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Canadian Journal of Fabrics

THE JOURNAL OF THE Textile Trades of Canada.

Vol. XIX. TORONTO AND MONTREAL, OCTOBER, 1902. No. 10

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

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CONTENTS OF THIS NUMBER.

OUR TRADE, INDEED.

For downright cheek, commend us to our esteemed contemporary, the Southern Textile Review. In a recent issue, under the heading "After Our Trade," it says: "Mr. George Anderson, of Toronto, who a few years ago visited Japan in the interests of trade between Canada and that country, has been appointed by the Dominion Government as commissioner to Yukon to make special enquiry into the trade of that district with a view if possible of diverting the business now so largely in the hands of the Americans into Canadian channels. Mr. Anderson will be absent two months. Dr. Wickett has recently been appointed a commissioner to the Yukon by the Canadian Manufacturers' Association for investigating the possibilities of Canadian trade there."

Our trade, indeed! What prescriptive right have our cousins across the line to the trade of the Yukon, which is a part of Canada? It is true when the gold excitement commenced a considerable part of the outfitting and supplies for the miners were obtained from Tacoma, Seattle, San Francisco and other places in the United States, but Canadian manufacturers and traders were soon aroused to the importance of that market, and took steps to secure a share of the trade which legitimately belongs to Canada. Some of it still goes to the United States. Mr. Anderson and Dr Wickett have both returned, and we are pleased to learn that their visit will result in turning more and more of the trade of the Yukon into Canadian channels. If the manufacturers of woollen and other goods necessary for that Arctic climate will bestir themselves, there is no doubt they can find a largely increased market there. A large part of the trade in ready-made clothing, for instance, is still done with the States. This our people can secure without feeling that they are robbing anyone of what belongs to them, despite the claim of the Review. The people of the United States shut us out of their market as far as possible by their high tariff. They have no right, however, to claim the trade of the Yukon as belonging to them, and we trust they will get less and less of it as the country fills up.

—The authors of the anti-shoddy bill, recently introduced into the United States Congress, discovered that the bill in its original shape was unconstitutional, and they withdrew it and introduced another. The new bill seeks to impose an internal revenue tax of $50 a year on manufactures of "woollen goods which are not composed of pure wool," and wholesale dealers in such goods are to pay a tax of $25 a year, and in addition to the manufacturers' tax, one-tenth of a cent a

pound is to be levied on all such goods manufactured, this tax to be levied in the form of coupon stamps, as in the case of the internal revenue tax on tobacco. The words "pure wool" are understood to mean wool that has not been previously used in the manufacture of any other fabrics. The bill proposes to deal with the manufacture of shoddy as with the manufacture of whisky, and it is the opinion of the trade that the new bill will also be pronounced unconstitutional.

—The strike among the weavers in some of the United States mills, against the two-loom system, has resulted in the way such strikes generally do. At a meeting on Sunday, September 14th, the weavers of Olneyville, R.I., who have been on strike since January, voted to return to work, on account of financial exhaustion. They express their determination, however, to keep up the fight, and will support weavers who quit the mills if asked to operate two looms on fancy worsteds.

—W. T. Smith, of Philadelphia, has constructed a device which will prove of great service to managers and overseers of mills. His invention consists of a combination of tubes, electric lights, mirrors and reflectors, by which he can sit at his desk and by turning different switches and looking into the mirror bring to his eye every room in the mills and observe what is going on therein as readily as if he were on the spot. In conjunction with the telephone, such a device would enable the manager of a large establishment to superintend it without leaving his desk.

—The profit in raising cotton is very large if the grower has anything like good luck. In an article on the production of sea island cotton in Cuba, a New York paper makes the statement that on a farm of thirty-three and a third acres, it is possible to clear $3,000 over and above all expenses. The minimum production is said to be 1,500 pounds of seed cotton to the acre. Frequently the production is as much as 2,000 pounds. Taking the minimum, a farm of a caballeria (thirty-three and a third acres) will produce 50,000 pounds of seed cotton. The seed cotton will give one-fourth of its weight in lint, or 12,500 pounds. The reason for this immense profit is found in the fact that Cuba produces more cotton to the acre and of a longer staple than that produced in any other part of the world. The staple will average three and a half inches in length, it is said. The length of the season and the humidity of the climate are responsible for the heavy production and the length of the staple.

DUTY ON UNDERWEAR—THE CANADIAN MANUFACTURER HANDICAPPED.

The following letter from a Canadian manufacturer of knitted underwear recently appeared in the Toronto Globe. It bears out the contention which the Journal of Fabrics is constantly making, that the Canadian woollen manufacturer is not sufficiently protected against foreign competition. Mr. Algie states the case very fairly:

Permit me, as a manufacturer of knitted underwear, to submit a few facts concerning the condition of this particular business in Canada. I may add that your readers can readily verify my statements by consulting the Canadian and United States tariff. I am manufacturing considerable quantities of ladies' underwear, the bulk of which is made from cotton yarns, No. 10 to 20, inclusive. The machinery on which these goods are made is all imported from the United States, as also are the bulk of the trimmings for same; i.e., laces, braids, tapes, buttons, etc.

Herewith is appended a list of the various materials and machinery that are used in the manufacture of ladies' underwear, and the rate of duty that the Canadian manufacturer must pay on the same, as per the Canadian tariff schedule:

Knitting machinery	25%
Needles	30%
Sewing machines	30%
Buttons	35%
Braids	35%
Laces	35%
Ribbons	35%
Thread	25%
Colored tapes	35%
Cotton yarns	25%

Average duty, 31 per cent.

The duty on underwear imported into Canada is 35 per cent., and, deducting 31 per cent., which the Canadian manufacturer is charged on all imported goods and machinery, leaves a margin of 4 per cent. as the absolute total limit of protection that can be claimed by Canadian manufacturers. This small per cent. can often be over-ridden by United States manufacturers, who, when they have certain lines of overmakes, prefer to cut the price (sometimes below cost) and slaughter them in the Canadian market, rather than carry the goods over for another season in their home market, subject to insurance, storage and interest charges. It is an open secret that such methods are often adopted by the United States manufacturers in various lines of goods, and it is not unusual to find some lines of United States goods offered for sale in foreign markets at figures much below what the same goods are sold at in the United States.

Now, presuming that a Canadian manufacturer of ladies' underwear should find our home market overstocked, he naturally studies the possibility of sending part of his surplus to the United States. He discovers, by consulting the *United States tariff*, the following clause: "Knitted underwear, valued at more than $1.50 per dozen, to pay $1.10 per dozen specific duty, and 15 per cent. ad valorem additional," which would mean $1.22, the total duty on one dozen of goods valued at $1.50 per dozen. Thus, your readers will notice that the interests of the Canadian manufacturer are, theoretically, protected by 4 per cent, while the United States manufacturer in the same line is favored with a protection of 95 per cent.

I submit the above statements without comment, with the hope that the facts, as stated, may perhaps remove from the minds of the agricultural population of Canada the time-worn impression that the Canadian manufacturer is a spoon-fed infant, kept up and pampered at the expense of the general public.

In all manufactured articles there are practically four elements that go towards successful development—i.e., power, material, machinery and intelligent labor. In addition to these, climatic conditions also affect, to a greater or lesser degree, certain lines of manufactured goods. As a Canadian I am impressed with the thought that we are rich in undeveloped power that will ultimately be supplied from the Niagara and St. Lawrence rivers, draining, as they do, the four great fresh water seas of America. With reasonable encouragement in the way of invention and technical schools we must surely hope to develop the best and most efficient class of machinery. We are within reasonable distance from the great markets where the raw materials for manufacturing goods are produced, and I am confident that, in the matter of intelligent labor, Canadians should be able to hold their own against the world at large.

Without claiming any prophetic knowledge I beg to predict that before the close of the present century the Niagara, St. Lawrence and Ottawa valleys will be the industrial storm centres, not only of this continent, but of the wide world. The march of civilization and development is gradually but surely going westward, and, at this particular time, when we notice pessimistic statements concerning the decline in the industrial centres of our Mother Country, it behooves us, as Canadians, to gird our loins and adopt such measures as will enable us to take our place in the front ranks of industrial warfare in the near or far future.

WILLIAM ALGIE.

HON. MR. TARTE AND PROTECTION.

Hon. J. Israel Tarte, Minister of Public Works for Canada, has recently been very outspoken in favor of protection, which he thinks must be applied in greater degree if our industries are to hold their own. This is precisely what the Journal of Fabrics has been urging with reference to the woolen industry more particularly. In order to acquaint himself with the situation, Mr. Tarte has been visiting a number of our factories, seeking to discover by actual observation why it is we cannot compet with outsiders in certain lines. He commenced with an inspection of the Dominion Cotton Company's mills at Hochelaga, in company with Senator Forget, vice-president, and a number of directors, where he spent several hours. He first got from the directors a statement, from which it appeared that the company last year was unable to pay a dividend, and, moreover, suffered a loss of $340,000. This year, owing to certain economies, it has done better, but is not in a good position. The company paid 6 per cent. and more for over eight years, but the directors say the British preference has put an end to that. The duty on white cotton, less the preference and plus the freight, comes to about 20 per cent. This protection is, according to the manufacturers, quite insufficient if the wages here and in England are compared. The manufacturers of cotton strongly urge that the duties be raised, so that the preference will leave at least 30 per cent.

Mr. Tarte made a number of enquiries. What proportion of the goods consumed in Canada is furnished by England? 50 per cent. How many workmen would this extra production permit to be employed in Canada? Three thousand. What would be the effect of an increase of the tariff? It would consolidate prices, prevent Canadian cotton from being at the mercy of foreign slaughter prices, and the capitalists, knowing that the manufacturer of cotton would have a certain and profitable market, would build factories to employ 3,000 men necessary to manufacture the 50 per cent. which England now furnishes us. But would the prices advance if the duties were raised? You would have the remedy in your own hands, replied the directors, and in case of abuse the tariff might be lowered.

The print works at Magog have still harder competition to meet, because by reason of the preference they have only 23 per cent. protection, while the United States mills have from 45 to 75 per cent. Mr. Tarte noticed that the large cylinders for collecting the cotton, which were formerly made of iron, are now made of pulp, and he was told that they are made in the United States with pulp from Canada, and that the house which manufactures them sells them to the whole world—England, France, Egypt, India. Since then Mr. Tarte has visited a number of other mills, and has found substantially the same condition of affairs.

Mr. Tarte has had this investigation in view for some time, and now that a Minister of the Crown, who is generally admitted to have great influence, has laid his hand to the task, we may hope more than ever that the tariff will be re adjusted to give some relief to the woolen and cotton industries, and any others which are suffering from the present state of affairs.

FABRIC ITEMS.

The Calgary Clothing Co., and the Calgary Tent and Mattress Co. have been incorporated.

Geo. S. Dunham, of Brockville, has an interesting relic in the form of a pair of sheets made by his grandmother from flax raised within two miles of Brockville, gathered, spun and woven by herself.

The American Wool and Cotton Reporter is publishing a series of articles, "Among the Flock Masters of Ontario," in which it describes some of the principal flocks of sheep kept by the breeders of that province.

A Japanese ship recently sailed from Seattle, Wash., for the Orient with one of the most valuable consignments of American goods ever sent to that region. The largest item was 1,681,600 yards of cotton sheeting.

Dr. W. H. Perkins, of Manchester, has discovered a way to render cotton and other inflammable goods permanently fireproof. The process consists in asbestinizing the fabric. It can be washed, and is perfectly hygenic.

Plaids in dress goods are in great demand this season. Flecked goods in black, white and colors are also in demand. The demand for ribbons has increased greatly, some wholesale houses have doubled their business.

It is understood that a new collar manufacturing business is to be started at Berlin by W. A. Greene, Jr., who has been connected with the Williams, Greene & Rome Company, since its inception, and from which he has now retired.

The project to consolidate 60 per cent. of the spinning and weaving mills of the Southern States has materialized. The capital involved in the transaction amounts to $25,000,000, which will be increased as other mills come in.

The Britannia Manufacturing Co. is a new Halifax partnership, consisting of James Anderson and John A. Neville. They will engage in the manufacture of ladies' skirts, blouses, etc. William Minto is their travelling representative for Prince Edward Island and Newfoundland.

Canadian made venetians, homespuns, and friezes are in good demand for fall and winter wear, much better than last year, although that was a particularly brisk one. Some tradesmen state that trade will be double that of last year. Blacks are as popular as ever for both men's and women's wear and greys are also selling well.

Vienna is threatened with an invasion of American dressmakers. The leading modistes are not seriously disturbed, as they say the American characteristic is uniformity, whereas Vienna houses deal in specialties, while many Americans prefer the Viennese style. The chief novelty which the Americans will introduce is a skirt that clears the ground.

The Dominion Compressed Air Dustless House Cleaning Co. has been incorporated, with a capital of $99,500, to carry on the business of cleaning, renovating, deodorizing and disinfecting carpets, tapestry, furniture, fabrics, etc. J. B. Kay, of Toronto, the well known dealer in carpets and upholstery goods, is one of the chief promoters.

Amos B. Musselman has been elected a director of the Williams, Greene & Rome Shirt Mfg. Co., in place of W. A. Greene, Jr., retired. He also becomes secretary-treasurer. Mr. Musselman entered the employment of the firm seven years ago as invoice clerk, and since then has steadily worked himself up, and during the last three years has been the accountant of the company at Berlin, Ont.

There has been a remarkable increase in the growth of flax in the Northwestern States. Last year Northern Dakota produced more than half the total flax crop of the United States, or almost 15,000,000 bushels. The Dakota farmers, who are immigrating into the Canadian North West, say Canada is better for growing flax than Dakota. We should be as well known for growing flax as wheat.

There are evidences that the natural waist is coming in, and therefore a corset which will conform to Nature's model, instead of the present coat of mail style. The world is drifting towards the Greek models and ideas in woman's apparel. Even the costliest gowns are marvels of simplicity, compared to the complex, profusely embellished creations of a few years ago. The curves of feminine beauty are brought out in graceful relief instead of being hidden under mountains of flounces and ruffles.

An event of not a little importance will be the annual convention of the United Textile Workers of America, which will open at Washington on October 21st. This organization has been in existence only a year, but as it pays a per capita tax to the American Federation of Labor on the basis of 12,700 members, it will be seen that it has already made considerable progress. Its name explains the nature of the organization. The aim is to unite all the textile operatives of America in a manner to admit of the highest effectiveness in promoting the interests of every worker in the cotton, woolen, flax and silk mills of the country.

The Oriental Silk Co., with a capital of $20,000, has been incorporated in Canada. It is to take over as a going concern the business known as the Oriental Silk Company, now carried on at Pittsfield, Massachusetts, and to pay for the same $10,000 in stock fully paid up at par; and to continue the business consisting of the manufacturing of and dealing in silk thread, silk fabrics and all kinds of silk goods, the operations of the company to be carried on throughout Canada and elsewhere. James C. MacGowan, manufacturer, Pittsfield; J. D. Kuppenheimer, merchant, of New York; Samuel Abrahams, agent; Leon Garneau, advocate, and Henry Weinfield, student at law, all of Montreal, are the incorporators.

It is stated that there are many bales of threshers' blankets still undelivered in Manitoba and the Northwest, and according to the present outlook, the factories will not be able to get them into retailers' hands until too late for use this season.

The semi-annual meeting of the New England Cotton Manufacturers' Association convened at New York, Oct. 1. It is proposed to enlarge the scope of the association by changing its name to the American Cotton Manufacturers' Association.

The factory girls who have been on a strike in Kewanee, Ill., for several months have procured articles of incorporation as the Union Girls' Manufacturing Company, and will begin making mittens, overalls and gloves in competition with their former employers.

The English Sewing Cotton Company, which controls the American Thread Company, reports for its fiscal year a loss of £127,006. Trade was reported bad owing to the high price of cotton and an unsatisfactory market for thread. No dividend was received from the American Thread Company common stock.

The plant and stock of Breslin Bros., manufacturers of workingmen's shirts, Toronto, was recently turned over to Simon Simonsky, a pawnbroker. A meeting of the creditors had just been called, and after disposing of the stock the members of the firm, Hymon, Charles and Soloman, disappeared. There are over 100 creditors, including a number of woolen mills, wholesale woolen goods' dealers, rubber goods companies, etc.

While the northern portion of the continent has suffered from cold and rain, the southern part has experienced unusual heat and drought. The result is that the cotton crops are unusually poor. Texas and Alabama report the lowest yield ever obtained, while in Georgia, Louisiana, and Mississippi it is very much below the average of the last ten years. Recent rains have started much of the cotton to growing and fruiting at the top, and with a late frost a fairly good top crop is in prospect. The worms may destroy this last hope, as the cotton caterpillar has made its appearance in unlimited quantities on the lowlands in Alabama.

The silk traffic on the Canadian Pacific route from the Orient is assuming huge proportions, and the Canadian Pacific steamer Tartar, which left Yokohoma on the 20th ult., is bringing one of the most valuable cargoes of raw and manufactured silks ever shipped across the Pacific Ocean. Her cargo consists of 539 tons of raw silk, as well as a considerable consignment of manufactured goods, all destined for New York. It will take a train of fifteen cars to carry this cargo across the continent, and as each carload is valued at over $100,000, it will be seen that the consignment is worth nearly $2,000,000. The silk will be ferried across at Ogdensburg.

