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R. JOHNSON, WEST GORTON, MANCHESTER.

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IMPORTANT RESOLUTION OF THE BOLTON EMPLOYERS' ASSOCIATION.

At a largely attended meeting of the Executive Committee of the Bolton Master Spinners' Association, held yesterday afternoon, a strong and unanimous resolution was passed recommending the adoption of short time in the mills of all the members of the association. There was a disposition in favour of working only three days per week, but ultimately the resolution was passed for four.

THE BLACKBURN SPINNING AND WEAVING TRADE.

A meeting of the Executive of the Blackburn Spinners' and Manufacturers' Association is arranged for Monday next, to take into consideration the situation in the cotton trade, and the best means of supporting the Masters' Federation in the present dispute.

MEETING OF THE MANUFACTURERS' FEDERATION.

Yesterday afternoon a meeting of representatives of the local Employers' Association affiliated to the Federation was held to consider the situation in the cotton trade. At the time of our going to press the result of its deliberations had not transpired. It is expected that an important resolution will be adopted supporting the Spinners' Federation.

THE LINEN TRADE OF ULSTER.

The linen trade of Ulster is far and away the most important of the textile industries of Ireland, and is apparently destined to long remain so. Spasmodic attempts have been made at various times during the current century to introduce others, but either complete failure or only the most limited success has attended these efforts. The ancient silk industry of Ireland is almost extinct, whilst its one-time important domestic industry of muslin embroidery quite died out, largely owing to want of enterprise upon the part of the people, after the injury it received in 1857 by the financial panic in America, to which its productions were chiefly exported. The invention and introduction of the embroidery machine in Switzerland

gave it the *coup de grace*. Nothing, or at least very little, was heard of it afterwards until recent years, when philanthropic individuals began to exert themselves for the revival of Irish industries of several kinds, and amongst these lace-making and embroidery came in for a share of attention. The latter, however, is not likely to thrive unless machinery be introduced, and of this we have not yet heard. The only important success made in other directions is by Messrs. Mahony Brothers, of Cork, whose well-known productions in tweeds enjoy a well-deserved reputation. They have, however, few imitators. As observed above, therefore, there is no appearance as yet of the near advent of any competitor in the field of textile industry that is likely to overshadow in importance the linen trade of Ulster. Of the present condition of this some particulars were given on Friday of last week, at the annual meeting of the Flax Supply Association, held in the Belfast Chamber of Commerce, over which the Right Hon. John Young, D.L., presided. The report stated that, as anticipated last spring, a decrease in the acreage has again been recorded. Unhappily on this occasion the yield will not neutralize the short sowing, as in last year, when a decrease in the area of 14.76 per cent. was followed by an increase in the yield per acre of 25 per cent., producing a gross supply of fibre 6.55 per cent. in excess of 1889. This year the results are as follows:—Acreage in 1890, 96,896 acres; in 1891, 74,612 acres—decrease, 22,224 acres, or 22.95 per cent. In 1890 flax was 5.51 per cent. of the total crop area, and in 1891 only 4.41 per cent. In 1890 there were 20,045 tons home-grown flax and 19,607 imported—total, 39,652. In 1891 there were 12,455 tons home-grown and 25,387 imported—total, 37,842. The chairman, in referring to the report, said he noticed that their society in almost every year's report dwelt upon the spread and growth of flax in the south of Ireland. The circumstances of the country were unfavourable to the growth of flax in the south and west of Ireland to a very great extent. The country was largely agricultural, pastoral, or devoted to the raising of store cattle, and anyone who knew anything about flax was aware that in a country of such a character the cultivation of the plant deranged the crops and required very extended resources to make it a success. Again, the farmers of Antrim and Down had resources at their command which those of the south and west had not. Those of the north found ready markets, whereas the latter had no resources. Alderman C. C. Connor said in regard to the importation of foreign flax he was of opinion the Irish material was the sterling article, and it was that that had given it such a name all over the world. This statement by Mr. Connor ought to be true, but if it is otherwise we may let it pass as the offspring of a patriotic sentiment.

THE FLUCTUATIONS IN OUR FOREIGN FLANNEL TRADE.

The course of the flannel trade during the past few years has been a troubled one. Not only have shipments fallen off to an alarming extent, but the average prices per yard have been also reduced. In 1863 the exports amounted to 7,800,000 yards, valued at £502,000, or an average of over 15d. per yard. In 1889 the exports amounted to 15,400,000 yards, the largest quantity shipped since 1860, to which date the records before us extend. But the value was only £563,000, or an average of less than 9d. per yard. If the exports in 1889 had been paid for at the same rate as those of 1863, they would have brought nearly a million sterling. Last year the shipments averaged a little over 8½d. per yard, the quantity being 11,600,000

yards, and the value £416,000. We have not been able in these later years to touch the figures of 1864 relating to value. In that year the total exports were entered at £554,000, although the quantity was only 8,700,000 yards, as against that over 15,000,000 two years ago. Since 1866 we have only exceeded £450,000 eight times—in 1872, 1875, 1877, 1889, and 1890. We have not yet reached the low figures of 1861, when the value of the exports was only £263,000, the average value, however, being over 14d. per yard. If the marvellous spurt of 1889 had only been maintained, one might have anticipated better times for the flannel trade. It is to be feared, however, that the increase in that year was due to exceptional causes. In 1820, the exports of flannels were 2,500,000 yards. In 1830 the quantity was 1,600,000, and in 1840 about the same. It is probable, therefore, that the figures for 1889 exceed those of any previous year in the history of the trade.

THE SPREAD OF COTTON CULTIVATION.

There can be no doubt that it will be considerably to the advantage of the English and other branches of the cotton trade when they can obtain increased sources of supply of the raw material, because so long as they are almost wholly dependent upon the United States they can never be free from a considerable risk of the recurrence, from one cause or another, of a cotton famine. India does not make the advances in its increase or the improvement of the quality of its supply that might be expected. Egypt, on the other hand, since it came under English control, has done well, and in the future may be expected to do great things. Still this does not obviate the desirability of every opportunity being taken to further increase the sources of supply whenever they offer. We are therefore pleased to find that Mr. F. M. Hodgson, Colonial Secretary of the Gold Coast, in a recent journey through Akwapuri and Krobo did not forget to take a quantity of cotton seed along with him. In a despatch to the Government at home he says, after referring to some other matters, amongst which was the adoption of the cultivation of coffee as a staple crop by the natives of those districts:—"I took with me in my journey through Akwapuri and Krobo a large quantity of Egyptian cotton seed, some of which I gave to King Kwamin Forti, of the former country, who stated that he would have it planted in some of his own ground, and the remainder I gave to the District Commissioner to distribute in Krepi, where there are numerous native cotton plantations, and where it will be of more use, as the people of Krobo are turning their attention to coffee, and should not at present in my opinion be drawn away from it to another industry." We trust other Colonial Secretaries will do likewise.

TRADES-UNION FOLLY IN HALIFAX.

Two or three weeks ago Messrs. Clayton, Murgatroyd, and Co., silk spinners, of Halifax, dismissed from their employment a man named J. H. Beever, who had been somewhat prominent in one of those fussy trades-union organizations termed Trades' Councils, and of which he had been elected president. Of course the conclusion was jumped to, without enquiry, that he had been dismissed for his activity in this connection. Accordingly he has been posing as a "victim," for whom it is necessary to make provision. Last Saturday an enthusiastic meeting was held to formulate a scheme whereby he could be provided with a pension. That which found most favour was that he should be made "Organizing Secretary of the Halifax Trades." Among the speakers was a

reverend gentleman, who would have been better employed in making a close study of the industrial situation, when it might have dawned upon him that it is not such as would justify him, or any sensible man, in encouraging the ignorant follies of the working classes, as manifested by the manner in which they are harassing their employers in the conduct of their business. There is hardly a trade in the country in which the greatest difficulty is not experienced in keeping the operatives employed, and that at prices that barely return to employers the amount they have to pay out in wages, let alone repaying them for their labour and the investment of their capital. Beaver will be a new recruit to the crowd of mischief-mongers who, in the various industrial centres, are battenning upon the labour of the workers whilst engaged in planting the seeds of dissension between them and their employers. The fruits of their work may be seen in the strikes at Newcastle and in Durham, in which whole districts have been reduced to a condition of poverty from which it will take them many years to recover. Halifax will therefore, if it be wise, take warning, or its fate may soon become very much of a kind with theirs.

THE WOOLLEN TRADE IN BELGIUM.

