the two representative air moistening companies of America, is announced, the American Drosophore Co. and the Aerophor Co., both of Boston, which have for many years manufactured their various apparatus for the humidification of the various departments of textile factories, and for special purposes, as well as dampening machines for the finishing of fabrics and paper. Both companies have for years sustained a high reputation for this line of work. The above companies have been incorporated under the name of the American Moistening Co., and will occupy offices in the Equitable building, 150 Devonshire street, Boston, Mass., under the direction of the following officers: William Firth, president; Frederick Grinnell, vice-president; Frank B. Comins, treasurer.

The Canadian Colored Cotton Mills Company held its annual meeting at the head office, 1760 Notre Dame street, Montreal, May 30th. Mr. D. Morrice, the president, occupied the chair. In a brief address, he referred to the annual statement, and expressed a disinclination to give so much publicity in the press, of private figures in business The company carried no bad stock, and the position was considered to be excellent. Changes were being made, so that the company would be able to manufacture a higher class of goods than heretofore The capital account had been increased $117,000 in order to purchase new machinery, etc. The statement itself showed net profits for the year after all interest charges and other deductions had been made, to be $210,877. A dividend of two per cent. had been declared, amounting to $153,000 during the year, and the sum of $156,877 had been carried forward to profit and loss. The profit and loss account now had $784,000 to its credit

D. G. Loomis & Sons, contractors, Sherbrooke, are building a large warehouse adjoining the Dominion Cotton Mills Co. *The building is to be five stories high and 200 feet long by 100 feet wide.*

Judge Pagnuelo rendered judgment recently in Montreal in the case of the Canada Jute Company vs. the Robert Mitchell Co., Ltd. This was an action for damages caused by fire

sprinklers placed by defendant in plaintiff's factory, the company defendant had undertaken to replace certain automatic sprinklers attached to the ceiling and destined to open automatically and flood the premises upon being subjected to a certain temperature, thus being a protection against fire. A gong was attached to the system of sprinklers, which was intended to give the alarm both inside and outside the building of the fact of the flow of water. The plaintiff alleges that on Feb. 6, 18—, one of the sprinkler heads burst and allowed the water to flood the factory. As the gong did not work and give the alarm plaintiff held defendant responsible for the damage caused. The Court held that the damage having been caused by the sprinkler's head opening of itself without any heat to start it, one of the links soldered by defendant having broken without any apparent cause, defendant was responsible, and judgment was rendered in favor of plaintiff for $658.50, amount of damage established.

CHEMICALS AND DYESTUFFS.

Business quiet, owing to arrivals and deliveries of May importations. Market continues firm, sumac and bluestone steady at last quotations. The following are current quotations in Montreal —

Bleaching powder	$ 1 95	to	$ 2 00
Bicarb soda	2 00	"	2 05
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 00	"	2 50
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	60 00	"	65 00
Soda ash, 48 ° to 58 °	1 15	"	1 25
Chip logwood	1 90	"	2 00
Castor oil	0 09	"	0 09½
Cocoanut oil	0 06½	"	0 07

WITT'S THEORY OF DYEING.

Witt formulated a very interesting hypothesis, which forms a connecting link between the chemical and the mechanical theories of dyeing. He considers that dyeing is due to a process of solution. The usual idea of solution is that a gas or a solid requires a liquid to dissolve it, but Witt maintains that a solid can dissolve in another solid. He considers dyeing as a process analogous to the coloring of glass by metallic oxides. According to his theory, all dyes are soluble to a greater or less degree in the various fibers, or else all dyes could easily be washed out from them. If cotton is dipped into a solution of Fuchsine, for which it has no direct affinity, it is impossible to get all the dye out again by mere washing. Those dyes which require no mordant are those which are more soluble in the fiber than in water, a circumstance which enables the former to extract them from their aqueous solutions, just as ether will extract resorcin from solution in water. In dyeing with the adjective dyes, the mordant is first dissolved by the fiber, and then the mordant dissolves the dye. Witt's theory clears up many points hitherto obscure. The reason why a dyebath cannot always be fully exhausted is shown by it. If a watery solution of resorcin is shaken up with amyl alcohol, the latter takes up resorcin, but not all of it.

—Japanese rugs have deteriorated in quality to such a degree as to greatly check the foreign demand. The materials used are hemp, jute, cotton, wool and silk, the two latter separately and in combination. They are made on upright handlooms, which vary from 3 to 24 feet in width. The pattern is worked from the front. This is largely a "home" industry there being no large factories, only one or two employing more than 100 hands each. Kobe is the centre of the rug-making district. In the neighborhood of Osaka and Hiogo there are some 2,000 establishments, which employed in 1896 about 13,000 females and 5,000 males, and produced some 3,000,000 square yards of rugs, at prices ranging from 6½ to 20 sen (1½d. to 5d.) per square foot. The countries from which Japan imports hemp and flax for making rugs are the Philippine Islands, British India, China, and Great Britain. Hemp and flax yarn are also imported to the value of about £25,000 per annum.

—Governor Stephens, of Missouri, has signed the department store bill for St. Louis, Kansas City and St. Joseph. This bill applies to all stores employing fifteen persons or more. It divides merchandise into eighty-eight classes, which in turn are subdivided into three divisions. Proprietors of dry goods stores must confine their stocks to dress goods, staple products of the loom such as cotton goods, prints, table linens, etc. On ribbons, spool silk, notions, gloves, ready made garments, millinery, boots and shoes, art works, and other departments usually maintained in large stores, they will be compelled to pay a license tax of from $300 to $500 annually on each class of goods. Violation of the law incurs a penalty for each offense ranging from one year's imprisonment to a fine of not less than $100, or both.