R. R. Stevenson, selling agent of the Montreal Cotton Company and the Dominion Cotton Mills Company, who accompanied Mr. Tarte on his visit to the mills at Montreal, states that the Dominion Cotton Mills Company lost $3,.,000 last year, and the Merchants' Cotton Company $100,000. Both companies have always been economically managed, but their directors do not expect to declare a dividend so long as the present preferential tariff of 16⅔ per cent. net is maintained against them. The Montreal Cotton Company at Valleyfield continues to pay 9 per cent. dividend, simply because this mill has always confined itself to the manufacture of a patternless article, which is not subject to the caprice of fashion, and the great proportion of goods manufactured there is composed of dyed merchandise which is protected by a tariff of 23¼ per cent.

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.

The Westport, Ont., Woolen Mills Co. is now out of business.

Mr. Saulnier expects to have the Brockville hat factory in operation in about a month.

A New Jersey firm are reported to be negotiating for a site in Brockville on which to erect a silk mill.

The Breithaupt Estate, at Berlin, Ont., has sold the building next to the Y.M.C.A. to the Berlin Shirt and Collar Co., who have found it necessary to increase their capacity. They are erecting an addition at the rear of the building.

The Oxford Woolen Mills, Oxford, Nova Scotia, are being enlarged, new machinery installed, and other preparations made for the employment of more hands. This company has long been noted for producing excellent woolen goods.

The Dominion Hammock Company, of Dunnville, which has five power looms, is installing two more and also a machine to make Turkish towels from linen yarn imported from Ireland. It has produced about 20,000 hammocks this year in 38 designs.

Ben. Williams, formerly with the Stratford Woolen Mills, has purchased an interest in Dufton Sons' & Waterhouse's mill at Mitchell, Ont. The firm will hereafter be known as Dufton Sons, Waterhouse & Williams. Some new machinery will be added.

The Penman Manufacturing Co. are installing a new 200-h.p. Wheelock engine in their No. 2 mill at Paris, and are making other improvements in their various knitting mills. A further notice of this company's large establishment will appear in another issue.

The Paris Wincey Mill has recently put in six new looms, two of them being of English make and four of United States manufacture. After closing down about three weeks for annual repairs, the mill is again running, as usual. This mill runs with two shifts of hands, night and day.

Acording to the Times, Hamilton has secured another large industry, a rope, twine and thread firm in Philadelphia having leased a large building which they are fitting up for their business. The concern is a very large one, and its Canadian business will be a very important addition to Hamilton's industries.

Logan Bros., of Renfrew, have had a good deal of trouble with a galvanized iron roof on their woolen mill, which leaked and was injuring the wall. They have now replaced it with an asbestos roof. One advantage is said to be that as asbestos is a non-conductor of heat, there is less likelihood of the snow giving trouble.

David Reid, a young son of William Reid, who is employed in the Elmsdale flannel mills, Almonte, put his hand into a burr-picker recently and was hit across the fingers with such force by a part of the machine which makes fifteen hundred revolutions a minute, that his four fingers were bruised and broken between the second and third joints. An effort is being made to save the injured members from amputation.

The old woolen mill at Port Elmsley, shut down for some years, is now in operation as a plumbago works.

There are few woolen mills on the Pacific Coast. Speaking of course for their own country, though the same remarks will apply to British Columbia, one of our United States contemporaries says: Woolen mills on Puget Sound, like snakes in Ireland, are conspicuous by their absence. Yet no part of the country offers greater advantages for the woolen manufacture, and it can only be a question of time when it will spring up and flourish there. Sooner or later some enterprising man, escaping the fierce competition and monopolized markets of the East, will start the woolen manufacture on the Mediterranean of the Pacific, and in that virgin and growing field, build up a magnificent industry. Puget Sound has already become a great commercial centre, with steamship lines to Japan, China, the Philippines, South Africa, Australia, Alaska and South America, and can draw upon all these countries for wool and other supplies, while the domestic wools of Washington, Oregon, Idaho, Montana, California, and Nevada are at her doors. The many thousands of lumbermen, fishermen, miners and stockraisers of that coast are great consumers of woolen blankets and clothing, and other markets will be found in Northern China, Manchuria, and Siberia. The mild climate, unlimited water-power and cheap coal of Puget Sound are other advantages worthy of consideration.

Harvey L. Hewson, late of the Oxford, N.S., woolen mills, who we mentioned in our last number as promoting a new company, appears to have so far succeeded in his enterprise, and to have organized a company to erect a new woolen mill at Amherst. The Hewson Woolen Mills is to have a capital of $100,000, all of which has been subscribed, H. L. Hewson and his brother, Edgar E. Hewson, barrister, of Amherst, having taken two-thirds of the amount. According to the Maritime Merchant, the prospectus was prepared and the entire capital over-subscribed in a single day. A site of several acres has been purchased close to the Rhodes Curry Company's engine works, and a new brick and stone fireproof mill, 154 by 55 feet, four stories high, is in course of construction, and will be one of the best equipped in Canada. H. L. Hewson will be president; E. E. Hewson, vice-president; Mayor N. Curry, president of the car works; M. D. Pride, president of the Amherst Boot and Shoe Co., and J. A. Dickey, ex-mayor, directors; and G. J. White, secretary. H. L. Hewson brings with him from Oxford twenty-two years of valuable experience. The town of Amherst, in addition to some special privileges, has exempted the industry from taxation for a period of thirty years. This has been incorporated in a by-law and legislation is to be sought extending the same privilege to all new manufacturing firms coming to the town, which do not compete with an industry already established. The mill will make high-grade woolens from Nova Scotian and foreign wools, and is expected to be ready to turn out tweeds for the spring trade before many weeks. Speaking of this enterprise, the Monetary Times remarks: If the outlook for Canadian woolen manufactures in general under the present tariff is as bad as some of the Ontario men say, the Messrs Hewson and their friends, Mr. J. A. Humphrey, of Moncton, and other enterprising Eastern men who are investing in new buildings and new machinery for making woolen goods, must be ill-advised. But it would seem to be the newest and best-equipped factories in this line that least dread or complain of the tariff.

A party of twelve persons arrived in Almonte a few days ago from around Leeds and Huddersfield, England, with the intention of entering No. 1 mill as weavers and spinners. The men are all skilled workmen, and if they like the country more of their friends will come over and join them.

A cotton mill company in Lowell, Mass., which has a surplus of 200 tons of coal on hand has notified its employees that every father of a family or any two girls working for the support of the same family, can buy one ton of coal for $6.50, the price at which it was bought. The price in Lowell is now $12.

The cotton mill property at Dundas was sold by auction to G. C. Reid, of Toronto, for $9,100. The original cost was about $150,000. A number of new industries will be started—electrical works, cash register and typewriter factory, etc. The Canada Can Co. has also moved its works there. The factory was originally built in the 50's for foundry purposes, afterwards passing into the hands of Mr. Wright, who started the cotton mill. About eleven years ago it came into the possession of the Canada Colored Cotton Co., of Montreal, who shortly afterwards closed the factory, after removing a portion of the machinery, and the premises have remained closed ever since.

Mr. Raymond, of the Perth Cordage Co., has been figuring with Collingwood, Owen Sound, and possibly other towns, for a bonus, or other inducements, to remove from Stratford. Owen Sound is willing to give them the usual concessions, that is, free water, free light and exemption from municipal rates, except school rates, but wisely refuses to guarantee the company's bonds to the extent of a dollar. A guarantee of their bonds to the extent of $30,000 was asked. The C.P.R. offers to give the company a free site and to store flaxseed in their elevator at a very low rate. The company would employ forty hands. It has assets of $81,000 and liabilities of $31,900, and declared a dividend of 8 per cent. on July 15th. Collingwood had a previous visit from Mr. Raymond, but the Bulletin thinks he wants too much for an industry whose business is altogether one of exportation and importation, spends no money among the farmers, and the only benefit from which would be the circulation of the wages of forty men.

Personal

Mr. Cunningham, of Ottawa, paid a visit to Almonte to audit the books of the Anchor Knitting Co.

George Waring, formerly loom fixer for the Montreal Cotton Co., Valleyfield, is the new loom fixer at the Exeter cotton mill, Exeter, N.H.

W. D. Stanfield, vice-president of the Stanfield-Smith Co., Truro, has been making a visit to the knitted goods mills about Philadelphia.

Wm. Cook, superintendent of the Kingston cotton mill, while duck shooting recently near that city, was badly wounded by the accidental discharge of a gun.

A. M. Morrison, of Carleton Place, has accepted a position as superintendent of a woolen mill at Cargill, in Bruce County, and has removed there with his family.

J. Warwick, superintendent of the two mills at Carleton Place, owned by the Canada Woolen Mills Co., has resigned and is succeeded by James H. Hendry, late of the Amos Abbott Co., Dexter, Me.

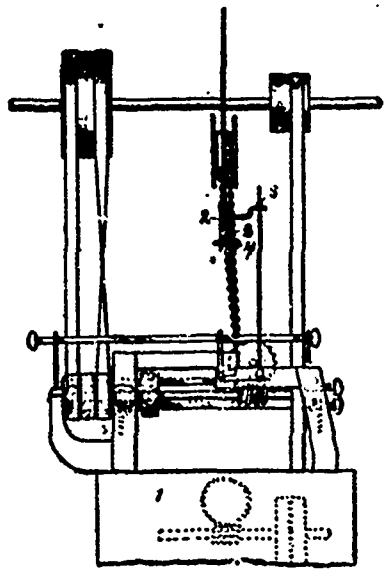
Lorenzo S. Way, son of Daniel Way, founder of the town of Way's Mills, Quebec, and an old-time woolen manufacturer, died at the home of his daughter, Mrs. W. E. Way, at Methuen, recently, aged 85. He carried on manufacturing at Way's Mills for 55 years, succeeding his father.

A farmer writing from Harrowsmith to the Kingston News complains that the binder twine turned out at the penitentiary this season is not of as good a quality as that usually made there. He says it does not go very far, and the fibre or material it is made from sometimes clogs up the machinery. He asks why it is that the penitentiary twine is now much coarser and heavier than brands made by Canadian companies.

J. M. Young, of St. Mary's, has purchased the old established dry goods business of Frank Cockshutt & Co., Brantford. The business was founded in 1832 by Ignatius Cockshutt. Some twenty years ago he retired, when the grocery and hardware business was taken over by W. F. Cockshutt, and the dry goods, clothing and furnishings by Frank Cockshutt. The business has always been conducted on a large scale. Under Mr. Young it will doubtless continue to prosper. Frank Cockshutt will give his attention to his manufacturing and other interests in Brantford.

AN ENGLISH IMPROVEMENT IN DYEING APPARATUS.

The Textile Record describes an improvement in hank dyeing machines, particularly that class of machine in which a revolving swift is employed. The object of the new mechanism is to provide means for raising and lowering the swift into the dye vat. The accompanying illustration shows the new mechanism and its action. When a swift is to be placed in the machine, the rail 2 is lowered as far as required, and the swift is secured to the rail by the pins 4. The swift is



moved along the rail by hand until it is directly over the vat 1 and is then lowered into the vat until it rests in bearing 3. The pins are then removed from the brackets and the rail is raised, and when it arrives at a certain height the bracket thereon comes into contact with an adjustable nut 5, which is connected to the strap fork which it operates, and the lifting motion is stopped. The swift is then revolved in the dye vat by ordinary mechanism until the material has been thoroughly dyed, after which it is raised out of the vat.

THE TORONTO CARPET CO. STRIKE.

After a fight lasting nearly ten weeks, during which time there were many unpleasant incidents to both parties concerned, the strike of the weavers employed by the Toronto Carpet Manufacturing Company has come to an end, the striking employees having resolved by a vote of 42 to 10 to return to work. There were 54 present at the meeting when this was settled, and 2 of these were undecided and cast blank ballots. The strikers give as the reason for their action that the company had reinstated the superintendent, Mr. Wolfe, who enjoyed the confidence and good-will of every worker in the factory. Simultaneously with the reinstatement of the superintendent there were many dissensions from the ranks of the strikers, particularly those employed in the ingrain department, and this it is understood was responsible for the large vote in favor of declaring the strike off. The strikers at first numbered about 300, and of these 150 went to Philadelphia, where there are 62 carpet manufacturing establishments. Of the balance about 40 had returned to work, leaving about 100 to carry on the strike. The result is a distinct victory for the company, who have all along maintained that the employees had no grievance, and is looked upon by the company as a vindication of their opposition to union control.

After the strike was declared off all the old employees for whom there was room were taken on again. About 125 of the strikers are again at work in the factory.

The appeal against the conviction of F. B. Hayes, secretary of the company, for infraction of the alien labor act, is to be pressed, Chancellor Boyd having granted a writ of certiorari. In connection with the strike there was another conviction before the police magistrate. William H. Fell, one of the strikers, on Labor Day met Miss Ida Holmes, a non-union worker at the factory on the Exhibition grounds and insulted her by calling her a "scab," intimating that she, with the other non-union hands, should be thrown into the lake and drowned. On the evidence of Miss Holmes and a young man who accompanied her Fell was fined $3 and costs.

THE WOLFE FAILURE AND ITS AFTERMATH.

In connection with the failure of Max Wolfe, a Toronto furrier, whose collapse the Journal of Fabrics noted at the time, both he and his wife have had to stand their trial before the Court of General Sessions. The charge against Wolfe was that of stealing some fur trimmings and a seal skin sacque from Zachariah Hemphill, the theft consisting in taking the sacque from the stock after an assignment had been made to Hemphill. Wolfe claimed that the jacket was the property of his daughter, Phoebe Wolfe, and the trial lasted two days. Judge McDougall's charge was somewhat against Wolfe, and the jury, after being out 20 minutes brought in a verdict of guilty. Sentence was deferred. The charge against Mrs. Wolfe was that of stealing $15, which she is alleged to have retained, being part payment for a $55 fur jacket, which should have gone to the assignee. In her case the jury disagreed, so that she will have to be tried over again.

MONTMORENCY COTTON CO.

The Montmorency Cotton Co. at its recent annual meeting elected the following officers: President, Fred. Henshaw, Montreal; vice-president, J. T. Ross, Quebec, directors, H. M. Price, Quebec; N. Rioux, Quebec; R. Forget, J. N. Greenshields and Alex. Pringle, Montreal. C. R. Whitehead was appointed general manager. In the annual report, Col. Henshaw, the president, stated that though the mill was well managed and the stock absolutely not watered, the company was unable to pay a dividend owing to the competition from Great Britain, rendered possible by the preferential tariff, and to the slaughter prices put on goods coming in from the States. The mill was kept running, but it was done with practically no profit. Business has been only fairly good during the past six months and not good enough to warrant a dividend. The China trade has been lost to Canadian mills owing to mills having been built in that country.

LITERARY NOTE.

The American Cotton Industry is the name of a recent book issued in London. It is a study of work and workers in cotton manufacturing, in a series of articles contributed to the Manchester Guardian by T. M. Young, with an introduction by Elijah Helm, M.A., secretary of the Manchester Chamber of Commerce. It is exceedingly readable and contains a great amount of information relating to the cotton industry in the United States. Methuen & Co are the publishers and Chas. Scribners' Sons, of New York, handle it for the United States.

A girl worker in a German factory has just received £10,000 for the discovery of a new method of flax-netting

. Dulin & Co., dry goods retailers, Cornwall, have assigned. The firm has been in existence only since February, 1901.

Herman & Wolff, clothing and dry goods, Sydney, C.B., have dissolved. David Wolff continues, and Louis Herman will open on his own account.

Linen colored gowns were popular last season. Linen colored hose are likely to be so next season to match the linen colored shoes which are coming in.

The offe. of 50 cents on the dollar, made by I. L. Vineberg & Co., clothiers, Sherbrooke, Que., has not been accepted, and an assignment has been made.

The high price of coal is likely to lead to a greater demand for heavier clothing, especially underclothing, and manufacturers and dealers would do well to be prepared.

Thornton & Douglas have been incorporated to carry on the dry goods business at Stratford, with a capital of $60,000. The members of the company are George H. Douglas, Helen M. Douglas, and Charles Bews, of Stratford; John H. Gordon, of Chatham, and Agnes Lawlor, of Oshawa.

Anthony William Allen, Anthony Paine Allen, Frederick Woodland, Sarah Allen, and Minnie Woodland, all of Toronto, have been incorporated as the Allen Manufacturing Co., and have taken over the whitewear manufacturing and laundry business of the Allen Manufacturing Co., which was carried on by A. W. Allen.

John W. Peck & Co., Montreal, propose to build in St. Louis, a suburb of that city, a four-story brick clothing factory, to employ 300 hands and pay out about $60,000 in wages annually. They want exemption from taxation and a bonus of 5 per cent. on the wages paid for ten years.