Verviers is one of the most important manufacturing towns in Belgium. It is only about a dozen miles from Liege, and is therefore in the centre of the busiest district of the busiest little State on the Continent. Its woollen trade is a very extensive one, yarns being shipped very largely to this country, (the Scotch manufacturers consume them largely), to France, Germany, and elsewhere. It is the custom of the Verviers Chamber of Commerce to issue a yearly report on the local trade. The document is generally a most interesting one. Last year the local trade was affected by the remarkable decline in the two important staples, wool and cotton, the last-named being an important one to the spinners of the town. Wool in December was 12% cheaper than at the beginning of the year, and it was thought the consumption would be stimulated by this circumstance. Unfortunately however, there was a lack of confidence in the trade. Speaking of yarns the Chamber refers to the action of the Government in separating, at its request, the tables relating to worsted yarns from those affecting woollen yarns in the official returns of imports and exports. Unfortunately merchants have not all conformed to the official instructions, so that the desired result has not yet been arrived at. The Chamber considers that the tables are inexact as far as their sub-divisions go, although the totals will of course be correct. The figures referring to exports of worsted yarns are scoffed at by the Chamber. According to the returns they exceed 5,000,000 kilos., whereas the entire production in Belgium does not exceed 2,500,000 kilos., of which at least one half are consumed in the country. Many of the yarns entered as worsted must therefore be set down as woollen. Putting the two quantities together we have the following total of yarn exports from Belgium, omitting 000's:—

	1891	1890	1889
Germany and Aust.	2,698	3,063	4,186
England.....	6,668	6,930	7,518
France.....	986	319	502
Luxemburg.....	85	..	..
Italy.....	301	..	..
Holland.....	101	196	449
Switzerland.....	156	..	..
Others.....	415	..	..

Kil. 11,414 11,110 12,657

The increase in sales of Belgian yarns to France is remarkable. On the whole there is an increase over 1890, but the turnover is less

than that of 1889. The returns relating to imports of woollen goods are also of interest. Casimirs and similar cloths have entered the country in smaller quantities than in either of the two preceding years. Out of a total value of 1,916,920 francs, England contributed 1,450,000 francs worth. The trade in coatings, duffets, and other heavy cloths has grown since 1889. Last year the Belgian imports were valued at 2,129,990 francs, of which we supplied 1,129,900 francs worth. In goods of a lighter texture, however, we yield place to France and Germany, who are practically our only competitors. The figures relating to this trade are of special interest, as it is of larger dimensions than those referred to above. It will be observed that in 1890 we occupied a position midway between France and Germany. We are now third on the list, Germany having made tremendous strides since 1889—a result all the more remarkable seeing that France and England have also increased their sales.

	LIGHT WOOLLENS (000 omitted)		
	1891	1890	1889
Germany.....	6,277	4,713	4,098
England.....	6,161	5,353	5,127
France.....	6,939	6,309	6,194
Holland.....	265	145	188
Other Countries ..	87	35	20

Francs 18,731 16,552 15,130

The total value of Belgian woollen imports is in round numbers £908,000. By a most stupid arrangement the Belgian woollen exports are given by weight, so that we cannot compare them with those of the imports above. The total shipments of casimirs and cloths of a similar character were last year 1,317,520 kilos. The quantities absorbed by some of the principal markets are given below in thousands:

	1891	1890	1889
Germany.....	146	154	119
England.....	100	173	74
United States....	111	182	156
France.....	540	505	503

The result of the year's trading with the United States is what might have been expected. The returns for the South American markets, which we have not reproduced, also shew a falling-off. The shipments of coatings, duffets, and other heavy woollens, were last year 317,210 kilos. Of this quantity England took nearly a third, and the Congo 42,449 kilos. Belgium's commercial transactions with the thickly peopled territory watered by that noble stream, have, we may add, grown considerably in volume since 1889. The shipments of light woollens from Belgium were last year 871,240 kilos. Of these we took 124,060, the Congo 131,940 (against 25,810 in 1890), France 192,710, and Holland 202,720 kilos. The total trade with the United States for the year was valued at 2,102,613 francs, according to the invoices legalised by the United States Consuls. The causes which have contributed to the decline of certain branches of the Belgian woollen trade of late have, of course, equally affected other nations. The disturbances in South America have had a marked effect upon the other trades of the country, which, however, have on the whole maintained themselves fairly well, as the above interesting tables shew.

THE RADCLIFFE COLOURED GOODS LIST.

Our Radcliffe correspondent writes:—"Some curious shuffling appears to have been going on in the game of cards in Radcliffe and Pilkington district in regard to the new list of prices for the weaving of coloured goods. For some months past negotiations have been in progress between the officials of the Bury, Radcliffe, and District Weavers' Association, and representatives of the Radcliffe and Pilkington Employers' Federation, with the object of drawing up a list to suit both parties; and after an almost

interminable number of meetings one was agreed upon. One half the weavers appear to favour the list agreed upon by the two committees, while the other half are somewhat violent in their declamations against it. The latter section is led by the officials of the old Radcliffe Association, and they certainly seem to have been actuated in their opposition by personal pique at not being among those chosen to draw up the list. These oppositionists held a meeting the other night, at which it was stated that the new list was a reduction of something like 30 or 40 per cent. on the old list, and that the prices fixed for circular looms were 10 per cent. less than Colne prices. The tone of the speeches was altogether too tall, to say the least. However, in the end, the meeting decided to start a new organization, presumably with the object of doing that which a strong organization backed by a still stronger amalgamation had failed to do, and the accomplishment of which would simply mean the removal of the whole of the Radcliffe coloured goods trade to other and more reasonable climes. The Bury Association are taking a ballot of the opinions of their members upon the point, and it is expected that the result will shortly be made known, when the action of the committee and secretary will most probably be vindicated. In any case, it is understood that the list will be adopted by the employers as arranged, and will become the standard of the district."

SETTLEMENT OF THE DAISYFIELD MILL DISPUTE, BURY.

At last, after exactly a month's stoppage of the mill, the dispute at the above-named place has been brought to a close by the masters agreeing to pay an extra ¼d. per lb. of weft woven, upon the weavers taking up, as before, the responsibility for the counting of picks and the weight of cloth, in lieu of the burden being lifted from their shoulders to those of the overlookers. Once again we have an exemplification of the avaricious and grasping spirit by which trades-unionists are actuated, and of the fact that gradually, but none the less surely, they are drifting into rank socialism, a socialism that has for its ideal a division of wealth so long as the portion they are to have from such division is larger than the sum total of the worldly goods they now possess. In this dispute the trades-unionists concerned have maintained, over and over again, that what they were fighting for was a "principle"—but from the result it would appear that the "principle" which most concerns them is simply one of £ s. d. The conditions upon which the strikers have agreed to resume work will admit of no other interpretation, and the whole affair is certainly one that does not redound to the credit of the operatives affected. There is one point about the dispute that should not be allowed to escape notice, and that is the statement made to the effect that at all the other mills in Bury and district, and at mills in the neighbouring towns, the overlookers are responsible for the counting of picks, and that it is the general custom of the trade. We have reliable information to hand that such is not the case; that the general custom of the fustian trade is that the weavers shall have such responsibility entirely to themselves, so that the overlookers are neither personally nor conjointly responsible. In Bury there are only four firms at which the overlookers are responsible, while the only other mill within our knowledge at which this principle obtains is one at Littleborough, where, however, this practice is forced upon the firm in consequence of a patent letting-off motion attached to the beam, which the overlooker is bound to have under his control. With the exceptions

named, the custom of overlookers being responsible for the picks and the weight of the cloth is entirely unknown throughout the whole of the fustian trade. Nor is there evidence wanting that where the work has been done by the overlookers, and resort has been made to the other plan, the latter has been productive of far better results, both as regards weight of cloth and the regularity of the picks, and this evidence points conclusively to the fact that the weaver, and the weaver alone, ought to be responsible. We are of opinion that the masters have not done a very wise thing in granting a sugar plum of $\frac{1}{4}$ d. for the mollification of the operatives. They have done this work for approaching 25 years, and then because three or four of the operatives become dissatisfied, and work the remainder up to fever heat, the employers must break through the good old custom of a generation, and run the risk of losing a good name in the market for a speciality of cloth, or else pay something over and above wages, which have not for one single moment in the dispute been held up as being bad or even indifferent. If it can be confined to this one mill, so far so good. The only fear we have is that the prospect of getting a similar concession from other mills will open up the flood gates to something else, and provide food for an agitation that may do much injury to both masters and men. In case of such an attempt, we would suggest that a firm stand be made, and a strong and united effort made to nip in the bud the growing spirit which seems to have blinded the vision of those who are doing their best to drive trade to other lands. It is worthy of note that this point was not brought to the front until the strike had been in progress some time.

THE NEW FRENCH FACTORY LAW.