It is stated by United States papers that this year large quantities of binder twine of Canadian manufacture are being exported to the United States, where it undersells the home product to the extent of two cents per pound In past years United States twine manufacturers used to flood the Canadian market with their surplus product, but for this year conditions have been reversed.

TECHNICAL EDUCATION.

By John Waddell, Kingston, Ont.

The question of technical education is before long bound to become a very importunate one in this country. Our industries are growing. We need trained men in agriculture, in forestry, in mining. We need engineers, hydraulic, mechanical, electrical. We need experts in our metallurgical works, our textile factories, our mills of various kinds. For all these men technical education is a necessity. It is impossible to estimate how much money has been wasted in this country owing to ignorance Every manufacturer, every man interested in the conversion of the raw materials of nature into the products which contribute to human necessities or human desires knows of cases where mistakes more or less serious have occurred simply because a man of insufficient training has been put to do work requiring the best effort of a thoroughly disciplined mind

It is not my intention in this article to take up the broad question of technical education. I propose to confine myself to the influence of chemical training on chemical industries in Germany. Germany is pre-eminently the land of chemical industries, it is also pre-eminently the land of thorough chemical instruction. This matter was last year the subject of a report to the British Foreign Office, published as one of the blue books in the series of diplomatic and consular reports. The report was compiled by Dr. Frederick Rose, His Majesty's consul at Stuttgart. Dr. Rose's report is not that of a man devoting a few weeks' time to the subject, collecting what information he can for the benefit of an inquisitive public department. Dr. Rose was for twelve years a student, assistant and lecturer in various universities, technical high schools, and laboratories be'onging to the state or under private control. He is therefore a man peculiarly fitted to draw up a report upon the subject.

In order to prevent misapprehension it may be well to emphasize the fact that technical high school is an institution for advanced study and is not a high school in our sense of the word. Students do not enter until they are over 18 years of age and a large number of them have had a training quite as extensive as is required for a Bachelor of Arts degree in our colleges. In 1899 of 5,115 students in the Prussian technical high schools, 2,471, or nearly one-ha'f, had gone through such a preliminary course, while in Berlin of 1,999 fully matriculated students all but seven per cent. had attained this educational standard. The technical high schools are of university grade and students not unfrequently pass from one to the other, more frequently from the university to the high school than in the reverse direction. When subjects of the same kind are taken up in the two institutions they are more likely to be considered from he theoretical point of view in the universities and from the practical point of view in the technical high schools. In chemistry for instance the amount of time spent in the universities on what is variously called chemical technology, technical chemistry or chemical industries, is small: while in the high schools such subjects are taken up more fully, and less attention is bestowed upon theoretical matters.

Both the technical high schools and the universities supply many graduates to the chemical works of the country and of foreign lands. In some departments of chemical industry such as those relating to aniline dyes, drugs and scents, the university graduates seem to be in greater demand, while in other branches the preference appears to be for men from the high schools. A feeling is growing through the country in favor of the high school training and in the Baden dye works high school students are preferred and it is probable that unless the universities take up the subject of chemical technology more fully they will lose students.

The majority of German universities have been in existence for centuries; the technical high schools have been founded within the last hundred years. The universities are for the most part in small towns suitable for a retired contemplative existence; the technical high schools are nearly all in large towns or cities in contact with the busy life of a bustling world.

Chemistry is a very prominent subject in the high schools and universities and the effect of the training given in these institutions is very evident in chemical manufactories and works of all kinds. In the chemical works of Germany there are over 4,500 thoroughly trained chemists who have taken a full course in the technical high school or the university. Thirty-three works emp'oy from six to twenty chemists each, while there are nine dye works none of which have less than twenty chemists and the others range up to one hundred and five. About a thousand graduates from Germany are in chemical works in foreign countries. During the last twenty-five years the number of chemical works in Germany has doubled and the number of chemists employed in them has grown from 1,700 to 4,500.

It must be remembered that the figures given above refer to chemists connected with industrial works. When professors, lecturers and assistants in universities, druggists with a full chemical training, chemists employed by the state, private chemists, analysts and such like are included the number is increased to between six and seven thousand, exclusive of the one thousand in foreign works. Notwithstanding all this great army of chemists Germany is not content and in Prussia two additional high schools are being provided.

Germany is by far the most advanced country in chemical works, and this is largely due to chemical training. Germany is little if any better adapted to the industry than any other country. It has a number of springs and rivers which are indispensible for chemical processes, large quantities of water being required; it has considerable mineral wealth and great quantities of salt. Several hundred years ago the mineral resources of Germany were more important comparatively than they are now and perhaps this may have started the industry there.

(To be continued).

Albert H. Chitty, Amanda A. Simpson, Nora L. Worthington, Nelson Simpson, and R. A. Lyon, of Sault Ste. Marie, have been incorporated as the Pearl Laundry Co., with a capital of $40,000.

A process of tanning leather has been discovered for doing the work without the use of bark. This is a very important discovery, and if it fulfils the expectation of the inventor, will revolutionize the manufacture of leather. A Milwaukee tanner has paid $500,000 for the right to use it.

—The Fairbanks Co., Craig street, Montreal, have concluded arrangements with the Dodge Mfg. Co., of Toronto, for their general agency for Montreal and vicinity. An entire new stock of Dodge standard pulleys have been received, as well as various stocks of Dodge transmission goods, including ball and socket hangers, flange and grim death couplings, safety collars, improved self-oiling bearings, all types, etc. All of these standard lines will be carried in stock at the Fairbanks' Co.'s warerooms, Craig street, Montreal, for immediate shipment at factory prices.

BOARD AND PLANK MEASUREMENT AT SIGHT.

This table gives the square feet and inches in boards or planks from 3 to 25 inches wide, and 4 to 20 feet long. If a board be longer than 20 feet, or wider than 25 inches, unite two of the numbers.

Length	4 ft.	5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	11 ft.	12 ft.
Width.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
3 in	1 00	1 03	1 06	1 09	2 00	2 03	2 06	2 09	3 00
4 in	1 04	1 08	2 00	2 04	2 08	3 00	3 04	3 08	4 00
5 in	1 08	2 01	2 06	2 11	3 04	3 09	4 02	4 07	5 00
6 in	2 00	2 06	3 00	3 06	4 00	4 06	5 00	5 06	6 00
7 in	2 04	2 11	3 06	4 01	4 08	5 03	5 10	6 05	7 00
8 in	2 08	3 04	4 06	4 08	5 04	6 00	6 08	7 04	8 00
9 in	3 00	3 09	4 00	5 03	6 00	6 09	7 06	8 03	9 00
10 in	3 04	4 02	5 06	5 10	6 08	7 06	8 04	9 02	10 00
11 in	3 08	4 07	5 00	6 05	7 04	8 03	9 02	10 01	11 00
12 in	4 00	5 00	6 00	7 00	8 00	9 00	10 00	11 00	12 00
13 in	4 04	5 05	6 00	7 07	8 08	9 09	10 10	11 11	13 00
14 in	4 08	5 10	7 06	8 02	9 04	10 06	11 08	12 10	14 00
15 in	5 00	6 03	7 00	8 09	10 00	11 03	12 06	13 09	15 00
16 in	5 04	8	8 00	9 04	10 08	12 00	13 04	14 08	16 00
17 in	5 08	7 01	8 06	9 11	11 04	12 09	14 02	15 07	17 00
18 in	6 00	7 06	9 00	10 06	12 00	13 06	15 00	16 06	18 00
19 in	6 04	7 11	9 06	11 01	12 08	14 03	15 10	17 05	19 00
20 in	6 08	8 04	10 00	11 08	13 04	15 00	16 08	18 04	20 00
21 in	7 00	8 09	10 06	12 03	14 00	15 09	17 06	19 03	21 00
22 in	7 04	9 02	11 00	12 10	14 08	16 06	18 04	20 02	22 00
23 in	7 08	9 07	11 06	13 05	15 04	17 03	19 02	21 01	23 00
24 in	8 00	10 00	12 00	14 00	16 00	18 00	20 00	22 00	24 00
25 in	8 04	10 05	12 06	14 07	16 08	18 09	20 10	22 11	25 00

Length.	13 ft.	14 ft.	15 ft.	16 ft.	17 ft.	18 ft.	19 ft.	20 ft.
Width,	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
3 in	3 03	3 06	3 09	4 00	4 03	4 06	4 09	5 00
4 in	4 04	4 08	5 00	5 04	5 07	6 00	6 04	6 08
5 in	5 05	5 10	6 03	6 08	7 01	7 03	7 11	8 04
6 in	6 06	7 00	7 06	8 00	8 06	9 00	9 06	10 00
7 in	7 07	8 02	8 09	9 04	9 11	10 06	11 01	11 08
8 in	8 08	9 04	10 00	10 08	11 04	12 00	12 08	13 04
9 in	9 09	10 05	11 03	12 00	12 09	13 06	14 08	15 00
10 in	10 10	11 08	12 06	13 04	14 02	15 00	15 10	16 08
11 in	11 11	12 10	13 09	14 08	15 07	16 06	17 05	18 04
12 in	13 00	14 00	15 00	16 00	17 00	18 00	19 00	20 00
13 in	14 01	15 02	16 03	17 04	18 05	19 06	20 07	21 08
14 in	15 02	16 04	17 06	18 08	19 10	21 00	22 02	23 04
15 in	16 03	17 06	18 09	20 00	21 03	22 06	23 09	25 00
16 in	17 04	18 08	20 00	21 04	22 08	24 00	25 04	26 08
17 in	18 05	19 10	21 03	22 08	24 01	25 06	26 11	28 04
18 in	19 06	21 00	22 06	24 00	25 06	27 00	28 06	30 00
19 in	20 07	22 02	23 09	25 04	26 11	28 06	30 01	31 08
20 in	21 08	23 04	25 00	26 08	28 04	30 00	31 08	33 04
21 in	22 09	24 06	26 03	28 00	29 09	31 06	33 03	35 00
22 in	23 10	25 08	27 06	29 04	31 02	33 00	34 10	36 08
23 in	24 11	26 10	28 09	30 08	32 07	34 06	36 05	38 04
24 in	26 00	28 00	30 00	32 00	34 00	36 00	38 00	40 00
25 in	27 01	29 02	31 03	33 04	35 05	37 06	39 07	41 08

Explanation.—To ascertain the number of feet, multiply the number of inches in width, and divide the product by 12; the result will be the number in feet and inches. Thus, multiply 9 inches wide by 26 feet long, and the result will be 234. Divide this by 12 and we have the product 19 feet and 6 inches.

DYEING SHODDY.

When treating shoddy it is frequently necessary to dye comparatively light shades on dark material, and although it is not always possible to properly meet requirements of this kind, satisfactory results may generally be obtained by stripping the color and then dyeing afresh. The stripping agents which are generally used are sulphuric acid or a mixture of sulphuric acid and bichromate of potash, and when these fail to act properly, hydrosulphite is used. A simple method to commence with is to boil for half to three quarters of an hour with sulphuric acid (5 to 15 per cent.), and then, if this is not found to be sufficient, to repeat the process with 3 to 6 per cent. bichromate of potash and 6 to 12 per cent. sulphuric acid.

The material which is thus stripped with the use of both bichromate of potash and sulphuric acid, adopts, however, a yellowish shade, which makes it worthless for a good many shades—especially mode shades—and it is in such cases that stripping with hydrosulphite has proved to be of value. This hydrosulphite is produced by mixing 10 gals. sodium bisulphite, 65° Tw., with 10 gals. of water, and gradually adding 10 lbs. zinc dust while constantly stirring. The whole is then allowed to settle, when 4 to 6 gals. of the clear solution and half a gallon of acetic acid are used, with 100 gals. of water. The material to be stripped is then treated for 20 to 30 minutes in this solution at 140° F., and afterwards rinsed thoroughly.

For dyeing the stripped, or unstripped, shoddy, a range of colorings has been drawn up by Leopold Cassella & Co., which, according to the results shown on the shade card accompanying them, give very satisfactory colors. The following is a summary of the dyestuffs used and their treatment:

Milling Yellow, Milling Red, Formyl Blue, Formyl Violet and Brilliant Milling Green give good results if the shoddy has not been stripped with acid. The goods are entered into a bath heated to 105 to 120° F., and after half an hour's boiling 3 to 5 per cent. bisulphate of soda is added for exhausting the bath.

With anthracene acid colors the bath is prepared with 1 to 2 per cent. acetic acid, and the goods entered at 105° F. The temperature is then raised gradually, and after half an hour's boil the bath is exhausted with 3 to 5 per cent. bisulphate of soda. After exhaustion, bichromate of potash is added in the usual manner, and the goods are then boiled for another 20 to 30 minutes.

When Diamine colors are used, the goods are entered into a bath charged with the dyestuffs only, the temperature then raised to the boil, when the bath is exhausted by the addition of 2 to 3 per cent. acetic acid.

The above instructions all apply to goods which have not been stripped with acid. When acid has been used, the material is entered, after a thorough rinsing, direct into the bath charged with the dyestuff. Further additions of acid are seldom necessary, for the goods generally retain quite enough acid from the stripping process.

Union (cotton and wool) are dyed in as concentrated a liquor as possible (about fifteen times as much water as the weight of the goods), with the addition of 30 per cent crystallized Glauber's salt. When handling stripped union material, care should be taken to see that it contains as little acid as possible on being entered into the dyebath. To ensure this, the material should be thoroughly rinsed after being stripped, some ammonia being added to the rinsing bath so as to neutralize any remaining acid. The goods are entered into the boiling bath and dyed for half an hour without steam, and are then subjected to another half hour's gentle boiling. The after treatment with bichromate of potash or chrome alum is carried out for 20 to 30 minutes in a fresh bath heated to 140° F., with the addition of 1 per cent. acetic acid; but if the dyebath is not used continuously, the after treatment may be carried out there.—Textile Manufacturer.

NAILS AND SPIKES.

Ordinary. Size.	Length. Inches.	No. to lb.
2d	7/8	716
3 fine	1 1-16	588
3	1 1-16	448
4	1 3/8	336
5	1 3/4	216
6	2	166
7	2 1/4	118
8	2 1/2	94
10	2 3/4	72
12	3 1/8	50
20	3 3/4	32
30	4 1/4	20
40	4 3/4	17
50	5	14
60	5 1/2	10

Light.		
4d	1 3/8	373
5	1 3/4	272
6	2	196

Brads.		
6d.	2	163
8	2 1/2	96
10	2 3/4	74
12	3 1/8	50

Clinch. Length. Inches.	No. to lb.
2	152
2 1/4	133
2 1/2	92
2 3/4	72
3	60
3 1/4	43

Fence.	
2	96
2 1/4	66
2 1/2	56
2 3/4	50
3	40

Spikes.	
3 1/4	19
4	15
4 1/2	13
5	10
5 1/2	9
6	7

Boat.	
1 1/2	206

Finishing. Size.	Length. Inches.	No. to lb.
4d	1 3/4	384
5	1 3/8	256
6	2	204
8	2 1/2	102
10	3	80
12	3 5/8	65
20	3 7/8	46

Core.		
6d	2	143
8	2 1/2	68
10	2 1/8	60
12	3 1/8	42
20	3 3/4	25
30	4 1/4	18
40	4 3/4	14

W H	2 1/2	69
W H L.	2 1/4	72

Slate.		
3d	1 5-16	288
4	1 7-16	244
5	1 3/4	187
6	2	146

In the above table d stands for penny. This term penny, as applied to nails, is generally supposed to have been derived from pound. It originally meant so many pounds to the thousand; that is, six-penny means six pounds of nails to the thousand.

DECIMAL APPROXIMATIONS USEFUL IN CALCULATIONS.

Cubic inches × .267 = lbs. average cast iron.
Cubic inches × .281 = lbs. average wrought iron.
Cubic inches × .283 = lbs. average cast steel.
Cubic inches × .3225 = lbs. average copper.
Cubic inches × .3037 = lbs. average brass.
Cubic inches × .26 = lbs. average zinc.
Cubic inches × .4103 = lbs. average lead.
Cubic inches × .2636 = lbs. average tin.
Cubic inches × .4008 = lbs. average mercury.
Cylin. inches × .2065 = lbs. average cast iron.
Cylin. inches × .2168 = lbs. average wrought iron.
Cylin. inches × .2223 = lbs average cast steel.
Cylin. inches × .2533 = lbs. average copper.
Cylin. inches × .2385 = lbs. average brass.
Cylin. inches × .2042 = lbs. average zinc.
Cylin. inches × .3223 = lbs. average lead.
Cylin. inches × .207 = lbs. average tin.
Cylin. inches × .3854 = lbs. average mercury.

RULES FOR OBTAINING APPROXIMATE WEIGHT OF CAST IRON.

Square of diameter multiplied by 2.46 equals weight of cast iron round bar 1 foot long.

To ascertain weight of cast iron columns or pipe subtract weight of inside diameter of shell from weight of outside diameter.

Square of the diameter divided by 5 equals approximately the weight of a circular cast iron plate 1 inch thick.

WEIGHT OF CAST IRON COLUMNS PER LINEAL FOOT OF PLAIN SHAFT.