This measure, which has passed the Chamber of Deputies, and of which the Senate has already adopted some clauses, excites the keenest interest amongst French manufacturers and spinners. The feeling amongst these classes is well expressed in a report just issued by the Elbeuf Chamber of Commerce. Each time that this body has been approached on the matter it has pronounced energetically in favour of the absolute freedom of adult labour from legislative restriction, the forbidding of night work in the case of women and children, and the regulation of the labour of children under 16. The manufacturers have signified their willingness to accept an eleven-hours day, but they point out that if by the new law women are to be restricted to a ten-hours day, factories in which both sexes are employed will be thrown into confusion. The conditions of modern factory life do not permit of the home employment of women, although formerly the spinning mills were the only places of the kind where they could be engaged, other work having to be done at home. Power-loom weaving and the development of preparation machinery have, however, opened to them new avenues of employment in place of the old-fashioned hand work. It appears that the law referred to provides for a ten-hours day for women, and one of eleven hours for men. This arrangement, as those interested have very quickly pointed out, would result in the stoppage of a portion of the machinery an hour before the rest—a system which would possibly result in the displacement of female labour. While agreeing theoretically with the argument that the place of the woman is at the fireside, the president of the Elbeuf Chamber, in a recent common-sense address, reminds too enthusiastic legislators of the necessities of existence. The proposal to divide all labour in mills into two shifts of eight hours each, working between four a.m. and 10 p.m., is

bitterly opposed by French employers. After mature deliberation the following resolutions have been passed by the Elbeuf Chamber:—

Seeing that the working day for females cannot, without serious consequences, be made shorter than that applying to men;

That the proper place of the woman is at the family fire side; and that night work in her case should, therefore, be forbidden;

That the term "night work" includes the period between 9 p.m. and 6 a.m.;

Resolved:

(1) That the working day should, with exceptions, be fixed at eleven hours;

(2) That night work should be forbidden to women and girls;

(3) That night shall be supposed to include the hours between 9 p.m. and 6 a.m.;

(4) That the division of working operatives into two shifts of eight hours, working alternately between 4 a.m. and 10 p.m. should not be authorised for women.

A copy of these resolutions has been forwarded to the Minister of Commerce and Industry, the local Senators and Deputies, and the Chambers of Commerce in France.

THE TEN-HOUR VIEW.

On the other hand, advocates of a ten-hours day are to be found even amongst the ranks of the employers. Amongst the most intelligent of these is M. Badin, of Barentin, Seine Inférieure. This gentleman has just addressed a long communication to the Minister of Commerce, of which a copy has been placed at our disposal by a correspondent at Lille. M. Badin advocated the ten-hours day in 1879 when he was a member of the Conseil Général of his department. He is of opinion that the adoption of a ten-hours day for women will perforce result in a ten-hours day all round. The Elbeuf Chamber, on the other hand, as we have pointed out, fears that such a measure would simply result in driving female labour out of the market. M. Badin does not recommend the immediate enforcement of a ten-hours law. He is in favour of proceeding towards the desired goal slowly, so that there may be every opportunity for preparation. Nor does he anticipate that it will at first be possible to produce as much in the ten-hours day as in the present one of eleven hours, although he is apparently of the opinion that in the end, provided that the operatives co-operate cheerfully, the desired result will be arrived at. "The English," he says, "failed to accomplish this object, i.e., the producing of as much or more in the ten hours as in twelve previously in less than 44 years—1848-1892." M. Badin's point here is not clear. If he means to imply that the workman of to-day produces as much in ten hours as his predecessor of 44 years ago did in twelve, he is no doubt correct; but the feat has been rendered possible by improvements in machinery. M. Badin states that at first English wages were lowered as a result of shorter hours. He does not, in view of these and other facts, favour the immediate application of the ten-hours law, but would rather have one of eleven hours first. He points out that the proposed restriction of the labour of children will have a serious effect upon the heads of large families, and more especially on widows with young children. He states that in his mill there are children belonging to two families, each of which numbers twelve, exclusive of the parents. He deprecates the action of those who would forbid the employment of this labour, but recommends the adoption of the English law as to half-timers for children of eleven years. In raising this suggestion he speaks of our countrymen as *gens très pratiques*. M. Badin also urges the advisability of adopting the English system of half a working day on Saturday, the lost time to be made up by a slight addition to each of the other working days. The result of the action of the legislature is not yet certain; but

the proceedings so far are interesting, as showing that at last the influence of English example in the treatment of factory workers is beginning to have a salutary effect in France. The danger in cases of such awakening of the moral conscience amongst our impulsive neighbours is that they may go too far, and so injure the interests of the employers in their desire to benefit the operatives, the result being disaster to both. But perhaps the French are not *gens pratiques*.

"THE FUTURE TRADE RELATIONS OF GREAT BRITAIN AND THE UNITED STATES."

Under this heading Mr. R. S. McCormick, the Resident Commissioner for Great Britain for the World's Columbian Exposition (most unrhythmical of titles!) read an address recently before the Society of Arts. The reprint occupies some twenty pages of the official journal of that body. A careful perusal of the document convinces one that Mr. McCormick had set out for himself the task of mollifying the angry British manufacturing public which refuses to patronise the "show," by reminding his hearers that England, too, was highly protectionist once upon a time. His views he expresses by a quotation from Sir Donald Mackenzie Wallace's "Russia." "Great Britain is at present in the position of a successful manufacturer who has outstripped his rivals and has awakened amongst them a considerable amount of jealousy and envy. To justify these feelings a peculiar economic theory had been invented. England, it is said, has become by her *politique d'exploitation*, the great blood-sucker of less advanced nations. Having no cause to fear competition, she advocates the insidious principles of free trade, and deluges foreign countries with her manufactures to such an extent that native industries are inevitably overwhelmed. In the pride of their hearts the manufacturers and merchants of Manchester and London may exclaim—using the quaint old words of the poet Waller:—

Gold, though the heaviest metal, hither swims,

Ours is the harvest where the Indians mow,

We plough the deep and reap where others sow.

Thus all nations pay tribute to England, but this cannot last for ever. The fallacies of free trade have been detected and exposed, and the nations have found in the beneficent power of protection a means of escape from 'British thralldom.'" As we have stated, Mr. McCormick endeavours to justify the protectionist policy of the United States by pointing out that Englishmen (who, of course, were not then so wise as they are to-day) once believed in taxation of competing imported products. Mr. McCormick's paper is, in effect, a summary of the commercial progress of England. It no doubt cost him some trouble to compile the facts it contains. He shows that the United States is still one of the best markets for British products. The assertion is, of course, beyond dispute; but it has little bearing upon the question at issue. As we have already pointed out, those who refuse to exhibit are quite aware of the size of the American market, and their action in refusing to exhibit is due to considerations which are not taken into account by Mr. McCormick. The Commissioner thinks that the cotton factory should be near the cotton field. He forgets that there are other considerations that require to be taken into account, besides proximity of raw material. In some classes of cotton goods the cost of the cotton itself forms only a small percentage of the total expenses of production. This is more particularly the case in connection with damasks, Turkey towels, and other high-class productions. It is obvious, therefore, that Mr. McCormick's views (which are those of a large section of his countrymen) will not bear close examination.

THE POSITION OF AFFAIRS IN THE COTTON TRADE.

Our readers are sufficiently familiar with the general aspect of affairs in this dispute to know that no improvement has taken place or is discoverable in prospect. The farcical offer of arbitration, when there is really nothing to arbitrate about, put forward by Mr. James Mawdsley, has met with the reception any sensible man would have predicted. It has practically been shelved. The impudence of such an offer would be about paralleled in the case of a brutal bully of a man making an unprovoked attack upon an inoffensive individual, and then, when remonstrated with, proposing to arbitrate whether or no he had a right to the contents of the pockets of the man he had knocked down. The proper course would be to bring the offender to justice, punish him, and compel him to pay an indemnity for the damages committed. So it should be in this case. The unprovoked and gratuitous attacks the operatives have allowed their officials to make upon the Stalybridge Spinning Company and the Accrington Spinning Company, have inflicted great damage upon themselves, and might have had very serious results had they not been defended by their respective associations. In order to defeat these attacks the employers are perfectly justified in the course to which they have resorted, and they would be justified to the full in both the cases in punishing the aggression by demanding an indemnity from the operatives' associations for all the loss incurred, and that may yet result from them. This should be accurately estimated and a claim put forward for indemnification on account thereof. It would be useless for the operatives to plead that they neither would nor could pay it, because the whole struggle having been remitted to the arbitration of force the defeated side will have to submit to what the victor chooses to impose. If, therefore, the masters win in the dispute, they will have a perfect right to impose such an indemnity upon them. As it seems by the resolutions the various operatives' organisations have passed, that their members can afford to pay weekly contributions of from 3s. to 3s. 6d. each in support of the dispute, it would inflict no great hardship upon them if they continued them until their employers had recouped their losses. In the event of there being any difficulty in the collection of the money, the employers can do it easily by means of a reduction of 10 per cent., to endure until the sum has been paid off. This may seem a very hard and unfeeling suggestion, and in fact it is so, but we hold it is the only one by which the justice of the case can be met, and it is essential in the interest of both the employers and employed, and the preservation of the trade for the country. The monkeying tricks in which the leaders of the cotton operatives have been indulging, and in which they have been backed in the main by their constituents, would justify the anticipation that there will soon be seen a recrudescence of tails amongst them.

But, leaving this aspect of the question, we may say that the trade is to be congratulated upon the stand it is making against the wanton and unprovoked attacks that have so long been indulged in without resistance. The old adage says that "the trodden worm will turn," a truth which has been exemplified at last in this case, where, after having been kicked and cuffed in every conceivable manner, the trade has turned upon its oppressors. And it should not cease the contest until it has taught them a lesson that will not soon be forgotten. Messrs. Mawdsley and Co. are now beginning to seek to make capital out of the allegation that the

employers are shewing a vindictive spirit in locking out the whole trade because of a paltry and miserable dispute at a single mill in which only the sum of about £28 was involved. But this is not a true statement of the case, and had they so regarded it they would not have kept the workpeople idle for seven months at a cost per week to their funds of £220, according to their own reckoning, and of over that to the employing firm. With them it has long since been a fight for mastery: they felt they could not afford to be beaten, or to acknowledge the blunder in their tactics. The employers have also seen this, and they cannot afford to be ousted from the management and direction of their own business establishments, whilst they are still to be held responsible for the payment of wages and trade liabilities. Therefore if they have not to submit to extinction they must win in this struggle, whatever be the cost. These are truths that ought to be brought home to every man's mind in the trade. It is, therefore, gratifying to record the spread of a determination in this respect throughout every industrial centre in the trade, to put an end once for all to the mischievous and dictatorial interference to which they have already far too long submitted. There is the greatest unanimity amongst firms already stopped to repulse the attack made upon them, and other adhesions are steadily coming in. The Rochdale firms and limited companies which did not appear at first to appreciate the gravity of the situation, and had started their mills last week, did not re-open them on Monday. The young association of employers at Darwen has taken prompt action immediately on receiving the necessary recognition and acceptance into membership by the Federation, and has during the week given their employes a fortnight's notice to terminate their engagements with them. In the East Lancashire districts this is the customary notice. Bolton is considering, and by the time this reaches the eye of our readers will have decided the matter, and it is anticipated that action of an important character will be taken to support the Employers' Federation. The operatives' leaders are looking forward to the reception of heavy contributions from the fine spinning centres. Should the anticipated step be taken these will be cut off. That it will be a wise action on the part of the fine spinning section of the trade admits of no dispute, as they themselves are sufferers from the same aggressive and harassing policy of the mischief makers as the spinners of low counts. In proof of this we need only point to the "Diary of Mr. J. T. Fielding, J.P.," the secretary of the Bolton Operatives' Association. In the event of the employers attempting to resist this gentleman's impertinent interferences with their businesses, they would inevitably be confronted with the serried ranks of the battalions commanded by Messrs. Mawdsley, Ashton, and Company. Thus it will be obvious that by continuing to run full time they are simply contributing to the defeat of the largest section of the trade, and the section that in a contest would become the most powerful ally they could possibly enlist on their side. A victory won now by the South Lancashire districts will be a victory for them in the future, whilst a defeat will be equally a defeat for them. These remarks apply with equal force to the spinning establishments of Burnley, Blackburn, and Preston, indeed to every mill in the country spinning yarns for sale. It is only in relation to combined spinning and weaving establishments that they do not apply with the same degree of force, but even in respect of these we hold that the force is steadily increasing, and is now only very little less, and may, if the

stoppage endures for a short time longer, become no less at all. Their employes in the spinning department will make their contributions to the funds, that go to sustain their side in the contest, and by affording this section of their opponents continued employment they become accessories to a prolongation of the struggle against their own side. They have, we suppose, adopted this policy of working mainly because the manufacturers who do not spin are continuing at work, and they are afraid that they may get some advantage over them. That this is a groundless fear it is not necessary to demonstrate.

There is another aspect or two of the matter which we reproduce from a communication addressed by the writer to and which appeared in the Manchester papers yesterday:—

"It is perfectly obvious that if the spinning districts remain idle the weaving districts cannot work for any great length of time, as a yarn famine must very soon result. This being indisputable, the question arises whether it will not be much more to the interest of manufacturers to stop their mills immediately rather than use up every skip of yarn existing, and then be compelled to stop because another cop cannot be obtained. It will seem to every person in the possession of any common sense that there can only be one answer thereto, and that is that it will be best to stop immediately. An opposite course implies two serious disadvantages, the first being that they will, by causing a dearth of yarn, raise the price very greatly against themselves, and render their business exceedingly bad, if not disastrously unprofitable, as they cannot possibly obtain corresponding advances upon cloth prices. Should this course be followed, they must know from bitter experience in the past that it will take from eighteen months to two years' time before stocks of yarn can be so far replenished as to admit of a fairly equal division of profits, if there are any, between the two sections of the cotton trade. This is to look at the matter purely from the manufacturers' standpoint. It has also another aspect, that of the general interest of the trade. For the manufacturing section to continue working means that there must soon be a great scramble for yarn, in which demands will be made upon spinners for supplies under threats of the cancellation of all high-priced orders if not complied with. The disastrous effect of this will be that many spinners will be tempted to break away from acting with their Federation, and so induce a complete failure of the present course of action. This would be as disastrous for manufacturers as for spinners, as it would destroy the organisations now engaged in the contest, and would disorganise the remainder. In the South Lancashire and Cheshire districts the trade from a tactical point of view, and from that of its best interests, is committing a serious blunder in not shutting down, and especially in the establishments in which spinning and weaving are combined and in which independent spinning and weaving establishments exist side by side, as they are directly in both cases contributing to the defeat of that portion of the trade engaged in the present struggle."

We need only add that as this article is being closed numerous evidences are appearing of the increasing determination of the trade to act upon the lines of these suggestions.

At a meeting of Swiss embroidery merchants held at St. Gall, it was decided to acquire the patent of the Saurer steam embroidery machine for the sum of 600,000 francs.

It seems that our German friends have not suffered as severely as they apprehended through the McKinley tariff. On the contrary, it is admitted that half-silk goods, printed cotton fabrics, hosiery, etc., have since the beginning of the year been exported in rapidly increasing quantities to the United States and to South America. There has even been an increase in the trade of Annaberg and Eibenstock with the United States, the figures for the first quarter of the present year being more than \$60,000 in advance of those for the corresponding period of the previous year. The returns for Crefeld shew a decline in velvet and plush, but an improvement in cotton velvet and stuffs all silk,

Reviews of Books.

A DICTIONARY OF THE COAL-TAR COLOURS. BY G. H. HURST, F.C.S. London: Heywood & Co., Ltd., 68, Fleet St.; pp. iii., and 106. Price 10s. 6d.

In the pages of the *Dyer* during the past year there has appeared a dictionary of the coal-tar colours. This is now sent out in a complete condition in book form; a small edition of 250 only being printed. This book will supply a want among dyers and users of coal-tar colours, who have long required a handy book of reference to which they could look when they wanted to know what sort of a thing a particular colour might be, and how it was used. Being arranged in dictionary form, no time and labour is lost in wading through a mass of information which at the moment is not wanted, to get at that which is wanted. Mr. Hurst has managed to give in clear, simple, language a brief account of all coal-tar colours. We have gone through the book and find that it is up to date in this particular, very few colouring matters being omitted. Two we may mention, viz., capri blue and azurine, which are not given, and only one of the rosinduline colours of Messrs. Kalle and Co. Due prominence is given to the productions of our English colour works, and credit is given them for the introduction of colouring matters both old and new; in subsequent editions we trust to see them more fully to the front. People are so accustomed to look to Germany for coal-tar colours that they are surprised rather than otherwise when they see the name of an English firm as the introducer of such articles. The information given about a colour comprises the maker's name, date of invention, chemical name, formula, method of making, properties of the colour and manner of dyeing, with the results yielded, and a statement as to its fastness to acids, alkalis, soaping and light—points of the utmost value to a dyer. This part of the book has been well done, and it is evident from the remarks which are given under these heads that Mr. Hurst has given here the results of many of his own observations, and the value of the book has been enhanced thereby. Besides the descriptions of the colours themselves, there are a number of special articles included in the work, on methods of dyeing and printing, and valuable alizarine dyes, benzidine colours, rosaniline colours, etc.

SOCIALISM. BY STEPHEN WILLIAMSON, M.P. Kilmarnock: Dunlop and Drennan.