	Thickness of Metal.							
Diam.	1/4-in.	3/8-in.	1/2-in.	5/8-in.	3/4-in.	7/8-in.	1-in.	1 1/8-in.
2	4.3	6.0	7.4	8.4	9.2	9.7	9.8	....
2 1/2	5.5	7.8	9.8	11.5	12.9	14.0	14.7	....
3	6.8	9.7	12.3	14.6	16.6	18.3	19.6	....
3 1/2	8.0	11.5	14.7	17.6	20.3	22.6	24.6	....
4	9.2	13.3	17.2	20.7	23.9	26.8	29.5	....
4 1/2	10.4	15.2	19.6	23.8	27.6	31.1	34.4	37.3
5	11.7	17.0	22.1	26.9	31.3	35.4	39.3	42.8
5 1/2	12.9	18.9	24.5	29.9	35.0	39.7	44.2	48.3
6	14.1	20.7	27.8	33.0	38.7	44.0	49.1	53.9
6 1/2	15.3	22.6	29.5	36.1	42.3	48.3	54.0	59.4
7	16.6	24.4	31.9	39.1	46.0	52.6	58.9	64.9
7 1/2	17.8	26.2	34.4	42.2	49.7	56.9	63.8	70.4
8	19.0	28.1	36.8	45.3	53.4	61.2	68.7	75.9
8 1/2	20.2	29.9	39.3	48.3	57.1	65.5	73.6	81.5
9	21.5	31.8	41.7	51.4	60.8	69.8	78.5	87.0
9 1/2	22.7	33.6	44.2	54.5	64.4	74.1	83.5	92.5
10	23.9	35.4	46.6	57.5	68.1	78.4	88.4	98.0
10 1/2	25.2	37.3	49.1	60.6	71.8	82.7	93.3	103.5
11	26.4	39.1	51.6	63.7	75.5	87.0	98.2	109.1
11 1/2	27.6	41.0	54.8	66.7	79.2	91.3	103.1	114.6
12	28.8	42.8	56.5	69.8	82.8	95.6	108.0	120.1
12 1/2	...	44.6	58.9	72.9	86.5	99.9	112.9	125.6
13	...	46.5	61.4	75.9	90.2	104.2	117.8	131.2
13 1/2	...	...	63.8	79.0	93.9	108.5	122.7	136.7
14	...	...	66.3	82.1	97.6	112.8	127.6	142.2
14 1/2	...	...	68.7	85.2	101.2	117.0	132.5	147.7
15	...	...	71.2	88.2	104.9	121.3	147.3	164.3
16	...	...	76.1	94.3	112.3	129.9	147.3	164.3
17	...	...	81.0	100.5	119.7	138 5	157.1	175.3
18	...	...	85.9	106.6	127.0	147.1	166.9	186.4
19	...	...	90.8	112.8	134.4	155.7	176.7	197.4
20	...	...	95.7	118.9	141.7	164 3	186.5	208.5

WEIGHT OF VARIOUS MATERIALS.

Weight of Stones.—Granite (averages), per cubic foot, 170 lbs.; limestone (magnesium), 144 lbs.; Berea (sandstone), 140 lbs.; freestone, 140 lbs.; gypsum, natural state, 140 lbs.

One ton of vein marble is 13 cubic feet; of statuary marble, 13½; granite, 13½; of Berea stone, 14½; of limestone, magnesium, 13¾.

Weight of Masonry.—Granite, per cubic foot, 160 lbs.; of Berea stone range, 140; of limestone rubble, 140; of brick, dry, 115; of brick, dry (press), 130; of brick, dry (fire), 150; of brick masonry in mortar, 110; of brick masonry cement, 112.

Weight of Marble Slabs.—One-half inch thick, per sq. foot, 7.17 lbs.; ¾-inch thick, 10 75; 1 inch thick, 14.32; 1¼ inch thick, 17 92; 1½ inch thick, 21.05; 1¾ inch thick, 25.08; 2 inch thick, 28.67; 2½ inch thick, 35.83.

Cement and Lime.—One bushel of Portland cement weighs 96 lbs.; of Rosendale, 70; of Louisville, 62; of quicklime well shaken, 80; of quicklime, loose, 70.

Iron and Wood.—One cubic foot of wrought iron weighs 480 lbs.; of cast iron, 450; of oak (seasoned), 38; of pine (seasoned), 36.

Coal.—One bushel of anthracite weighs 86 lbs.; of bituminous, 80; of coke (Connellsville), 40; of charcoal (hardwood) 30.

Miscellaneous Weights.—Per cubic foot: Ordinary quicklime, 53 lbs.; old mortar, 90; new mortar, well tempered, 115; new mortar, 110; river sand (average), 107; river sand (screened), 95; clay with gravel, 130; earth—vegetable, 90; earth—loamy, 100; earth—semi fluid, 110.

To Find the Weight of Cast Iron Balls when the Diameter is Given.—Multiply the cube of the diameter by .1377.

To Find the Diameter of Cast Iron Balls when the Weight is Given.—Multiply the cube root of the weight by 1.936.

To Find the Weight of a Spherical Shell.—From the weight of a ball of the outer diameter subtract the weight of one of the inner diameter.

Cast Iron.—Assumed weight in estimating a cubic foot = 450 lbs., a square foot, 1 inch thick = 38 lbs., a bar 1 inch square and 1 foot long = 3.125 lbs.

HOW TO FIX ANILINE DYES ON WOOL.

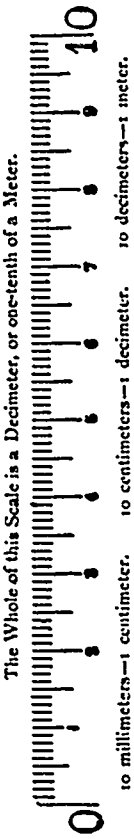
The wool must be completely freed from fat before dyeing by washing with soap, carbonate of soda, and ammonia, and then freed from every trace of the cleansing agents by thorough rinsing with cold and warm water. To dye wool in a neutral bath, the dye is added to the bath in a completely dissolved state, and the goods are entered at 40° C. The bath is then heated to 95° C., and the goods are worked at this temperature for three-quarters of an hour. If the water is hard it should be mixed with from 1 to 2 per cent. of its weight of acetic acid. Too much acid must not be added, as it delays the dyeing. With Fuchsine, Cerise, Grenadine and Methyl Violet, a little Marseilles soap increases the purity of the shade. For a weak acid bath from 5 to 10 per cent. of acetic acid are put in with the dye. Enter at 40° C., boil up and boil from 30 to 45 min. Another way is to boil for half an hour with 5 per cent. each of alum, tartar and acetic acid of 6° B., then allow to cool to 50° C., and put in the dye. Then boil up again (first re-entering the goods, which are taken on while the dye is being put in), and boil from 15 to 30 minutes. If care is taken not to enter too hot, or to boil up too quickly, there will be little fear of unlevel shades.

To dye wool in a strongly acid bath, make the bath with 10 per cent. of Glauber's salt, 2 to 4 per cent. of sulphuric acid and the necessary dye. Enter the goods at 40 to 50° C., work and boil up, and boil for from 45 to 90 minutes. Another way is to substitute 5 to 10 per cent. of tartar preparation for the acid; the rest of the procedure is the same. If in dyeing dark shades the bath does not exhaust properly, let it cool a little, then add 1 to 2 per cent. of sulphuric acid and boil gently for another half hour. A third method is to put in 5 to 10 per cent. of acetic acid with the dye, enter at 50° C., boil for an hour, add 1 to 2 per cent. of sulphuric acid or 2 to 5 per cent. of tartar preparation, and then boil for another 30 to 60 minutes.

To dye wool in an alkaline bath, add 5 to 10 per cent. of borax or 3 to 5 per cent. of soda crystals with the dye, enter at 60° C., boil up, boil for from 45 to 60 minutes, rinse thoroughly, and then give a second bath containing 5 per cent. of sulphuric acid. Work in this bath, which is a neutralizing bath only, for a quarter of an hour at 60° C., and finally rinse thoroughly.

To dye wool on a mordant of bichromate or chromium fluoride, boil it with 1 to 4 per cent. of bichromate and 1 to 2 per cent. of oxalic acid, or 1 to 3 per cent. of tartar for an hour and a half, rinse and dye in a fresh bath acidified with from 1 to 2 per cent. of acetic acid, according to the amount of dye and the hardness of the water. Enter at 35° to 40° C., and bring to the boil very slowly. Instead of the bichromate, 2 to 5 per cent. of the chromium fluoride can be used. With the bichromate, lactic acid can be substituted for the tartar or oxalic acid. Boil for 30 to 60 minutes with 1.5 per cent. of bichromate, 2.75 per cent. commercial lactic acid (50 per cent.), and 1.0 per cent. sulphuric acid. To after-chrome, dye in a strongly acid bath as above described, and then, when the bath is exhausted, treat the goods in the same or in a fresh bath with the 3 per cent. of bichromate or 1½ to 4 per cent. of chromium fluoride, according to the amount of dye used, first letting the bath cool to 70° C. When the fluoride has been added in solution the bath is boiled for another hour and a half. If the dyebath is to be used a second time, the chroming must be done in a fresh bath.

METRIC SYSTEM OF WEIGHTS AND MEASURES.



The metric system of weights and measures will soon be adopted in some form throughout the English-speaking world. All should, therefore become familiar with it; especially as its principles can be learned in ten minutes. To show its simplicity the following is taken from a chart of the system, published by Biggar, Samuel & Co., in which the entire series of tables, applicable to all purposes, is given on a single sheet. The diagrams on the chart referred to are not here reproduced, but a decimeter (one-tenth of a meter) is given on the margin:

A meter is, as near as possible, the ten-millionth part of the distance from the earth's equator to its pole. In the Metric System the meter serves as the unit from which are derived all measures, whether of length, area, volume, capacity or weight, and the denominations of all the measures are based on the decimal system of notation. The fractions of each measure are expressed by placing before the unit prefixes derived from the Latin, such as deci (a tenth), centi (a hundredth), and milli (a thousandth), while multiples of the measure are denoted by prefixes derived from the Greek, such as deca or deka (ten), hecto or hekto (hundred), and kilo (thousand). Applying these simple principles we have the following tables of measures and weights:

MEASURES OF LENGTH.

10 Millimeters	=	1 Centimeter
10 Centimeters	=	1 Decimeter
10 Decimeters	=	1 Meter
10 Meters	=	1 Decameter
10 Decameters	=	1 Hectometer
10 Hectometers	=	1 Kilometer
10 Kilometers	=	1 Myriameter

MEASURES OF AREA.

The unit of measures of area is the square meter. For land measuring the unit is the are (pronounced air) which is equal to 100 square meters, and which is multiplied and divided as in Square Measure.

100 Square Millimeters	=	1 Square Centimeter
100 Square Centimeters	=	1 Square Decimeter
100 Square Decimeters	=	1 Square Meter
100 Square Meters	=	1 Square Decameter or 1 Are
100 Square Decameters	=	1 Sq Hectometer or 1 Hectare
100 Square Hectometers	=	1 Square Kilometer

MEASURES OF WEIGHT.

A cubic centimeter of distilled water at its greatest density (a temperature of 39.2 Fah.) is taken as the unit of weight, and is called a gram. In commerce the kilogram is also a unit, and by common usage is abbreviated to kilo (pronounced kee-lo).

10 Milligrams	=	1 Centigram
10 Centigrams	=	1 Decigram
10 Decigrams	=	1 Gram
10 Grams	=	1 Decagram
10 Decagrams	=	1 Hectogram
10 Hectograms	=	1 Kilogram
10 Kilograms	=	1 Myriagram
10 Myriagrams	=	1 Quintal
10 Quintals	=	1 Metric ton

METRICAL UNITS AND ENGLISH EQUIVALENTS.

1 meter = 39.37 inches.
1 square meter = 1.196 square yards.
1 hectare = 2.471 acres.
1 cubic meter = 1.308 cubic yards.
1 liter = 1.76 English pints or 2.113 U. S. pints.
1 gram = 15.432 grains.
1 kilogram = 2.205 lbs. avoirdupois.

MEASURES OF VOLUME.

A cubic decimeter is the unit of the measure of volume, or cubic measure. 1 cubic centimeter of water weighs 1 gram. (See Measures of Weight).

1,000 Cubic Millimeters	=	1 Cubic Centimeter
1,000 Cubic Centimeters	=	1 Cubic Decimeter
1,000 Cubic Decimeters	=	1 Cubic Meter or Stere
1,000 Cubic Meters	=	1 Cubic Decameter.
1,000 Cubic Decameters	=	1 Cubic Hectometer, etc.

MEASURES OF CAPACITY.

The unit of the measure of capacity, both for dry measure and liquid measure, is called a liter (pronounced leet-er), and is equivalent in contents to a cubic decimeter.

10 Milliliters	=	1 Centiliter
10 Centiliters	=	1 Deciliter
10 Deciliters	=	1 Liter
10 Liters	=	1 Decaliter
10 Decaliters	=	1 Hectoliter
10 Hectoliters	=	1 Kiloliter
10 Kiloliters	=	1 Myrialiter

RULES FOR OBTAINING APPROXIMATE WEIGHT OF WROUGHT IRON.

For Round Bars.—Multiply the square of the diameter in inches by the length in feet, and that product by 2.6. The product will be the weight in pounds, nearly.

For Square and Flat Wrought Bars.—Multiply the area of the end of the bar in inches by the length in feet, and that by 3.32. The product will be the weight in pounds, nearly.

To find the sectional area of a bar of wrought iron, given the weight per foot, multiply by 3 and divide by 10.

To find the weight per foot, given the area, divide by 3 and multiply by 10.

To Convert Weight of—

Wrought iron into cast iron × 0.928.
Wrought iron into steel × 1.014.
Wrought iron into zinc × 0.918.
Wrought iron into brass × 1.082.
Wrought iron into copper × 1.144.
Wrought iron into lead × 1.468.
Square iron into round × .7854.

KEEPING MILL ACCOUNTS.

Apart from the technical side of any industry, a great deal depends upon the management of the finances, and as an important factor relating to the latter a proper system of account or book-keeping cannot be over-estimated. To the progressive spinner and manufacturer any new information on this subject is usually welcomed, and so the abstract of an article by E. J. Forney, of the North Carolina State Industrial College, is given below. Many of the remarks apply to methods peculiar to United States practice, but the principle remains the same.

The manufacturer of the future will be able to get, at all times, a complete statement of his affairs, including loss and gain results for short time periods, as is usually afforded by the annual or semi-annual closing of the books, and that, too, without extra clerical costs. The accounting system of the future will be so constructed that small shareholders, the number of whom are rapidly increasing, can have the assurance of those who direct the financial operations of the company, that their annual dividend is not, by some trick of accounting, paid out of invested capital, or resulting in a depleted plant. In no single department has there been, within the last ten years, so marked improvement as in the accounting department. All kinds of loose-leaf propositions have found their way into the best offices. Many of these are valuable as time savers, and some one or more can be used in many lines to good advantage. Manufacturing cost systems, vouchers systems, balance ledgers, columnar cash books and journals, and daily ledger proof may be mentioned as having come into general practice within the last few years; but one development which, to my mind, stands out foremost of all, is the introduction of a going balance-sheet, and an active loss and gain statement for short-time periods. Under existing methods the loss and gain account is disturbed once a year only, or whenever the books are closed. But what modern manufacturer in this day of sharp competition can afford to wait twelve months to know the condition of his affairs? In order to get a statement at any time, the closing of the books depends upon one thing—the inventory. Since the books reflect (or ought to), all the liabilities and all the assets, with the one exception of the inventory, it is only necessary to supply the missing assets to complete the circle, and with a going inventory in the books, it is only a step to a going loss and gain statement and a going balance-sheet. The analysis of the loss and gain account and of expense, becomes then a mere matter of detail, whipping into line the information in the books. Manufacturers who now keep classified records of all materials bought and used have a going inventory in their books; many of them do this, and most of them are doing something towards obtaining the cost of production. Some of these methods are cumbersome, and the result is approximately, not absolutely, accurate. In this approximate cost may be covered up the difference between a steady gain and a steady loss, and this indefinite method should be eliminated from the accounting system, and a method which will give absolute cost installed. There is a widespread demand among manufacturers for accounting systems that will develop the cost of production without loading down the office with needless details. The following brief, general plan, which embodies many of the latest developments, including the going balance-sheet, and which, with a slight change, can be adapted to meet particular conditions, will produce absolute cost of production with a minimum amount of office work.

It is the custom of most American manufacturing estab-

lishments to pay their labor every two weeks, and we will assume this to be the time period. At the end of every four weeks (thirteen times a year), the secretary-treasurer will make up his report. This report will show a four weeks' loss and gain account, general loss and gain account, amount held for impairment and betterment, etc.—in short, a complete statement of the business.

The items of expense which enter into the cost of finished product are raw material, supplies, wood and coal, insurance (paid in advance), taxes (accruing), plant depreciation, producing labor, non-producing labor (salaries), and incidentals. Of these items, plant depreciation, insurance, taxes, and non-producing labor are fixed, and the absolute amount for the year can easily be reckoned, one-thirteenth of which must be spread over the finished product of four weeks. The raw material, supplies, wood and coal, producing labor, and incidentals will vary each month, and a record must be kept of the actual amount consumed, the total of each being spread over the finished product for that particular period. The cost of producing any finished product will change slightly each month, depending upon the variations in these accounts. All of the above accounts, except producing labor, and incidentals, should be entered in the ledger, along with other items of resource—notes receivable, value of finished product, other assets, if any. An account should also be opened with "manufacturing." The ledger should contain the liabilities, as follows: Notes payable, accounts payable, taxes, four weeks' loss and gain, general loss and gain (undivided profits), impairment and betterment, capital stock, other liabilities, if any. The above conditions, including the cash, will open a double entry set of books. A brief analysis of each account will make the scheme perfectly clear.

Raw Material.—Debit this account with the inventory at cost, which should include freight, with future purchases, the total amount for the time period coming from the special column in the cash book in one entry. Through the journal, credit the account with the cost of raw material consumed during the time period under consideration, debiting the manufacturing account with a similar amount. The difference will represent the value of the raw material on hand, a fact the manufacturer may be called upon any day to establish in case of fire. Rule the account, bringing down the difference below the line inventory for the new time period. The best manner of arriving at this cost of raw material will readily suggest itself to anyone. If the cost record showing the different quantities of each grade is desirable, this classification can be easily made, though this record, which is simply a memorandum for the guidance of the purchasing department, not of cost values, forms no part of the accounting system.

Supplies.—Debit with the inventory at cost with future purchases, the amount being controlled by the total from the cash book. Credit the account with cost of supplies used, debit the manufacturing account with the same amount. One journal entry will effect the result.

Wood and Coal.—Debit with the inventory at cost with future purchases, the total from the special column in the cash book controlling. Credit the amount consumed, debiting the manufacturing account. One journal entry.

Insurance.—As all insurance is paid in advance, generally for one year, this account will show an asset to the extent of the insurance unconsumed. In order to spread the insurance equally over the finished product of many time periods, credit this account at the end of each time period with one-thirteenth of the annual insurance, debiting the manufacturing account with a corresponding amount. The difference should be brought down as an asset, which will be constantly reduced as the time periods are charged off. The account will balance at the end of the year. This entry can be made on the face of the ledger, and the amount carried direct to the manufacturing account.

Taxes.—This account is designed to take care of accruing taxes. It should be credited at the end of each time period with one-thirteenth of the yearly taxes, and the manufacturing account debited with same amount. It will stand on the books as a liability, increasing each month, until the taxes are paid in full, when it will become a resource to the extent of the taxes paid in advance. It should then be treated similar to the insurance account.

Incidentals.—All payments for stamps, printing, advertisements, gas, water, light, expense of salesmen and offices, etc., should be entered in the "incidentals" column in the cash book. The total amount at the end of the time period should be carried direct to debit of the manufacturing account. If there is any appreciable inventory on hand, which could be reasonably charged to a future time period, handle the account from the ledger, bring down the inventory, and carrying only the amount consumed to manufacturing account.

Producing Labor.—The amount paid for pay-roll should be entered in the "labor" column in the cash book, and the total carried to the debit of the manufacturing account.

Non-producing Labor, Salaries.—The special "salary" column in the cash book should contain all payments made on account of these items. If care be taken so that all salaries of managers are paid at the end of each four weeks (one-thirteenth of the yearly amount), the total of this column can be carried direct to the manufacturing account; otherwise, if payments are made by the calendar month (one-twelfth of the yearly amount), it is necessary to carry the total of the special column whatever it may be at the end of the time period to the ledger account as above, and carry only one-thirteenth of the yearly amount to manufacturing account. The difference will show a resource or liability. The account will balance at the end of the year. These accruing manufacturing costs are salaries of managers, foremen, clerks, watchmen, teamsters, and similar workmen who cannot be classified as producing labor.

Impairment and Betterment.—This account should be credited at the end of each time period with one-thirteenth of the annual depreciation of the plant (to be determined by the board of directors), which is made up as follows: Mill site, buildings, power plant, machinery and fixtures, tools and furniture, horses and wagons. The manufacturing account should be debited with a similar amount. This account should be debited from the cash book with the total paid during the time period for tools, repairs, etc. The difference in the account will show the amount held in reserve for the improvement of the plant. As the plant and its duplication forms the basis of one of the most important accounts in a ledger, a word in extenso as to the manner of its intelligent handling will not be out of place here. A good plan is to carry in the books all machinery and other items of plant at cost so long as they are in service, debiting all new machinery and other additions, and crediting at cost all machinery sold or rendered useless by wear or invention and therefore withdrawn from use, creating in the meantime a reserve against which to charge losses by depreciation when the same become apparent through alterations. It is wise to classify and sub-divide your subordinate plant accounts to

any extent which may be desirable, as, for example, manufacturing plant, mill site, buildings, power plant, machinery and fixtures, tools and furniture, horses and wagons. It is necessary to have records, classified after the same plans, giving in detail the cost of such items of plant, to enable you to give at any time the details which make up the one item in your balance-sheet, called plant, a thing which might prove very valuable in a case of serious loss by fire.

To illustrate the plan: Suppose the machinery and fixtures account stand at £40,000, which represents the cost (or, in the case of an old plant, the appraised value), of the items of plant belonging in this account, and suppose we run for ten years without making any change in the plant, reserving for depreciation of machinery meantime at the rate of 7 per cent. per annum on the cost. At the end of the ten years machinery and fixtures will still be represented in the asset account of plant at £40,000, and we shall have a reserve for depreciation of machinery and fixtures of £28,000. Suppose now that we purchase fifty new machines at the cost of £160 each. We will charge machinery and fixtures with the cost of fifty new machines, £8,000, and will credit it with the cost of the forty old machines thrown out, £6,000. For the purpose of illustration, we will say that the old machines are worthless. When we credit the plant account with their cost, £6,000, we must debit that amount somewhere; we will charge it to impairment and betterment. The transaction does not affect the surplus nor any other profit account at all, we have simply reduced the asset account of the plant by the cost of some machinery which is no longer a part of the plant, and have reduced by the same amount the liability account of the impairment and betterment, which was created for this very purpose With a classified plant account at cost, we shall have a good guide for insurance purposes. In case of a disastrous fire we would have a right to expect a settlement by the insurance companies on the basis, not of the market value of the property destroyed, but of the cost of replacement; and in this plant account, backed up by detailed records, we shall have an excellent basis of judgment.

Manufacturing Account.—This account shows the debit items from the following accounts: Raw material, supplies, wood and coal, insurance, taxes, incidentals, labor, salaries, impairment, and betterment. The total amount represents the actual cost of the finished product produced during the time-period. A record must be kept of the finished product as it comes from the mill. The cost per pound or individual piece can be easily determined. The account should be closed at the end of each time period of the finished product account.

Finished Product.—Debit with the cost of finished product on hand at the opening of the books with the amount of manufacturing account at the end of each time-period. It is credited at cost with all sales, the amount being controlled by the total only from a special column in the sales book. The difference will represent the cost value of the finished product on hand.

The Sales Book.—This is the regular charging medium to individual customers; it should carry two extra columns, one for "cost," and one for "gain." If it is not convenient to purchase a new sales book, the date lines at the left can be utilized for this purpose. The "cost" and "gain" is reckoned either on the individual sale or the total quantity sold. The total "gain" is posted to the credit of the four weeks' loss and gain account, and the total of the "cost" column to the credit of the finished product account. The column showing the amount of charges to customers should be added, and the amount carried forward from page to page.

Cash Book.—All payments for raw material, supplies, labor, etc., should be made by cheque, and a right side of the cash book should be a register of these cheque payments. It should have columns to agree with the main accounts in the leger; raw material, supplies, wood and coal, insurance, taxes, incidentals, labor, salaries, impairment and betterment, "sundries," commission, loss and gain, and total (bank account). The items in the "sundries" column only are to be posted to individual accounts, though, as a matter of fact, under a set of books intelligently handled the credit accounts rarely, if ever, get into the ledger. Insurance and taxes would not justify a special column and should be posted from "sundries" column. The totals of the other columns are posted at the end of each time period to the debit side of the respective accounts as already indicated. The debit side of the cash book should contain one column for sundries, to receive cash payments made by individual accounts. This column should be added. It should contain one column for interest, and two or three blank columns. There is sufficient room on this page for the "bank deposits," and a column headed thus can be used to good advantage.

Four Weeks' Loss and Gain.—This account receives as a credit the total of the "gain" column from the sales book, and all items of interest paid to the firm through the cash book. It receives as a debit from the right side of the cash book all the items of interest paid by the firm, commissions allowed, freight paid on finished product and other deductions in the nature of trading concessions, which cannot be considered as a charge against cost of production. It is closed at the end of each time period.

General Loss and Gain Account.—Credit this account at the end of each time period with the difference from the four weeks' loss and gain account. The total represents the amount held for the payment of dividends, etc. The account is debited with all dividends declared, the remainder being undivided profits or reserve held for future operations. All individual accounts should show a "balance" and all posting of these accounts should be proved daily. This safeguard is not a laborious task, and it does away entirely with the necessity of getting off a trial balance. This proof is absolute in detecting errors of posting and additions, and the book-keeper should make himself acquainted with its operation. In order to be in touch with the information on the books, there should be opened in the back of the ledger an account with "Customers Dr." This account must be charged with the totals of the sales to customers during the time period, and credited with all amounts due to customers or accounts payable, in the general ledger. These two accounts are simply memoranda, the aim being to bring to a focus the widely scattered material of accounts receivable and payable. With these two items at instant command, the making of a complete statement of the business at the end of any time period is a matter of a few minutes only, and the books thus kept will afford valuable information to the management for studying the development of the business.

MEASURES.

Troy Weight.—24 grains make 1 pennyweight, 20 pennyweights make 1 ounce. By this weight gold, silver and jewels only are weighed. The ounce and pound in this are the same as in Apothecaries' weight.

Apothecaries' Weight.—20 grains make 1 scruple, 3 scruples make 1 dram (drachm), 8 drams (drachms) make 1 ounce, 12 ounces make one pound.

Avoirdupois Weight.—16 drams (drachms) make 1 ounce, 16 ounces make 1 pound, 25 pounds make one quarter, 4 quarters make 1 hundredweight, 2000 pounds make 1 ton, 2240 pounds one long ton.

Dry Measure.—2 pints make 1 quart, 8 quarts make 1 peck, 4 pecks make 1 bushel, 36 bushels make 1 chaldron.

Liquid or Wine Measure.—4 gills make 1 pint, 2 pints make 1 quart, 4 quarts make 1 gallon, 31½ gallons make 1 barrel, 2 barrels make one hogshead.

Circular Measure.—60 seconds make 1 minute, 60 minutes make 1 degree, 30 degrees make 1 sign, 90 degrees make 1 quadrant, 4 quadrants or 360 degrees make 1 circle.

Lineal Measure.—Distance.—3 barleycorns or 12 lines 1 inch, 12 inches 1 foot, 3 feet 1 yard, 5½ yards 1 rod, 40 rods 1 furlong, 8 furlongs 1 mile.

Cloth Measure.—2¼ inches 1 nail, 4 nails 1 quarter, 4 quarters 1 yard.

Miscellaneous.—3 inches 1 palm, 4 inches 1 hand, 6 inches 1 span, 18 inches 1 cubit, 21.8 inches 1 Bible cubit, 2½ feet 1 military pace, 6 feet 1 fathom, 7.92 inches 1 link, 100 links or 66 feet 1 chain, 10 chains 1 furlong, 80 chains 1 mile.

Square Measure.—144 square inches 1 square foot, 9 square feet 1 square yard, 30¼ square yards 1 square rod, 40 square rods 1 rood, 4 roods 1 acre.

Surveyors' Measure.—7.92 inches 1 link, 25 links 1 rod, 4 rods 1 chain, 10 square chains or 160 square rods 1 acre, 640 acres 1 square mile.

Cubic Measure.—1728 cubic inches 1 cubic foot, 27 cubic feet 1 cubic yard, 128 cubic feet 1 cord (wood), 40 cubic feet 1 ton (shipping), 2150.42 cubic inches 1 standard bushel, 268.8 cubic inches 1 standard gallon, 1 cubic foot four-fifths of a bushel.

HOW TO MEASURE COAL IN A BIN OR BOX.

A solid cubic foot of anthracite coal weighs about 93 pounds. When broken for use it weighs about 54 pounds. Bituminous coal, when broken up for use, weighs about 50 pounds. The consequent rule for the approximate measurement of coal in a bin or box is to multiply the length in feet by the height in feet, and again by the breadth in feet, and this result by 54 for anthracite coal, or by 50 for bituminous coal. The result will equal the number of pounds, and to find the number of tons, divide by 2,000.

THE AGE OF ANIMALS.

By the time a colt is eight months old it has a full set of milk teeth. These teeth have a slender fang, and on their front surface grooves or furrows, which are worn smooth on the middle nippers by the time the colt is a year old, and on the next pair in two years, from the cutter teeth in three years.

At two the nippers are loose and fall out, their place taken by two permanent teeth with deep, black cavities and full sharp edges. At the age of three the next pair undergo the same change and at four the corner teeth. By five years of age the horse has a full set of permanent teeth. These teeth grow longer by slow degrees, and at the same time wear away at the bottom—the wearing about one-twelfth of an inch a year—and gradually show irregularity in form.

The age of cattle is told by the rings on the horns, as also of rams. As a rule the animal begins to have rings at two years of age, forming a ring a year after that. This is not an infallible rule, but it is a convenient one to know.

The age of a sheep is told by the teeth. A young sheep has eight even front lower teeth (no upper ones). At the age of two the front two are supplanted by others of greater width. At three a new small tooth appears on each side of the two broad ones. At four the animal has six new teeth, and at five all the set are broad. Then they begin to narrow, and the teeth of an old sheep are thin, sharp and long

HOW TO MEASURE A BARREL, IN GALLONS.

The barrel is usually estimated at 31½ gallons, and the hogshead at 63 gallons. But the following will enable one to find the exact capacity of any barrel. A gallon of water weighs nearly 8½ pounds, avoirdupois. A pint is generally estimated as a pound, and the rule is to add together the diameters of the bung and head in inches and divide the sum by two, which equals the average diameter. Then multiply the average diameter by itself in inches and again by the height in inches, then multiply by 8 and cut off the right hand figure, and you have the number of cubic inches. Divide by 231 and you have the number of gallons. To find the number of bushels divide by 2,150.4.

HOW MANY BRICKS REQUIRED FOR A WALL.

The usual size of bricks is 8 inches long, 4 inches wide and 2 inches high, or 64 cubic inches. It takes 27 such bricks to make a cubic foot, without mortar, and from 20 to 22 with mortar. The following is a common rule for brick measurement: Multiply the length of the wall in feet by the height in feet, and that by its thickness in feet, and then multiply that result by 20, and the product will be the number of bricks to the wall. If there are doors or windows in the wall then multiply their height, width and thickness together and deduct the amount from the solid contents of the wall, before multiplying by 20

HOW TO MEASURE A WALL.

It is customary to estimate walls by the perch, a perch being equal to 24¾ cubic feet. At least, that was customary. The foot is now more commonly employed as the unit of measurement. Cut-stone is sold by the cubic foot. Brick largely is reckoned by the thousand brick laid in the wall. The following scale for wall measurement is in common use:

4½ inch wall (½ brick) per superficial foot, 7 bricks.
9 inch wall (1 brick) per superficial foot, 14 bricks.
13 inch wall (1½ bricks) per superficial foot, 21 bricks.
18 inch wall (2 bricks) per superficial foot, 28 bricks.
22 inch wall (2½ bricks) per superficial foot, 35 bricks

For every half-inch added to the thickness of a wall seven bricks are allowed. A rule which often comes convenient for ascertaining the number of bricks in a wall is to multiply the length by the height, deducting for windows and doors, getting the square feet of the wall, and then multiplying the number of feet found to the surface measurement by the number of bricks per thickness, as shown in the foregoing scale In buying and selling the bricks in an old wall this rule is a great convenience.

HOW TO MEASURE LOGS AND LUMBER.

First find the average diameter of the log, and then allow 4 inches in diameter for slab waste, then square the remaining diameter and multiply length in feet. That will give the number of feet in board measure contained in the log.

In board measurement, one inch in thickness is the unit employed. Thus, if a board is twenty feet in length, one foot in width and one inch thick, it constitutes twenty feet of lumber, but if it is two inches thick it constitutes forty feet, or if half an inch, ten feet. If then, the measurement is by count, the thickness must be the base of calculation.

It is customary to compute the length and height of a pile of boards in feet and the width in inches. Then, bearing in mind that twelve inches make a foot, the computation is simplified. For example, if the boards are twenty-four feet

long and six inches wide, each board will contain twelve feet in lumber. If the board be two inches thick, that is, a plank, then double the figures in price measurement. But any kind of timber can be computed readily by remembering that one foot in length one foot in width and one inch in thickness, constitute a foot of timber.