This is a reprint of an address delivered by Mr. Williamson to his constituents at Kilmarnock in December last, together with some correspondence arising upon it with the Rev. John Herkless, of Tannadice. Mr. Williamson has told some wholesome truths, in a plain and forcible manner, to the working classes under whose notice his address would come. The conglomeration of scraps of knowledge in the minds of the bulk of our working classes which does duty for the fruits of education, combined with the limited experience derived from the narrow spheres of life in which their time is passed, forms the fertile soil from which grow their crude ideas of political economy and socialism. The fallaciousness of these Mr. Williamson exposes with considerable ability, earnestness, and convincing power. It is to be regretted that his example is not more followed by members of Parliament than it is; were it so we should hear and see less of the ignorant movements that are at the present moment plunging large areas of the country into poverty and distress. The reprint, we trust, will be extensively circulated, and if it be widely read in the proper spirit it cannot fail to be proportionately beneficial.

An arrangement for the protection of trade marks and designs has only just been concluded between Germany and Switzerland. Such a measure was urgently needed.

The silk firm of Karl Koenig and Co., the leading member of which is now president of the Chamber of Commerce of Crefeld, celebrates its fiftieth anniversary in the course of the present year. Another Crefeld firm, Gust. Jacobini, attains its twenty-fifth year.

Foreign Correspondence.

TEXTILE MATTERS IN THE UNITED STATES.

BOSTON, APRIL 20TH.

SWEATING IN THE REPUBLIC.

It is already pretty well understood, both in this country and abroad, that for examples of some of the worst effects of the sweating system one need only make investigation in our own large cities, where the ready-made clothing trade is carried on. Congress is now making an investigation into the matter, and representatives Hoar and Warner were recently in Chicago for the purpose of making enquiries there. They made a personal visit to a large number of "sweat-shops," and also took evidence in Judge Harlan's court room. While in the city the congressmen visited fourteen different shops, thirteen of which they declared to be filthy beyond description. During the examination the working people claimed that wages had been reduced about 25 per cent. within the past two years, and the manufacturers claim that there has been an advance of from 5 to 10 per cent. Many of the manufacturers appeared profoundly ignorant of what was daily going on in their midst. They acknowledged, however, that such conditions as those concerning which evidence was given ought not to exist. Mrs. T. J. Morgan told the committee that she had given a good deal of time to the study of the question. She described a place at 58, Wilson street, in a basement, where two girls worked ten hours a day for 12s. 6d. a week and three men twelve hours a day for 37s. 6d. a week. At 545, Jefferson street, also in a basement, four girls worked ten hours a day for 16s. 8d. a week. Seven men were employed twelve hours a day at 6s. 4d. a day, and so on through a list of fifty places.

Mr. J. H. Prentiss, of Charles Kellogg and Co., was evidently taken aback by the Commissioners. He admitted that he knew nothing about the sanitary condition of the workshops.

"Suppose a case where people eat, sleep and work in a room alongside of piles of unfinished clothing, and that these people are filthy," said one of the questioners, "what would be your position?" "I should take my goods away at once and call in a health officer," was the prompt answer. "Well, then," replied the chairman, "Mr. Hoar and myself saw several such places in Chicago to-day." Mr. Prentiss said it was a surprise to him.

"Suppose," broke in Mr. Hoar, "a room 10 by 10, a garbage bucket, two children, an old lady with a diseased face, cooking going on and piles of cloaks lying about—what would you say?" "There is no such place in Chicago," quickly responded Mr. Prentiss. "There is," said Mr. Hoar, "for we saw it to-day."

HIGH TARIFF APOLOGISTS.

The *Chicago Inter-Ocean*, a protectionist daily, pointed out exultingly the other day that the tariff had resulted in a reduction of prices. One of the principal reasons for this assertion is to be found in the following statement of prices:—

	Price Mar. 1890.	Price Feb. 1892.
Prints -	1890.	1892.
American Indigo blue.....	6½c	5¼c
Passaic fancy.....	6 c	4½c
Victoria solid black.....	5¼c	5 c
Domestic ginghams—		
Rates Warwick dress.....	8½c	8 c
Cumberland staple.....	6 at 6¼c	5¼ at 5½c
Westbrook dress style.....	8½c	7¼c
Brown shirtings and sheetings—		
Atlas R.....	6¼ at 6½c	6 c
Atlantic A.....	7 at 7¼c	6½c
Pacific extra.....	6¼ at 7 c	6½c
Cotton flannels, brown—		
Amoskeg A.A.A.....	15 c	14½c
Ellerton, O.....	11½c	11 c
Hamilton, M.....	6½c	6 c
Massachusetts, R.....	7¼c	7 c

It would probably puzzle the *Inter-Ocean* to explain how the McKinley Tariff Bill has reduced cotton prices, seeing that that measure

only resulted in a slight alteration of the duties on such goods. The reduction is due more to cheaper raw material, the result of an abnormally large crop. The table I have reproduced because of its interest to those in England acquainted with the staple makes of which quotations are given. Even the best of causes would be weakened by the presence amongst its supporters of such blundering champions.

SIGNS OF THE SCHOOLMASTER BEING "ABROAD."

The Bissell Carpet Sweeper Company received lately at their Grand Rapids office a letter which is reproduced herewith just as it was written.

Mess. Bissell Carpet Sweeper Co., Grand Rapids, Mich.

GENTS:—

Incloust find check for Bissells Carpet Sweepers your Carpet Sweepers are just simply emments they are hot sellers And give good satisfaction Joust so I sell A lady A Carpet Sweeper Oncef then i stand in with her all my live And can sell hair everyting else All for loff.

Yourn.

Here is another effusion after the style of Josh Billings. It was received by Mr. C. H. Ward, of Marshall Field and Co.'s upholstery department:—

BILLERICA, Mass., Marsh 8 1892.

Dear Mistr ori Ental.

I herd yew was a declin in ruggs, blankits, sheets, bed komfirts an ulsters. I hev an ole bed quilt morne a hunded yeers ole in fac it hes not ben washed to mi nollige for ninety six yeers it was made for mi wies grate gramuther in 1767 orl worked bi han. it hes ben stept under so hard for the past sentry that the picters and woosted hev orl ben worn off severil times and the pattern hes ben sowed on from memry, on the under side ov this quilt there is a lot of figgered munnygrams statin over and over round round about and sidleways crossin each other, and neerly worn off, lik this *this way difficulties 2 tryhump* a fine motto not onli fer chicawgo but fer orl kinds of bed quilts.

i no that yew pay good figgers for sech kewirsoities to spred out in rich folkses parlars an lyberies wat wil yew pa for this i it is six feet squar on wun sid an seven feet on the other an waies 3 pouns when wet. it is sum what staid very much sum what so in severil places wich proves its antikai if yew wil giv me a fair livin figger fer it i can mak up severil duizen just lik it a hunded an fifty yeers ole for the same prise wich i cood afford 2 do of yew shoold want a kwantiti, fer in onyun there is strenth.

yewes trewly

NATHAN DAVIS.

FRENCH SHIPMENTS OF WOOLLENS TO THE STATES.

The French are, of course, well represented in this market amongst foreign sellers of the better classes of woollen goods. Their recent shipments include jacquard plissé, silk and wool crepon, and serpentine Bedford cord. Fine Scotch suitings are also included.

The loss by fire at Bromley's mill, Philadelphia, will foot up to fully £80,000. The insurance is £65,000. The following companies are holders of risks: The Lancashire; The Royal; The Liverpool, London, and Globe; and The German American.

J. D. Dazian, representing Meyer, Ebling and Co., New York, sole agents for the celebrated Linden velveteen, and F. Ebling and Co., one of the largest manufacturers of silk velvets at Crefeld, has been visiting the St. Louis market. It is stated that he took large orders on both makes in that city, one house alone buying 1,000 pieces.

THE president of the Society of Berlin Linen Manufacturers is endeavouring to obtain a reduction of the duty on Irish linen yarns. The duty for the quality under consideration amounts at present to 120 marks per quintal, whereas in 1879 it amounted only to 60 marks. In order to encourage the export of linen manufactures, it is proposed to ask that the earlier rate may be again adopted.

DYE-STUFFS AND COTTON IN ZANZIBAR.—The indigo plant grows wild everywhere in Zanzibar, and was formerly manufactured for export in the islands, but has been abandoned for 40 years, and the tanks have gone to ruin. Logwood has been introduced, and spreads rapidly, being evidently well adapted to both climate and soil. Cloth is made of the native cotton, which grows freely, but the boll is very subject to be attacked by insects, and the occurrence of rain when the crop is ready to be picked makes cotton a crop ill-suited to the islands, although eminently so to the mainland.