HOW TO MEASURE CISTERNS AND WELLS.

It is often desirable to know how much water there is in a cistern or old-fashioned well. The rule is: Multiply the square of the diameter in inches by the depth of the water in inches, and this by 34, and then point off four figures. The result will be the quantity in gallons. Of course, if the capacity of the cistern or well, if full, were the point to be determined, the depth of the well or cistern itself would be taken. If it be desired to reduce the calculation to barrels divide by 31½; if to hogsheads, by 63.

HOW TO MEASURE A TREE.

Very many persons, when looking for a stick of timber, are at a loss to estimate either the height of the tree or the length of timber it will cut. The following rule will enable anyone to approximate nearly to the length from the ground to any position desired on the tree: Take a stake, say six feet in length, and place it against the tree you wish to measure Then step back some rods, twenty or more if you can, from which to do the measuring. At this point a light pole and a measuring rule are required. The pole is raised between the eyes and the tree, and the rule is brought into position against the pole. Then by sighting and observing what length of the rule is required to cover the stake at the tree, and what the entire tree, dividing the latter length by the former and multiplying by the number of feet the stake is long, you reach the approximate height of the tree. For example, if the stake at the tree be six feet above ground and one inch on your rule corresponds exactly with this, and if then the entire height of the tree corresponds exactly with say nine inches on the rule, this would show the tree to possess a full height of 54 feet. In practice it will thus be found an easy matter to learn the approximate height of any tree, building, or other such object.

To Measure Casks or Barrels.—Find mean diameter by adding to head diameter two-thirds (if staves are but slightly curved, three-fifths) of difference between head and bung diameters, and dividing by two. Multiply square of mean diameter in inches by .7854, and the product by the height of the cask in inches. The result will be the number of cubic inches. Divide by 231 for standard or wine gallons, and by 282 for beer gallons.

Grain Measure.—To find the capacity of a bin or wagon-bed, multiply the cubic feet by .8 (*tenths*). For great accuracy, add ⅛ of a bushel for every 100 cubic feet. To find the cubic feet, multiply the length, width and depth together.

Cistern Measure.—To find the capacity of a round cistern or tank, multiply the square of the average diameter by the depth, and take 3 16 of the product. For great accuracy, multiply by 1865. For square cisterns or tanks, multiply the cubic feet by .2½. The result is the contents in barrels.

Land Measure.—To find the number of acres in a body of land, multiply the length by the width (in rods), and divide the product by 160. When the opposite sides are unequal, add them, and take half the sum for the mean length or width.

Measures of Capacity. The following table, showing contents of boxes, will often be found convenient, taking inside dimensions:

24 in. by 24 in. by 14.7 will contain a barrel of 31 ½ gallons.
15 in. by 14 in. by ' in. will contain 10 gallons.
8¼ in. by 7 in. by 4 in. will contain a gallon.
4 in. by 4 in. by 3.6 in. will contain a quart.
24 in. by 28 in. by 16 in. will contain 5 bushels.
16 in. by 12 in. by 11.2 in. will contain a bushel.
12 in. by 11.2 in. by 8 in. will contain a half bushel.
7 in. by 6.4 in. by 12 in. will contain a peck.
8.4 in. by 8 in. by 4 in. will contain a ½ peck, or 4 dry quarts
6 in. by 5 3-5 in., and 4 in. deep, will contain a half gallon.
4 in. by 4 in., and 2 1-10 in. deep, will contain a pint.

GENERAL RULES FOR ESTIMATES OF MEASUREMENT.

Multiply three sides of a cube together and the result is its solid contents, and multiply the square of the length of one side of the cube by six, and you have its surface.

The surface of a sphere is found by multiplying its diameter by its circumference, and its solidity is ascertained by multiplying the square of the diameter by 3.1416.

The solidity of a cylinder is found by multiplying the area of one end by its length.

The area of a triangle is found by multiplying the base by one-half the altitude. The area of a rectangle is found by multiplying the length by the breadth.

The area of a circle is ascertained by multiplying one-half the diameter by one-half the circumference.

The circumference of a circle is three and one-seventh times greater than its diameter.

MEMORANDA FOR PAINTERS.

Painters' work is generally estimated by the yard, and the cost depends upon the number of coats applied, besides the quality of the work and the material to be painted.

One coat or priming will take, for 100 yards of painting, 20 pounds of lead and 4 gallons of oil. Two-coat work, 40 pounds of lead and 4 gallons of oil. Three-coat work, the same proportionate quantity as two coats; so that a fair estimate for 100 yards of three-coat would be 100 pounds of lead and 16 gallons of oil.

One gallon priming oil will cover 50 superficial yards.

One pound of paint covers about four superficial yards the first coat, and about six each additional coat. One pound of putty, for stopping every twenty yards.

One gallon of tar and one pound of pitch will cover 12 yards superficial the first coat, and 17 yards each additional coat.

A day's work on the outside of a building is 100 yards of first coat, and 80 yards of either second or third coat. An ordinary door, including casings, will, on both sides, make eight to ten yards of painting, or about five yards to a door without casings. An ordinary window makes about two and one-half or three yards.

THE MANUFACTURE OF ROPE.

The machinery used in the manufacture of rope is divided, according to the operations to be performed, into four general classes, namely, preparation, spinning, forming and laying. The preparation machinery may be divided into two classes—the drawing machines, single chains, and the heckling machines, or breakers, which are double-chain machines. The hemp is received in tightly compressed bales, which are taken to the opening room, where the lashings are cut from the bales, and the hemp, which is packed in heads or hands, is taken out and each bunch untied and shaken out thoroughly. It is then passed through a softening machine, consisting of from six to ten bars of heavy fluted iron rollers. An oil sprinkler at the head of this machine enables the

operator to distribute over the hemp a quantity of oil, varying according to the amount of hemp, as well as to the uses to which the yarns or rope are to be put. The hemp is softened and the fibre separated, and is now ready for the heckling or combing process.

In the case of manila, owing to the fineness or softness of the hemp at the tow, the fibres are not separated, but are bunched together in a towy mass. In order to separate the fibre and remove the tow, an operation termed "scutching" is introduced. A bundle of hemp is seized at the middle of its length, and the top end thrown against the swift revolving cylinder. This rim is thickly studded with steel pins or blades about 4-in. long, being held so that the seed end comes in contact with the rapidly moving pins, the hemp is teased out, the fibres are straightened, and the two removed from the hemp and thrown from the cylinders by centrifugal force. The hemp is fed to a breaker, or a double-chain machine, one chain travelling very much faster than the other, the relative speeds of the two chains being about ten to one.

A chain is an endless combination of bars linked together, the distance between each two bars being equal. The bars are of round iron, varying in diameter from ½ to 1½-in., and are studded with pins, which vary in length, thickness and distance in about the same proportion as the bars. The heavier the bar, the coarser the pin, and vice versa, being largest at the beginning of the preparation, and decreasing in size on each successive working machine. At each end of the bar is a "dog," which is moved through guide bars in such a way as to keep the pins in a vertical position. The chains are moved by means of a carrier wheel, consisting of from five to ten pinions. The carrier is connected to the motive power by gearing, thus permitting changes in the speed of the chain to be made.

The single-chain machine, or drawing frame, consists of a chain and a pair of fluted iron rollers placed close to one end of the chain. These rollers, or drawing rolls, as they are called, have a speed of four to six times that of the chain, and in consequence draw a body of hemp on the chain into a sliver four or six times the original length. The breakers are heavier and stronger than the drawing frames, and have, in addition to the chain and drawing roll described above, a second chain, moving at from one-sixth to one-tenth of the speed of the fast chain, or the chain nearest the head. These two chains, one moving six to ten times faster than the other, heckle, or comb, out the hemp into the sliver, made up of the hemp fibres all extending in the same direction, the hemp being firmly imbedded on the slow chain and the pins of the fast chain passing through each operation as presented. The fibre is straightened out, and in each revolution of the fast chain a body of hemp is drawn into a sliver of ten times the original length. Naturally, this sliver is not even or uniform throughout its length, due in most cases to irregular feeding, and also to unequal softening of the hemp. To correct the inequalities, six or eight slivers are fed on the slow chain of the second breaker, which operation further completes the separation and straightening of the fibre, and at the same time makes the sliver more uniform throughout its length. The subsequent operations are essentially the same as described above, six, eight or ten slivers are placed behind machines consisting of a slow and fast chain. The bars in these chains are in each successive working brought closer together, and also are finer and the distance between each two made smaller in each case.

Manila receives from four to six workings on the double-chain machines. The sliver is then considered sufficiently even, and the fibre soft and elastic. A number of such slivers are placed back of the drawing frame or single chain machine, to be drawn to a size which will admit of its being spun into yarns or threads of 300 to 650 feet to the pound, and sometimes even longer.

The drawing frame is made up of a chain studded with fine pins, and in place of a fast chain is a pair of fluted iron rollers with a speed of four to five times that of the chain. The difference in speed will reduce the bulk of the slivers to one-fourth or one-fifth the original size, by drawing them to the single sliver four or five times the original length. After one or two workings on the drawing frames, the sliver is ready for the finishing machine, where the hemp is finally reduced to a condition ready for spinning. After the last operation on the finishing machine the sliver is run into cans, which are then taken into the spinning or jenny room, where it is spun or twisted into yarn of any desired size.

The jenny spins and winds the yarns on spools or bobbins, holding about 10 pounds of yarn or threads. The bobbins are sent to the rope walk, or rope-machine room, to be made into rope. Rope of a diameter of ¾-inch. or less is commonly made on rope machines. Rope of larger sizes used formerly always to be made on rope-walks, but now rope of any size is made on machines, and the product of the machine is equal in every respect to the product of the rope-walk rope. The size of the rope determines the number of threads necessary to make it up to say, twenty-one thread, or 1½-in. diameter. One-third of the number of threads are twisted into a strand where three-strand rope is wanted, and one-quarter of the number where a four-strand rope is required. These strands are called readies. Above, say twenty-one thread, or ½-in. diameter, the number of yarns in a ready depend upon the size of the yarns used to make same, and vary with different manufacturers, as some use a larger size yarn than others. The readies are made on a machine called a former, and, when finished, either three or four former reels containing the readies are taken out and put into the rope-making machine, where they are laid up in either three or four-strand rope, as required.

In a rope-walk the bobbins are mounted upon a rack, the required number of threads to make a strand are passed through the same number of holes in a perforated plate to and through a trumpet-shaped tube, and fastened to a hook on the forming machine. This hook can be geared to revolve a definite number of times per each foot of travel of the former; in this way a regular amount of turn is put into the strand. The turn varies with the size of the strand, more turn being required in the small than in the large sizes. The length of the track limits the travel of the former, and also the length of the strand; six strands are generally made at one time. As many strands as are required for the rope are stretched at full length along the walk and attached at each end to hooks on the laying machine. The hooks are set revolving, continuing the fore turn placed in the strand by the former. At one of the laying machines each strand is in turn removed from its hook and laid in one of three equidistant concentric grooves of a cone shaped block called the "top," and then fastened together on the centre hook of the machine. The hooks on the two laying machines are now set revolving, the direction of the turn at one end being the opposite to that at the other end, as a consequence being fastened at one end to one hook and at the other end to three hooks; the strands turn or twist on themselves at the end where there is one hook. As the twist or turn is communicated to the strand between the single hook and the

"top," the latter is pushed forward, leaving the laid rope behind it.

Great care must be exercised in guiding the block, for on its uniform motion depends the firmness of the rope, as well as the uniform character of its lay. The essential object of spinning hemp is to twist the fibres together, so that by the mutual friction among the fibres composing a thread, the strength of the thread is made equal to the strain necessary to break it at its smallest section; hence the right amount of twist is a matter of considerable importance. Too much twist injures the individual fibre and causes the thread to kink and bunch, while too small an amount of turn would allow the fibres to part and slip from one another. The same reason applies to the twisting of threads together to form a strand and the strands to form a rope. The turn which forms the strand is the reverse of the turn placed in the yarn in spinning, and again, the twist which laid the rope is the opposite of the twist or turn in the strand, and hence similar to that of the yarn.—J. W. Walton.

FINE YARNS.

The improvements in machinery to produce fine yarns have all been made with the object of improving the quality of the yarn first, the increase of production being a secondary consideration. It is now a generally accepted fact that it is not possible to get the maximum of production and quality at the same time, so production is sacrificed to quality. It is the quality that makes fine yarns valuable, and in order to maintain the standard of quality it is necessary to watch all the little details of manufacturing. When double combed staple is used the fibres have very little cohesion and will stick to an apparently smooth, dry surface. In order to spin them all polished plates or surfaces over which the fibres pass must be kept in a state of perfect smoothness, free from moisture, and this includes the flyers, which must be polished inside as well as outside. For the purpose of maintaining the polish flour of emery is first used, then followed by rouge. The bobbins must be as light as possible, and all as nearly of the same weight as possible. Defective skewers and steps must be at once replaced by perfect ones. The sliver and roving are so attenuated that the slightest strain will stretch them, with the result that the yarn will vary 20 or more hanks. This stretching destroys the high quality of the yarn and any little detail that will prevent stretching must be attended to if success is sought.

The mules for spinning fine numbers are, in some respects, different from those used for coarse and medium numbers. Some few years ago motions that were considered as belonging exclusively to fine mules are now found on mules spinning medium fine numbers, resulting in much improvement in the yarn produced. The mule must have a stretch of from 52 to 54 inches, short spindles with a greater inclination towards the roller beam than spindles on coarse or medium mules have, twisting at the head, roller motion, patent governing motion, and the fullers must work on anti-friction bearings. There are other points of difference and some of the above motions may be found on mules spinning medium fine numbers.

Fine yarns contains more twist than coarse or medium numbers, and the fewer fibres of a smaller diameter contained in any one section of fine yarn render it unable to stand the strain of receiving the full amount of twist simultaneously with the drawing. During the outward run of the carriage only sufficient twist is introduced to hold together the fibres which, owing to their length, will permit of greater drawing than short staple. To get the full benefit of the drawing qualities of the fibres, the rollers cease to deliver roving just before the carriage has completed its outward run. During spinning the twist has run into the thin places and as the carriage runs out a short distance after the delivery of roving ceases the thick places are drawn out to a diameter as nearly uniform as possible. After the drawing is completed the full amount of twist is introduced by the spindles revolving a sufficient number of times. The introduction of the full amount of twist increases the tension on the threads and undue stretching would be the result if the tension were not relieved. The roller delivery motion causes the rollers to deliver from half to three-quarters of an inch of roving which is drawn out by the tension which would otherwise stretch or break the yarn.—American Wool and Cotton Reporter.

TEXTILE PATENTS.

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

Button fastener; H. G. C. Horning, Bronx, New York city. A new method of attaching buttons.

Overall; H. S. Lanier, Danville, Va. New method of forming hem.

Woven wire fabric for wire mattresses; Donald M. Learmouth, Toronto.

Tanning process; K. F. F. G. Sommer, Hamburg, Germany

Washing machine; A. D. Rogers, Hyrum City, Utah.

Garrigans; W. H. Mackenzie, Bridgetown, N.S.

Twine holder; Geo. E. Ernst, Mt. Pleasant, Ohio.

Curtain fixture; R. Caspar, Lisbon Falls, Maine.

Glove fastener; J. L. Dinkelspiel, Manhattan, N.Y.

Process of tanning hides, skins and animal tissues; O. P. Amend, New York.

Collar button; Bruce Murphy, Orillia.

Hat fastener; John Pomeroy, North Invercargill, New Zealand.

Operating mechanism for looms; Fred. Lacey, Valleyfield

Leggings; John Peel, Drayton.

Pin; Hannah A. Kimball, New York. Pin having a hardened head and point and a soft shank.

Clothes pin; S. G. MacMillan, Brookfield, N.S.

Washboard; Chas. J. Vohs, New London, Wis.

Washing machine; J. M. D. Cyr, Ste. Rose, Que.

Umbrella or parasol; Hugo Keller and Frank Gallagher, Frankfort, Penn.

Neckwear fastener and shield; Wm. H. Hart, Philadelphia, Penn.

Clothes Drier; Stephen Tillson, Chatham, Ont.

Awnings; Alfred L. Clark, Dubuque, Iowa,

Wire heald for looms; Vincenz Macku, Brunn, Austria.

Dress stay; F. O. C. Brown, Grand Rapids, Mich.

Hammock; I. E. Palmer, Middletown, Conn.

Corset; Christine M. Barnum, Haworth, N.J.

Folding box; A. J. Charpy, Botton Road, Pt. Sunlight, England.

Skirt and trousers hanger; Geo. R. Davis, St. John, N.B.

Winding machine; Thos. H. Savary, assignee of V. G. Hazard, Wilmington, Del.

Hat box; B. F. Porter, New York.

Hat box; Hannah L. Perry, East Liverpool, Ohio. A new folding hat box.

Machine for steaming, oxidizing and drying yarns; J. W. Freis, Winston, Salem, N.C.

Bobbin holder; John E. Bacon, Clinton, Conn.

Leggings; A. M. Lundgard, Council Bluffs, Iowa.

Sad iron; Michael Joyce, Salt Lake City. (Two patents).

Sewing machine; Wm. A. Parkes, Brooklyn, N.Y.

Weaving diagram; La Societe des Inventions, Vienna, Austria.

Window shade holder; W. S. Axtell, Castile, N.Y.

Belt holder; C. W. Van Wagner and G. N. Lemon, Englewood, N.J.

Curtain fixture; A. S. Lundberg, West Everett, Mass.

Ironing machine; J. J. O'Shea, St. Louis, Mo.

Washing machine; N. J. Millette, Farnham, Que.

Spinning frame mechanism; H. B. Ashton, Medford, Mass.

Apparatus for treating yarn in compact form; E. Hindley, S. Walker and M. Rose; Stockport, England.

Machine for making excelsior; Jas. R. Bate. Baltimore, Md.

Fan attachment for sewing machines. Geo. Geer, Richmond, Va.

Stitch finishing machine; the Goodyear Shoe Machinery Co., Boston, Mass.

Feeding mechanism for carding machines; Harry Kemp, Dedham, and P. L. McBride, Lowell, Mass.

Shade and curtain support; Mary E. Kistler, Findlay, Ohio

Washing machine; F. C. Kaiver, Chicago.

Sad irons; Wm. E. Hoyt, New York.

Carpet sweeper; S. J. Reynolds, Saginaw, Mich.

Stuffing for horse collars; B. H. Rueter, Burlington, Wis. A stuffing made of sponge and wool.

Method of forming pulp into sheets; J. S. Hughes, Chesleys Corner, N.S.

Skirt lifter; John Hammer, Tacoma, Wash.

Skirt grip; Lewis Marks, St. Brelades, Leicester, Eng.

Treatment of raw cotton or cotton goods to reduce their inflammability; Dr. W. H. Perkin and Whipp Bros. & Tod, Manchester, England.

Button polisher; Ernest W. Wright, Chicago.

Garment fastener; H. W. Thurlow, San Francisco.

Hook for hooks and eyes; Josephine Fryer, Chelsea, Mass.

Belt; Edith A. Hawkins, Montreal.

Garment support; John P. Conway, New York.

Hose supporter; Myron B. Hammond, Bridgeport, Conn.

Laundry bag; John J. Tully, Louisville, Kentucky.

Paper bag making machine; National Manufacturing Co., Elkhart, Ind.

Drier for paper, cloth, etc.; Chas. H. Crowell, Swampscott, Mass.

Apparatus for disintegrating and drying pulp; Francis C. Cream, Montreal.

Loom; Fannie J. Booze, Springwood, Va.

Wire weaving machine; E. E. Matthews, Jacksonville, Ill.

Paper making machine; H. L. Kutter, Hamilton, Ont.

Umbrella lock; Isaac Pinkus, Memphis, Tenn.

Pin holder; Eliz. Koller, Bloomville, Ohio.

Bodice belt pin; Emily L. Merrill, Boston, Mass.

Lace Protector for shoes; Thos. R. Anderson, Sackville, New Brunswick.

Miner's hat; A. Harris, Calumet, Mich.

Buttonhole sewing machine; National Machine Co., Troy, New York.

Loom; American Loom Co., Readville, Mass.

Carpet renovator, J. S. Thurman, St. Louis, Mo.

Pneumatic carpet renovator dust bag; J. S. Thurman, St. Louis, Mo.

Skirt and waist support; H. N. Northrop, West Somerville, Mass.

Garment supporter; H. N. Northrop, West Somerville, Mass.

Woven wire fabric for spring mattresses; P. J. Smyth and Thos. Colleran, Toronto.

Seam for sewed articles; Jas. W. Smith, Woonsocket, R.I.

Lining; Keystone Hair Insulator Co., Allegheny, Penn.

Twine meter for spinning machines; E. M. Coleman and E. Constant, St. Paul, Minn.

Mittens; Ferdinand Bertheau, Morgan Park, Ill. Reversible mitten.

Sad iron handle; Fred. Stuart, Milwaukee, Wis.

Devices for protecting hats; Ed. Krancher, New York.

Trousers shaper; L. F. Anderson, Milwaukee, Wis.

Window shade bracket; J. C. Barker and W. H. Hawkins, Seattle, Wash.

Substitute for gutta percha; Adolf Gentzsch, Vienna, Austria.

Method of producing heddles, the Steel Heddle Mfg. Co., Philadelphia.

Umbrella; S. J. Evans, Roanoke, Va. (Two patents).

Hammock loom; Z. L. Chadbourne, New Brighton, N.S.

Vest; R. S. Scott, Baltimore, Md.

Garment fastener; John M. Duffy, Philadelphia, Penn.

Machine for baling fibre; J. J. Davenport and A. G. Jennings, New York.

Curtain pole or rod, Chas. R. Barrett, Chicago.

Window shade spring roller; J. H. P. McPherson, John F. Brown and Robt. E. Menzie, Toronto.

Manufacture of fibrous material; National Pan-Metallic Co., Buffalo, N.Y.

Wardrobe; Joseph A. E. Delfosse, Montreal.

Clothes drier; T. M. Anderson, New Whatcom, Wash.

Waistband adjuster; Walter S. Evans; North Adams, Mass.

Carpet cleaner; the Vacuum Cleaner Co., London, Eng.

Lacing flies and button holes and eyelets for garments; Sahlin Corset Co., Chicago.

Carpet sweeper; Charles King, Port Huron, and R. J. Groves, Davison, Mich.

Garment hanger; Peter Steiger, Baltimore, Md.

Carpet stretcher; C. O. Devibbiss, Derrahs, Mo.

Process for tanning hides and skins; Paul Bez, Leran-Aviege, France.

Machine for cutting, turning and fastening the ends of trousers; Wm. Heller, Savanna, Ill.

Band cutter; T. N. Huddlestone, Russell, Man.

Process of bleaching and disinfecting; G. J. Atkins, Tottenham, England.

Mercerizing machine; Frank Shuman, Tacony, Philadelphia. (Two patents).

Button stencilling machines, 11 patents; John Hormby, Woonsocket, R.I.

Necktie; Louis Auerbach, New York.

Woven wire fabric for spring mattresses; P. J. Smyth and Thos. Colleran, Toronto.

Marking pin (for laundry); L. J. Davis, Battle Creek, Mich.

Warp stop motion for looms; J. V. Cunniff and E. Cunniff, New Bedford, Mass.

Circular loom; Chas. G. Hill, Arnot Hill, Daybrook, Nottingham county, England.

Washing machine; Geo. Drinkwater, St. Thomas.

Glove; Lettie D. Bunyon, Cedar Rapids, Iowa.

Carpet or door strips; W. U. Spencer, McCutchenville, Ohio.

Garment measuring and drafting device; Catherine Ryan, Ottawa.

Hammock; I. E. Palmer, Middletown, Conn.

Garment fastener; W. L. Dinsmore, Portland, Oregon.

Umbrella grip; Edward Currie, Toronto.

Hook and eye; Dora Floerckey, Philadelphia.

Suspender; Isaac Wechsler, New York.

Washing machine; E. D. Hamilton, Vancouver.

Shoe sewing machine; United Shoe Machinery Co., of Canada, Montreal.

Twisting machine; W. E. Krey and A. Duppler, New York.

Suspender; P. M. Way, Tallapoosa, and T. O. Oleson, Super, Mo.

Tucking guide for sewing machines, R. C. Johnson, Cincinnati, Ohio.

Machine for making spool blanks; J. W. Carver, Auburn, Maine.

Twisting-in machine; W. E. Krey, New York, and A. Duppler, Jersey City.

Means of reproducing multicolor designs; A. Von Beust, Orange, N.J.

Washing machine; L. R. Brooks, Independence, Iowa.

Sad iron, Geo. Finn, Newark, N.J.

Hammock; I. E. Palmer, Middletown, Conn.

Cuff holder; Chicago Cuff Holder Co., Chicago.

Wood pulp press; J. S. Hughes, Chesleys Corners, N.S.

Machine for passing ribbon through insertions; Weingarten Bros., New York.

Glove or mitten; R. B. McMasters, Plymouth, N.Y.

Sad iron, H. B. Swartz, Wooster, Ohio.

Paper making machine; Chas. K. Graham, London, Eng.

Garment Closure; Sahlin Corset Co., Chicago.

Cap, C. W. Gordon, St. Paul, Minn.

Necktie fastener; Jas. A. Clinton, New York.

Manufacture of rubber boots and shoes; P. M. Matthew, Edinburgh, Scotland.

Treatment of leather; E. A. Warren and F. G. Bradbury, St. Paul, Minn.

Paper bag machine, National Mfg. Co., Elkhart, Ind

Method of forming wood pulp into sheets, J. S. Hughes. Chesleys Corner, N.S.

Textile Design

LIGHT-WEIGHT ALL-WORSTED TROUSERING.

Yarns dyed in skein. Finished weight average 14 ounces for 56-inch width.

Dressed—2-40s worsted and No. 100 silk.

Light slate	2 2 2 2 2 2 2 2 2 6	— 24
Dark slate	2 2 2 2 2 2 2 2	= 14
Black	2 1 2 2 2 6 2 4 2 2 4	= 32
No. 100 white silk	2	= 2
Total threads in pattern		72

12)6,048 ends 6-4 width.

504 ends section.
7 patterns to section.

Woven—2-40s worsted. All black filling; 52 picks to inch.

Drawn straight on 12 harnesses. Reed 67 inches over all equals 65 inches inside selvage.

CHAIN DRAFT.

Twill face to right when weaving.

	Ounces.
5,880 ends 2-40s worsted warp eq.	9.33
168 ends No. 100 silk warp eq.	*
52 picks 2-40s worsted fill eq.	5.53
(67 inches over all.)	14.86
*Weight not figured.	
14.86 oz. 2-40s worsted shrink 10 per cent. eq.	16.51
16 51 oz, 2 40s gray worsted at 96 cents per pound eq.	$ .9906
168 yards of No. 100 White silk in warp at $3.20 per pound eq.	.0250
Total cost of yarn for 1 6-4 yd. eq.	$1.0156
Total cost of mfg. for 1 6-4 yd. eq.	.3600
Total cost in round numbers for 1 6-4 yd. at mill eq.	$1.8700

Above layout makes a beautiful all-worsted trousering. If not heavy enough add four more picks, which will increase weight almost one ounce per 6-4 yard.

Have light slate well on the blue shade, and dark slate on the green. The weave and size of yarns are very common, but the figure of design is peculiarly handsome.

American Wool and Cotton Reporter.

OLD TIME RAG CARPET SHOPS.

There is in Chicago a rag carpet weaver, German by birth, who has worked at his trade in his little shop for the last thirty years. Before the door hangs his only sign, a strip of rag carpet. The interior of the shop has a picturesque old time air, with its great time stained loom, its hand wheel, heaps of bags bursting with parti-colored rags, and rolls of carpet piled up in the corner. The weaver, pale faced, as weavers are apt to be from living so much indoors, nimbly shoots his shuttle box to and fro, followed by the rhythmic thump of the beam. Over his head is a figured disk, like a clock face, with a revolving peg, on which he marks the number of yards woven. Nearby, seated on a stool, is his good German wife, engaged in making balls of sewed rags and otherwise helping him in his labors. He is always at work, the demand for his brightly woven carpets being continuous throughout the year.

Most of these carpets are of stereotyped pattern, owing to traditional ideas on the part of his patrons as to how a rag carpet should look. They insist on their carpets being as showy as the weaver can make them, the majority having a variegated stripe that outdoes the rainbow; indeed, in some cases, the pattern is an exact reproduction of the spectrum.

The weaver had just completed a special order that was really novel. This was a carpet woven out of old billiard

cloth, and the green rags mixed with the solid red warp produced an unexpectedly handsome effect. The crudeness of color seen in billiard cloth in its ordinary uses was subdued by the shadows of the pleats, and the cloth indeed changed in hue by the scarlet of the "chain" that wove it together.

In another small establishment of the same kind a still older weaver was busy at his loom, and noticing that in all the work completed the pattern was in the same variegated or rainbow style, the writer ventured to ask why a greater variety of patterns was not produced. The prompt reply was "Novelty is not wanted in rag carpets, and if it were I would not supply it. For fifty years I have been making the same designs for my carpets and if anyone wants something different he can go elsewhere."

In a much larger weaving shop, where thirty-five looms are operated, novelty is not so carefully shunned, for the proprietor said that his line of goods comprised over 300 patterns, but the old familiar stripe chain seemed to be the salient feature in all of them.—Carpet Trade Review.

WASHING WOOL OR WOOLEN GOODS.

In its cold state ammonia possesses the property of forming soap in conjunction with fatty acids. This property has not been capable of advantageous industrial application, on account of the difficulties which the manufacture and employment of such soap present. In fact, when a small quantity of oleic acid or of certain fatty bodies is poured into a weak ammoniacal solution, the affinity of these two bodies for each other is so great that a large number of lumps are immediately formed which only dissolve very slowly, while the excess of ammonia is lost by volatilization. When it is desired to utilize this soap for washing purposes the lumps attach themselves to the fibres of the material to be treated, and remain attached in the form of a sticky material. To obviate these disadvantages and to enable an ammoniacal soap to be advantageously used for washing wools or other materials, while permitting the fatty substances and the ammonia contained in the water employed for such washing to be recovered, a French manufacturer has recently patented a new process.

Any system of washing apparatus may be employed for the purpose, it being only necessary to add some presses, as will be hereinafter explained. Taking the case of a washer with four tanks, after scouring the wool it is led into the first tank, in which is placed a little carbonate of soda or potash, or ordinary commercial volatile alkali. As soon as it leaves the first tank, and after passing through the pressing rollers, the wool carried by the travelling band is sprinkled or watered with olein or other fatty body in a proportion represented by about half the quantity requisite to effect a perfect washing. This sprinkling or watering is effected by means of an apparatus of the kind employed for oiling wool before carding. The wool is thus charged with drops of olein or other fatty body. If it were now plunged into an ammoniacal solution, lumps would be formed in the same manner as above described, but in order to avoid this a press is used immediately after the watering. The wool passes through this press, and under the force of the pressure the fatty body is indefinitely divided over the fibre in a very fine layer.

On leaving this press the wool passes to the second tank, containing water charged with ammonia and raised to the ordinary temperature for washing wools. The ammonia and the fatty body distributed as described form a homogeneous and very detergent soap. On leaving the second tank, the wool is again watered with the remaining quantity of olein or fatty body necessary for completing the washing, and then again pressed and delivered to the third tank prepared in the same way as the second. On leaving the third tank, the wool proceeds to the fourth tank, which serves for rinsing. The wool obtained by this method of washing is said to be very white, and the combing resulting therefrom to be of remarkably fine touch. The great advantage resulting from this method of washing will be at once apparent. The manufacture of soap with its attending costly operations are entirely abolished. The employment of the steam necessary for dissolving the soap is also avoided. Moreover, as the soap is made in the bath itself, there is no longer any opportunity for loss of soap which occurs in the course of its manufacture. There is, further, no chance of the presence of free caustic potash, which, as is known, imparts to the combed wool a coarse feeling and yellow color, and which may also diminish the output. Finally, the employment of neutral salts is done away with, the soap is much more detergent than others, and the quantity of olein or other fatty matter to be employed is much less than hitherto necessary.

In the case where it is desired to produce the soapy ammoniacal solution outside the washing bath, it is only necessary to employ an extremely simple apparatus consisting in an endless cloth or felt travelling over rollers. The cloth is first watered with the fatty body, pressed between two rollers, then passed through a bath containing ammoniacal water, and again pressed on leaving, the operation being continued as long as is necessary. At each pressure the soap formed falls back into the bath and ammonia is added gradually to the latter. If desired to recover the fatty bodies from the washing waters, they are treated in the ordinary manner with sulphuric or any other acid; they are boiled, and the magma which floats to the surface is collected. As the sulphuric or other acid employed transforms the ammonia into a fixed ammoniacal salt (sulphate of ammonia, etc.) for the extraction of the fatty bodies, ebullition may be carried on without any loss of ammonia. If, therefore, it is desired to recover the ammonia in the form of a gaseous solution, which can again serve for washing, it is only necessary to convey the hot water deprived of its magma to a retort, in which milk of lime is added. By heating the ammoniacal gas will be liberated, and will be collected in cold water. It will, however, be more simple and economical for recovering the ammonia to employ one of the known apparati used in ammonia manufacture—such, for example, as the Mallet apparatus.

The economy effected by this new process of washing wools is noticeable, even if the ammonia is not recovered, for the quantity of ammonia requisite to saponify a fatty body is much less than the quantity of caustic potash necessary to saponify the same quantity of fatty body. It is, in fact, known that 17 grms. of ammonia are equal to 56 grms. of caustic potash. From this it is easy to see the economy effected by the substitution for the caustic potash of ammonia, without even recovering the latter substance.—Textile Manufacturer.

ENGLISH WOOL: A NEW DEPARTURE IN MANUFACTURING.