CITY AND GUILDS OF LONDON INSTITUTE.—The annual meeting of the governors and friends interested in the institute was held at Mercers' Hall, Cheapside, on Wednesday, Lord Selborne (chairman of the council) presiding. The report shewed that the income for the past year had amounted to £30,940, made up as follows:—Subscriptions and donations, £22,715; school fees and sundry amounts received from students for materials, £8,225. The total expenditure had been £30,226, thus leaving a balance of £714. The amount voted by the council for the central institution at the beginning of the year was £12,000, and the expenditure £11,489; the students' fees amounted to £4,086, and the net cost of the institution, after deducting the students' fees, etc., was £7,403. The amount voted by the council for the maintenance of the Technical College, Finsbury, was £8,794, and the expenditure there had been £8,786. The students' fees amounted to £3,932, and the net cost of the college, after deducting students' fees, etc., was £5,754. The amount voted in connection with the technological classes and examinations was £6,230, and the expenditure under this head amounted to £6,152; while the net cost of the examinations, after deducting candidates' fees, was £5,620. The expected income available for general purposes for the present year amounted to £31,870. Lord Selborne, in the course of an address, reported very favourably upon the work accomplished in all departments. The work carried out at the central institution during the past year compared most favourably with that attained by any science institution in the country. He concluded by moving the adoption of the report and balance sheet. Mr. D. Watney (treasurer) seconded the motion, which was adopted unanimously. The treasurer, the auditors, and the members of the council were then reappointed, and the meeting concluded with a vote of thanks to the chairman.

Designing.

NEW DESIGNS.

VESTINGS, Etc.

This is a season of novelties. All the well-known weaves are in demand, but the search is still for novel combination patterns. The old styles of by-gone decades are now brought to the front and made fashionable in the new shades of mauve, melon, fawn, and violet. We give a suggestive design *A*, which may be utilised for many fabrics either in silk, cotton, or linen; the ground, which is shewn in the design undotted, may be plain or a 7-shaft satin warp face. If a fine-set reed is used the ground may remain as it is, the warp and weft being made nearly equal. The repeat takes place every 147 threads, 42 to the round, all solid colours, piece dyed, or bleached.

A very stylish fabric could be produced for vestings by the use of fancy-coloured spun silk for the weft. We indicate a few arrangements: warp all a positive colour or tint, say, light fawn, light buff, dove, light green nearly approaching yellow; then the spun silk weft mixed

as a multicolour—that is, two or three-fold wound together on a bobbin without any twist—red and white, brown and white, lemon and dark green; the diagonal by this means would be merely as it were outlined with a graceful charming effect.

Design B is on 6-shafts, 18-end draft, 12 to the round. The following particulars will give a good combination in two colours for a large plaid, in zephyr cotton cloths, the monotony of the rectangle being well broken up by the weave: 40 dents per inch, 30's twist, two in a dent, 80 picks per inch, 30's weft. Warp pattern: 300 light drab or dark buff, 24 cream, 24 coral, 24 cream, 24 coral, 24 cream, 24 coral, 6 dark moss green, 6 white, 24 coral, 24 cream, 24 coral, 24 cream, 24 coral, 24 cream, 24 coral, 24 cream, and repeat from "300 light drab." Weft the same pattern as warp. We need scarcely observe that other colour arrangements may be made as required, or a smaller plaid produced. For instance, 36 green, 6 white, 36 green, 36 white, 6 green, 36 white, and repeat with the first "36 of green"; weft the same pattern. This would give a simple check, but one very graceful, neat, and effective. Little finishing, such as cold calendaring, will suffice; no stiffening.

SHIRTING PATTERN.

A matting on four shafts, 1 and 2 for first shed, 3 and 4 for second shed, all two in a heald, of 20's cotton for warp; 20's cotton weft, 16 dents per inch, four in a dent. Pattern of warp:—

2 white,	} Repeat for 20 ends of each.	2 white,
2 light blue,		2 light blue,
4 dark blue,		2 dark blue,
2 light blue,		2 light blue,
2 white,		2 white,
2 orange,		2 light blue,
2 white,		2 white,
2 light blue,		2 orange,
2 dark blue,		2 white,
2 light blue,		2 light blue,
2 white,		4 dark blue.
2 orange,		

And repeat from the first "2 white and 2 light blue." The weft pattern the same; two picks in a shed, 64 picks per inch.

THE ANALYSIS OF PATTERN.—XI.

THE SETTING OF CLOTHS (continued).

THE WEAVE

In considering the influence of weave on the sett of a cloth, two questions at once present themselves: Firstly, is the diameter of yarn modified at all in weaving? and secondly, in any given weave is it possible to ascertain the precise influence of the bending of warp and weft on the sett? Respecting the diameters of yarns much could be written, but for the present we need only again remark that common-sense is a most necessary adjunct in the application of the rules respecting the diameters of yarns.

Class of material, soft or hard twist, old or new spun yarns, are a few of the most noteworthy modifying influences; but notwithstanding this, the diameters of yarns as given may practically be made as the basis of all calculations for setts.

The influence of weave is still more remarkable, and, as in the case of the yarns, common-sense is most necessary, although it is now a recognised fact that this matter may be dealt with on scientific principles. All cloths may be classed under one of three heads—viz., cloths woven on the square; weft-rib cloths, in which the warp lies straight and the weft does all the bending; and warp-rib cloths, in which the weft lies straight and the warp does all the bending. The influence of the weave on the sett in each of these cases must now be considered.

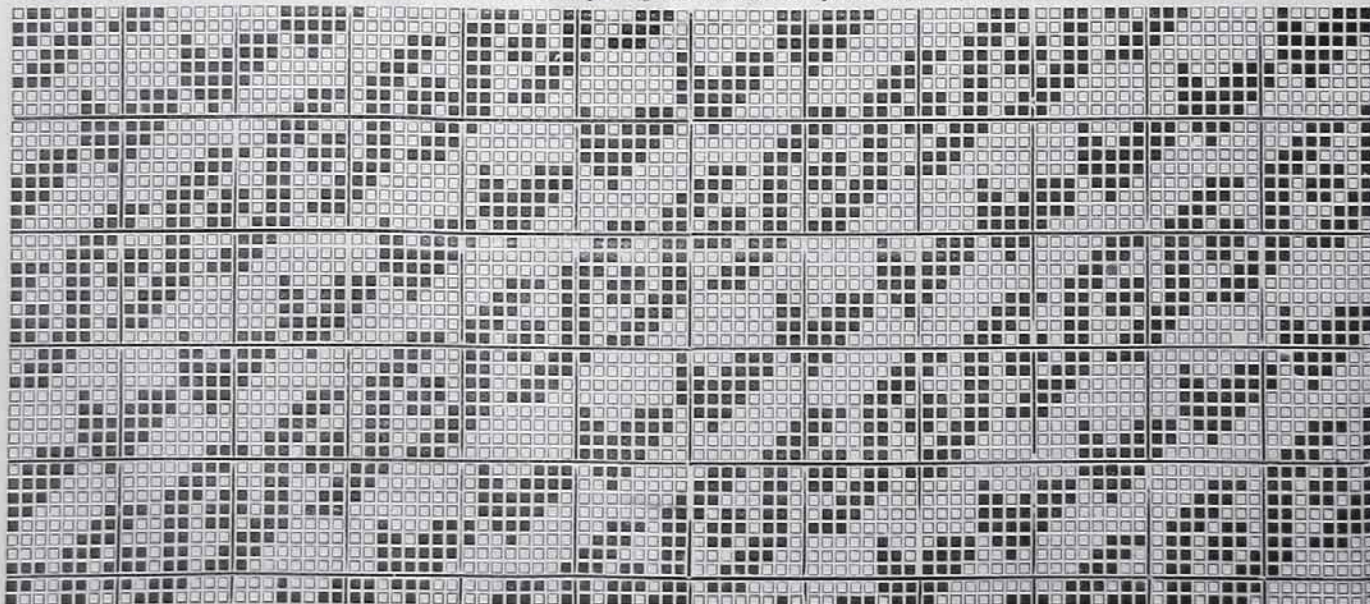
In cloths woven on the square—i.e., an equal number of threads and picks—if warp and weft are the same counts, as is usually the case, the threads and picks will do an equal amount of bending, as shewn in *Diagram 25*. Now a glance at this diagram shews that the warp threads *a a*, are separated from each other by the picks, so that taking both warp and weft to have a diameter of, say, $\frac{3}{10}$ th of an inch (i.e., 80 threads can be laid side by side in one inch), only 40 threads can be used, since there will also be 40 intersections of weft. The following rule may be made the basis for ascertaining the approximate sett required for any weave:—

Rule.—(1) Ascertain the number of units (i.e., threads and intersections) the given plan contains. (2) Divide the number of units as obtained in (1) into the diameter of the yarn to be used, thus obtaining the number of repeats of the plan in one inch. (3) Multiply (2) by the threads in the given plan, thus obtaining the threads per inch.

Example.—Required the ends per inch to use with the 3-and-3 twill (*Diagram 26*). Counts of warp and weft, 32's worsted = $\frac{1}{30}$ th of an inch diameter.

- (1) 6 threads + 2 intersections give 8 units in one repeat of pattern.
- (2) 120 (diameter of thread) $\div 8 = 15$ repeats of 3-and-3 twill in one inch.
- (3) $15 \times 6 = 90$ ends per inch to use, the other 30 units of space being occupied by weft intersections.

This is a very simple method, and gives fairly approximate results; but in some classes of goods, particularly lustre dress fabrics, greater accuracy is necessary, an essential condition for the most lustrous effect being that the weft shall make with the warp an angle of 60°. Taking *Diagram 25* again as our example, observe in the first place that although the threads are undoubtedly distant from one another by the full diameter of the weft yarn, yet *horizontally* they are not distant from each other the full diameter of the weft. Now proceed as follows:—1st, Draw a line *a* running with the centre of the weft; 2nd, draw a line *b* connecting the lowest positions of the lines *a*, and consequently through the centre of the



DESIGN A.

warp threads. Then the angle of weft with warp—i.e., $\angle c$ —must be one of 60° , and the sett must be selected to give this result. To obtain this it is evident that the length AB —i.e., the base of the triangle—must be ascertained, since this will represent the space required for each thread plus the intersection.

The length of b may be deduced as follows:—The perpendicular c is half the diameter of both warp and weft—i.e., it equals the diameter of either warp or weft—which for simplicity may be taken as 1 inch. Now, since the angle $\angle c$ is one of 60° and $\angle b$ 30° , the triangle ABC is evidently half an equilateral triangle, as shown in *Diagram 25a*, and consequently the side AC (the hypotenuse) is exactly twice the length of c , which is taken at 1 inch; thus $AC = 2$ inches. From this data proceed as follows to obtain the length of b . Since the angle $\angle b$ is a right angle, the following formula is correct:—

$$B^2 + C^2 = A^2$$

Now, inserting the figures given above—

$$B^2 + 1^2 = 2^2, \text{ or } B^2 + 1 = 4$$

Therefore, $B^2 = 4 - 1 = 3$, and $B = \sqrt{3} = 1.732$. That is, if the diameter of the yarn = c , then the space occupied by a thread and intersection = $c \times 1.732$.

Example 1.—A 2/40's yarn has a diameter of $\frac{1}{32}$. Find the number of ends per inch for plain. Then $\frac{95}{32} \times 1.732 = 95 \div 1.732 = 55$ triangles, or 55 threads per inch.

Should the previous rule be adhered to, $95 \div 2 = 47\frac{1}{2}$ ends per inch only would be employed, so that there is evidently a considerable difference in the case of the plain weave.

Another example may be taken to show the application to other weaves:—

Example 2.—A 32's worsted = $\frac{1}{16}$ th part of an inch in diameter. Find the number of ends per inch to use with the 3-and-3 twill.

Then, as shown in *Diagram 26*, in the 3-and-3 twill, there are 2 triangles + 4 diameters of the yarn. There-

fore, $4 + (2 \times 1.732) = 7.464$ and $\frac{1}{16} \times 7.464 = 120 \div 7.464 = 16$, and 16×6 (threads in repeat of weave) = 96 ends per inch.

In this case, owing to the few intersections, there is not such a marked difference as in the plain weave.

Weft-rib cloths must be treated in a different manner from the foregoing. As shown in *Diagram 27*, the warp lies straight, and the weft does all the bending. Therefore, the weft picks may lie close to one another, while the threads will be separated from each other by at least the diameter of the weft. In plain cloth, for example, the picks per inch to use will be, with a 2/40's yarn with $\frac{1}{32}$ th part of an inch diameter, 95, while the threads per inch will be $95 \div 2 = 47$. These, however, are theoretical conditions. If the angle of 60° be obtained, then the altitude of the triangle formed, as shown in *Diagram 27*, = the diameter of both warp and weft; thus the threads per inch will be $(\frac{95}{2} + \frac{95}{2}) \times 1.732 = 47 \div 1.732 = 27$ threads per inch. These, again, are theoretical conditions, since the warp and weft would bend equally, being the same counts, but a thick warp and thin weft would fulfil these conditions. For example, in a French cashmere made as follows:—

<i>Warp.</i>	<i>Weft.</i>
All 56's botany.	All 92's botany.
64 threads per inch.	Picks according to quality.

Taking the warp threads to be quite straight, the following result is obtained: Since 56's botany has a diameter of $\frac{1}{32}$ th part of an inch, the altitude of the triangle will be—

$$\frac{1}{32} + \frac{1}{32} = \frac{1}{16}, \text{ and } \frac{1}{16} \times 1.732 = 89 \div 1.732 = \frac{1}{22}$$

of an inch for base of triangle.

Then, since the cashmere twill occupies two triangles and are thread, as shown in *Diagram 28*—

$$(\frac{1}{22} + \frac{1}{22}) + \frac{1}{32} = \frac{1}{11} + \frac{1}{32} = \frac{100 + 11}{352} = \frac{111}{352}$$

= $\frac{1}{3}$ of an inch

for each repeat of twill, and since each twill contains three threads, $22 \times 3 = 66$ threads per inch. This is supposing the warp to lie quite straight, which it does not, as will be seen on referring to the micro-photograph of a thread and pick from a cashmere cloth given in *Diagram 4*; consequently, it may be taken for granted that a few threads should be added to the above for this reflection in the warp.

Now, if the warp and weft did an equal amount of bending, the following would be the result:—

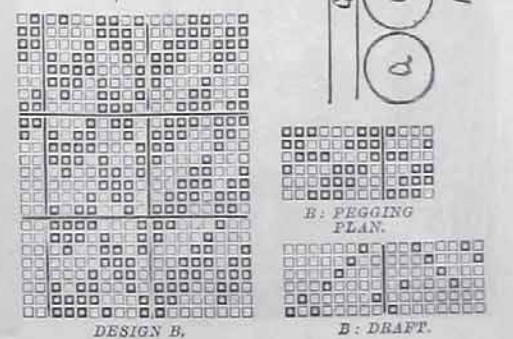
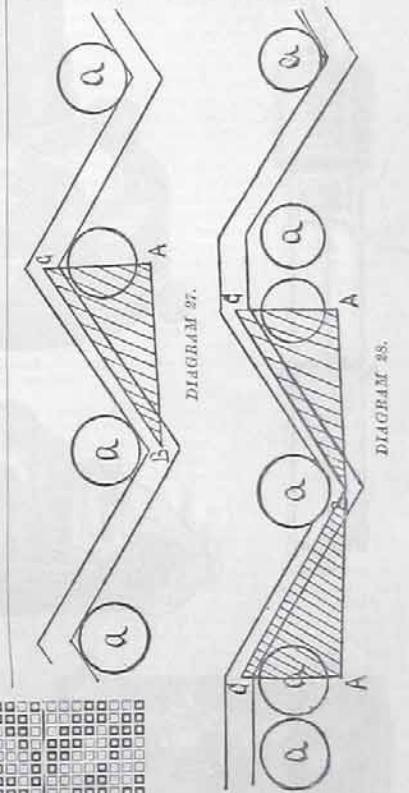
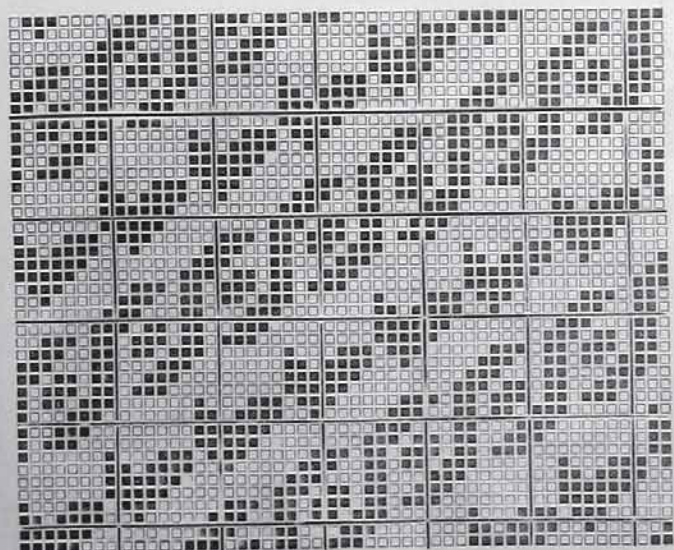
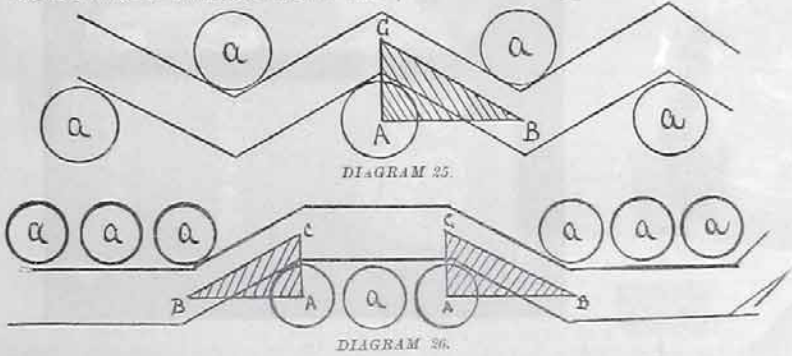
$$(\frac{1}{32} + \frac{1}{32}) \div 2 = \frac{1}{32}, \text{ and } \frac{1}{32} \times 1.732 = 178 \div 1.732 = 102\frac{1}{2} \text{th of an inch for base of triangle, and } \frac{1}{32} + \frac{1}{32} + \frac{1}{32} = \frac{3}{32} = \frac{3 \times 111}{32 \times 111} = \frac{333}{3552} = \text{about } \frac{1}{10}, \text{ and } 39 \times 3 = 117 \text{ ends per inch.}$$