R. A. Lister, a well-known agricultural implement maker and dealer, of Dursley, Gloucestershire, has been interesting himself on the subject of English wool. For some years past English wool has been selling at ridiculously low prices, the demand for it becoming less and less. Mr. Lister holds that this is mainly because English wool has not been used in the making of fine cloth, for which our manufacturers are so famous the world over. It now seems possible to remedy this state of things, in consequence of the enterprise of Mr. Apperly, of the firm of Apperly, Curtis & Co., of Stroud, Gloucestershire. A few years ago this gentleman bought the Hyde

Farm, a sheep-farm on the Cotswolds, near Stroud, and has there established a very fine flock of Hampshire Down sheep. Being disgusted with the low price obtainable for his own wool, Mr. Apperly has made experiments in the direction of utilizing this wool for the manufacture of fine cloth, of fashionable patterns and designs and has at last been successful. A new system of manufacture, and the adoption of special machinery for the carding and spinning, have been found necessary. Mr Apperly recommends shearing by machinery as far as possible, as the wool is less damaged than by hand-shearing. If proper allowance be made for loss of weight in washing the sheep, unwashed wool is preferred. The cloth made from this English wool is equal in appearance to anything that can be produced from foreign or colonial wools, which for elasticity and wear it doubtless excels. Coarse cloth, of no particular pattern or design, has been made from English wool for years both in Wales and in the North; but in consequence of its not being turned out of a quality suitable to meet the tastes of those who want to be well dressed, the demand has been comparatively limited and the price low. This difficulty has been overcome, and it now remains with the farmers themselves, and the friends of agriculture generally, to decide as to whether this cloth—home-made from home-grown wool—shall have a large sale. As is well-known, much of the woolen cloth made in the north of England is mixed with a large quantity of shoddy, old rags worked up, and as no doubt this new departure will find imitators, Mr. Apperly has decided to brand every piece with the registered trade-mark of "Hydea," in which nothing but pure English wool will be used. Mr. Lister says his only object is to call the attention of landowners, farmers, and all those who, like himself, are directly interested in agriculture, to give practical encouragement to this undoubted aid to our sheep-farmers. If this be done, he says, we shall not long have our splendid wool a drug on the market, at something like 4d. per lb.—Textile Mercury.

TABLE OF SQUARE ROOTS.

No.	Sq. Root.	No.	Sq. Root.
25	5.	1400	37.42
50	7.071	1450	38.08
75	8.66	1500	38.73
100	10.00	1550	39.37
125	11.18	1600	40.00
150	12.25	1650	40.62
175	13.23	1700	41.23
200	14.14	1800	42.43
250	15 81	1900	43.59
300	17.32	2000	44.72
350	18.70	2100	45.82
400	20.00	2200	46.90
450	21.21	2300	47.95
500	22.36	2400	48.99
550	23.45	2500	50.00
600	24.49	2600	50.99
650	25 46	2700	51.96
700	26.46	2800	52.91
750	27.39	2900	53.85
800	28.28	3000	54.77
850	29.15	3200	56.57
900	30.30	3400	58.30
950	30.82	3600	60.00
1000	31.62	3800	61.64
1050	32.40	4000	63.24
1100	33.16	4200	64.80
1150	33.91	4400	66.32
1200	34.64	4600	67.82
1250	35.36	4800	69.28
1300	36.06	5000	70.72
1350	36.74		

Miss Edith Wisdom, an employee of the Star Whitewear Co., Berlin, recently met with a painful accident, having run a sewing machine needle through her thumb.

Opinions of the Press

CHART OF THE METRIC SYSTEM.

The publishers have received many letters complimenting them on the issue of the popular Chart of the Metric System of weights and measures. The following are a few sample opinions:

I have very much pleasure in seeing you step to the aid of those pressing the Metric System to the front. I shall be glad to call the attention of teachers to your chart. The Metric System has for a number of years—since I came into office—been taught in all the schools of the province; and the metric measures are those called for in the returns from all our high schools—dimensions of school rooms, etc. I have much pleasure in sending you a few copies of my brochure on the "Three Great Reforms," in which it will be seen that for a number of years I had been an advocate of the system—even in the conservative city of Toronto. Wishing you much success.—A. H. Mackay, Superintendent of Education, Nova Scotia.

I am in receipt of your favor of the 7th ult., together with a copy of The Canadian Engineer for June, and a specimen of the Chart of the Metric System prepared by your firm. I am very pleased to read your article, but I wish particularly to compliment you on the chart. It is, I believe, the best I have seen for explaining briefly the principles of the Metric System. It will afford my committee much pleasure to hear of this awakening interest in Canada. Australia too is showing a growing disposition to adopt Decimal Coinage and Metric Weights and Measures, and here we keep gaining a step month by month.—E. Johnson, Secretary Decimal Association, London, Eng.

We see that you, too, advocate the general adoption of the Metric System of weights and measures, and we believe that as much as possible everywhere the same means should be employed to accomplish the desired aim. The widest possible distribution of your chart would no doubt be a good step forward. We request you therefore to forward to us two copies for our office and for the library of the American Society of Dyers.—L. M. Carriet, Philadelphia.

The Monetary Times has a review of your Chart of the Metric System. I notice the price is stated at ten cents per copy, but if you have any other more expensive editions printed, I should be glad to receive a copy or two; as it is my intention to frame a copy (if possible), and present it to the library of the society of which I am an associate, viz., the Incorporated Accountants (Eng.). It is high time that British traders and accountants awoke to the necessity of adopting decimal coinage and measures. Enclosed please find $1 (Canadian), to cover your expenses for as many copies as the remittance will pay for. Trusting you will be able to assist our efforts on this side to foster "intercolonial and home-country" trade, and lessen the tide of German competition, which is a danger to all the English-speaking countries, if Germany gets the upper hand (both politically and socially), and assuring you of the awakening of the British to their surrounding dangers of subsidized continental competition.—E. Woodroffe, 121 Stapleton Hall Road, Stroud Green, London, England.

Please accept my thanks for the Metric System Charts. The adoption of the Metric System must shortly take place, as everything is to be said for it and next to nothing against it. As to the chart, I consider it is a valuable one, and one which every progressive citizen ought to have in his home. The mass of information, which it explains, is handled in such a simple manner that anybody can understand it without becoming in the least confused as to the use of the different terms, which is the only drawback, that I know of, to the Metric System There is no doubt though that, if the system were adopted, the terms would be abbreviated to suit the rapid business methods this side of the Atlantic. I expect that a number of people, to whom I have shown the chart, will be calling upon you for copies of it ere long, as they have already expressed intentions of doing so.—Dermot McEvoy, Mechanical Engineer.

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:

Loom Fixing; a handbook for loom fixers working on plain and fancy worsteds and woolens; containing chapters on shuttles and bobbins, and their management; head motion; putting in warps; filling; adjusting and starting new looms; chain building, etc.; 104 pages, by Albert Ainley $1 00

Technology of Textile Design; explains the designing for all kinds of fabrics executed on the harness loom, by E. A. Posselt 5 00

Structure of Fibers, Yarns and Fabrics, the most important work on the structure of cotton, wool, silk, flax, carding, combing, drawing and spinning, as well as calculations for the manufacture of textile fabrics, by E. A. Posselt 5 00

Textile Machinery Relating to Weaving, the first work of consequence ever published on the construction of modern power looms, by E. A. Posselt 3 00

The Jacquard Machine Analyzed and Explained; explains the various Jacquard machines in use, the tying up of Jacquard harness, card stamping and lacing, and how to make Jacquard designs, by E. A. Posselt 3 00

Textile Calculations; a complete guide to calculations relating to the construction of all kinds of yarns and fabrics, the analysis of cloth, etc., by E. A. Posselt .. 2 00

Wool Dyeing: an up-to-date book on the subject, by E. A. Posselt 2 00

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

CHEMICALS AND DYESTUFFS.

Business as usual at this time of the year is quiet. Market steady.

Bleaching powder	$ 2 25 to $ 2 50
Bicarb. soda	2 00 to 2 05
Sal. soda	0 85 to 0 90
Carbolic acid, 1 lb. bottles	0 40 to 0 50
Caustic soda, 60°	2 35 to 2 60
Caustic soda, 70°	2 60 to 2 85
Chlorate of potash	0 10 to 0 11
Alum	1 35 to 1 50
Copperas	0 70 to 0 80
Sulphur flour	1 70 to 2 00
Sulphur roll	1 90 to 2 00
Sulphate of copper	5 50 *to* 6 00
White sugar of lead	0 07 to 0 08
Bich. potash	0 7½ to 0 08
Sumac, Sicily, per ton	50 00 to 58 00
Soda ash, 48° to 58°	1 30 to 1 40
Chip logwood	1 90 to 2 00
Castor oil	0 08 to 0 09
Cocoanut oil	0 10 to 0 11

The mules in both the mills at Carleton Place, owned by the Canada Woolen Mills Co., have been lined up by W. H. Shaw, of Montreal.

WOOL MARKET.

The fifth series of Colonial Wool Sales opened in London on the 16th of September and continued till Oct. 2. The attendance was large and competition throughout was very animated. The closing tone of the sale was firm, although the prices realized were not at the best, excepting crossbreds, which were at the highest prices realized and keenly competed for. During the series 193,000 bales were available, and of this number 176,123 were catalogued. The total sales for the home account numbered 98,000, for the continent 64,000 and for America 7,000. There were 27,000 bales carried over for the next series, which is scheduled to open Nov. 27th. The sale developed a strong demand and a marked advance for good greasy merinos. Deep combing, superior light conditions, Port Philip and New South Wales, at time prices, were over 10 per cent. above the July series. The sale was prominently supported by the German buyers, who purchased medium and heavy grade, which sold 50 per cent. dearer. Good scoureds realized 5 per cent., fine crossbreds 10 per cent., medium 15, common 5 to 10, scoured 5 to 7½, and Cape of Good Hope and Natal snow white greasy ½ higher than the July sales. Coarse wool sold at about unchanged prices, with the tendency towards lower prices. Closing prices were as follows: New South Wales, scoured, 5d. to 1s. 8½d.; greasy, 9½d. to 10d. Queensland, scoured, 9d. to 1s. 7½d.; greasy, 6½d. to 11d. Victoria, 5,000 bales; scoured, 5¼d. to 11½d.; greasy, 3¾d. to 10½d. South Australia, greasy, 4½d. to 11d. West Australia, greasy, 7¼d. to 8d. Tasmania, greasy, 4d. to 11½d. New Zealand, scoured, 6½d. to 1s. 7½d.; greasy, 3½d. to 10½d. Cape of Good Hope and Natal, scoured, 1s. ½d. to 1s. 4d.; greasy, 5¼d. to 6¼d.

(Continued on page 320).

A woolen factory in Toronto is, it is said, after a bonus to remove to St. Thomas.

The Clyde Woolen Mills, Lanark, have shut down to admit of some repairs being made.

The Empire Carpet Co., St. Catharines, which manufactures wool carpets principally, has its traveller, W. A Dewar, in the North-West, with a large range of spring samples.

The property, buildings, machinery, and plant of the Canadian Woolen Mills Co., of St. Hyacinthe, have been sold by auction to Gordon W. MacDougall, of Montreal, for the sum of $295,000. It is understood that Mr MacDougall purchased the property for a strong syndicate, that has the entire reorganization of the mill in hand. A charter has been secured at Ottawa, and the company will be reorganized under the name of the Canadian Woolen Mills Manufacturing Company, with a capital of $700,000 of common stock. Bonds will be issued to the amount of $750,000. A substantial working capital has been provided for, and extensive additions and improvements are contemplated, which will make the mills more effective than ever. A condition of the sale by the Royal Trust Company was to the effect that all orders on hand should be filled by the purchasers, to the complete discharge of the company and of the Royal Trust Company. Changes have been made in the working staff, and the operation of the plant has been continuous since the first steps for reorganization were taken. Bidding at the sale was very spirited.

Telke & Finklestein, hide and wool merchants, Winnipeg, have moved into comfortable and convenient new premises.

Plain linen handkerchiefs are reported by an English trade paper, the soft finish recommending them to the users. Irish linens, for shirtings and sheeting, would also sell better with a soft finish.

It is alleged that some makers of binder twine put it up in short measure, and an application has been made at Ottawa for the appointment of an inspector to see that the balls sold by dealers all have the length of twine that they profess to contain.

The Standard Bag Company, with a capital of ten thousand dollars, has been incorporated to manufacture bags made of jute, cotton and linen. The company consists of Joshua Collins, F. S. Mackay, A. L. Rinfret, F. X. Turgeon, and Maurice Loranger, all of Montreal.

The bag trade of Manitoba and the grain districts of the Teritories has grown within a few years to an enormous extent. One retail house in a Manitoba town is said to have handled 100 bales of grain bags the past season. Counting 100 bags to the bale, this would make 10,000, representing a value of well up to $2,000.

The Canadian Woolen Manufacturng Company, capital, $750,000, has been incorporated. This is the company which has been formed to take over the St. Hyacinthe mills. The charter members are Eugene Lafleur, Gordon W. MacDougall, Lawrence Macfarlane, Lawrence de K. Stephens, and W. J. Henderson, all of Montreal.

Electricity for lighting is being installed at the Cobourg woolen mills.

Three hundred Shropshire and Oxford rams recently left Ontario for Medicine Hat, where they were to be sold by auction.

J. B. Cudlip, manager of the Cornwall and York Cotton Mills, St. John, N.B., and H. D. McKerrow, of Boston, representing Tweedale & Smalley, cotton machinery manufacturers, were recent visitors to the Kingston cotton mills.

The Rolston Electric Laundry Co. has been incorporated; capital, $50,000; to carry on the business of the present Rolston Laundry Co., and the City Toilet Supply Co., Toronto; John A. Rolston, laundryman; Elspeth A. Rolston, Charles Heath, and E. C. Mackenzie, of Toronto, and Alexander L. Airth, of Pembina, N.D.

Miss Lillian Stacey, the young girl who had the scalp torn off her head by being caught in the machinery in the card room of the Canadian Colored Cotton Mills, at Cornwall, some weeks ago, and who was expected to recover, died at the General Hospital, September 20th. She had undergone several operations of skin-grafting, skin being taken from her thigh and arms and grafted on the head. On the day she died she underwent another operation for the same purpose, and while under the influence of anaesthetics died. A charity concert had been given to start a fund for the young girl, and about $300 was realized. Up till the day of her death her condition was satisfactory to the physicians, but her nerves were run down and her system was unable to stand the strain any longer.

(Wool Markets—Continued from page 313).

Compared with previous sales at this season, in 1901 the available supply was reported at 305,000 bales, and prices averaged 5 to 7½ per cent. advance on Australian merinos, with fine crossbreds 10 per cent higher, though medium and low crossbreds were barely firm. In 1900 the September and November sales were omitted, and in their place was substituted a single series in October, at which the available supply was 368,000 bales. This was the series at which prices experienced their heaviest drop of the year, good wools falling as much as 15 per cent and medium and inferior as much as 15 to 20 per cent. The manner in which the recent series opened may be regarded as reflecting a world-wide feeling that wool on its merits ought to sell at higher figures than have lately prevailed The long series of droughts in Australia, the consequent deterioration in the character of the yield, the enormous industrial prosperity in the United States, the removal of the burden of war from Great Britain and the gradual recovery from the industrial depression in Germany, are among the many factors which point to future firmness in the wool market.

The Boston market was characterized by enormous activity during the last week of September, which was one of the heaviest in the history of the trade, over 20,000,000 pounds being reported. This was due not to a speculative spirit but to a genuine demand for consumption. The heaviest buyers were large manufacturing interests, which have not been on the market for some time. Prices did not, however, come up to what sellers expected, still they took a fair profit, and the effect of reducing stocks by such a demand has improved the outlook for better quotations later on. The following are the last quotations from seaboard markets: Washed fleeces 23 to 30c.; delaines, 21 to 32c.; unwashed combing and clothing, 14 to 24c.; Texas, 15 to 20c.; Territory, 13 to 20c.; pulled wools, scoured basis, 33 to 60c.; Australian, 26 to 40c.; South American, 23½ to 26c.; Canada combing, 28 to 29c. Foreign

Toronto, demand fair. Prices steady and unchanged. Fleece fair enquiry. Canada washed 14c.; unwashed, 7½c. Pulled, quiet. Extras 18 to 19c., supers 14 to 15c.

Montreal.—The price of merino wools having advanced lately manufacturers are not able to pay the price, as they say they cannot get the advanced prices for their goods, so they are resorting to lower qualities and using a good deal of shoddy and cotton. Quotations are: Capes, 16 to 17c.; B. A., no change.

The Winnipeg Commercial says there have been large demands there for export to the United States at 28c. duty paid. All of the 1901 clip has been cleaned up, and stocks of the 1902 clip that are left are held at fancy prices. There has been a large increase in the clip this year in Western Assiniboia and Southern Alberta, owing to the advent of a number of ranchers from the United States with their herds. The new sheep have given a grade of wool which is exceedingly fine. The Mormons, who have settled so largely in Southern Alberta ,are great sheep raisers, and their herds have added considerably to the size of the clip.