This latter result is very far from correct, while the former is practically correct, for the practical sett given—i.e., 64 threads per inch—is for the loom, while the 66–70 ends found by calculation is for the finished state, so that they practically coincide. The following is a clear statement of all the results:—

Ends per inch ascertained by adding diameters together	89
Ends per inch ascertained by equal bending of warp and weft and angle of 60°	102
Ends per inch ascertained by warp straight, weft bending and angle of 60°	66
Ends per inch used in practice in loom	64

It is evident, then, that a strict adherence to the principles laid down gives results that practice fully confirms.

The treatment of weft-rib cloths will be exactly the reverse of warp-rib cloths, so there is practically no need to exemplify them here, since our space is somewhat limited.



B: PEGGING PLAN.
B-DRAFT.

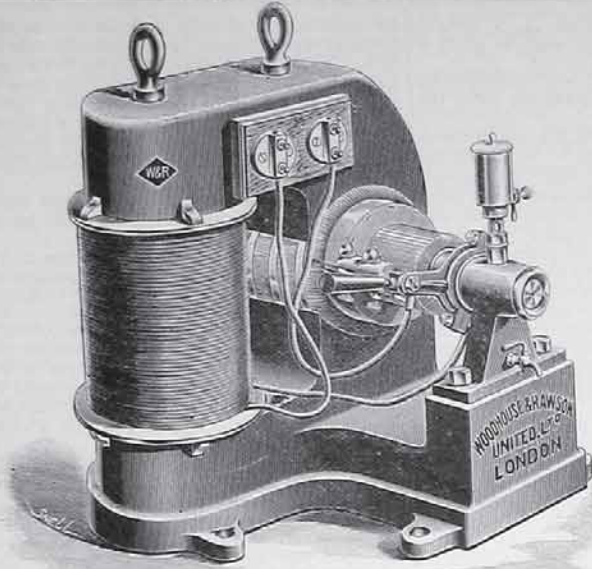


FIG. 1.

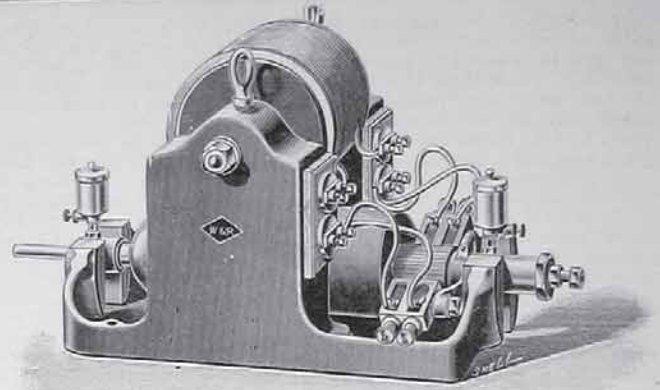


FIG. 6.



FIG. 2.



FIG. 3.

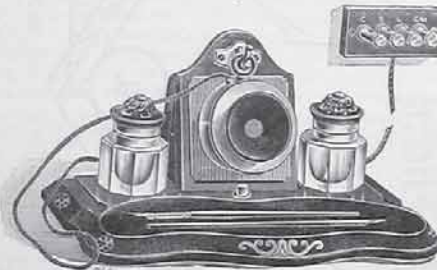


FIG. 8.

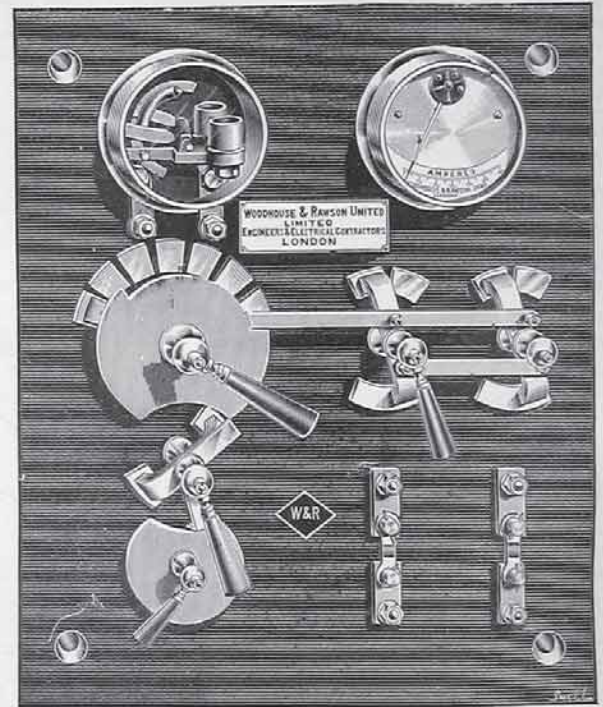


FIG. 7.

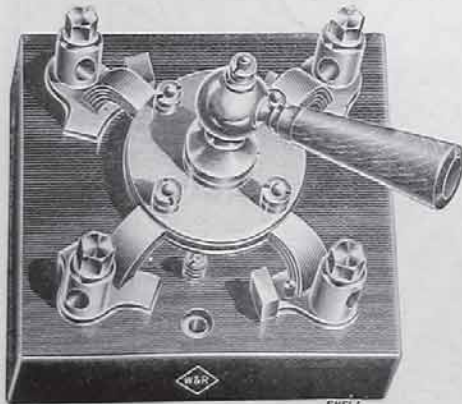


FIG. 4.

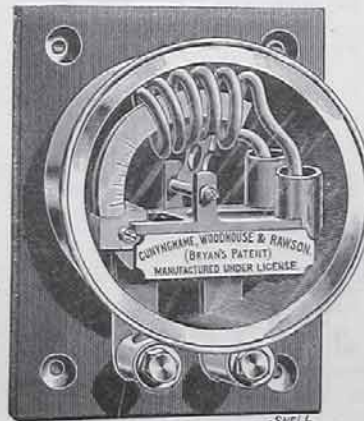


FIG. 5.



FIG. 9.

Machinery and Appliances.

ELECTRICITY IN TEXTILE FACTORIES.

MESSRS. WOODHOUSE & RAWSON UNITED, LTD.,
88, QUEEN VICTORIA STREET, LONDON, AND
CORNBROOK, MANCHESTER.

The increasing number of cotton spinning and weaving mills and bleach, print, and finishing works using the incandescent electric lamp as their illuminant, is conclusive proof that the advantages of this mode of lighting are becoming more widely appreciated. The recent publication in our esteemed contemporary, *The Engineer*, of the result of six years' trial of the electric light in a large flour mill at Barrow, where 161 lamps have been installed, proves its economy. Here the dynamo is driven by a small 10 h. p. Marshall's engine, supplied with steam from the works' boilers. In calculating the cost, it has been assumed that 3½ pounds of coal are burnt for every horse power indicated by the engine—a not too liberal estimate.

In six years the average number of hours during which the lamps were required was 3,392, the number of lamp hours 380,243. The lamps used are of 16 candle-power size. The average annual cost was £91 19s. 11d., or per lamp hour 0.59d.

Taking the price of gas at 3s. per 1,000 feet, and substituting for the incandescents an equal number of No. 5 burners consuming 5½ cubic feet of gas per hour, the cost of lighting by means of gas would be £313 13s. or nearly 3½ times that of the present electric light installation.

The above shows how economical the electric light may be in mills and factories or other establishments where long hours are worked, and where a portion of the steam generated in the general works' boiler may be used, as in this case.

But another and highly-important advantage in the use of the electric light, especially in mills making coloured goods, and in print works and warehouses, is found in the fact that it gives the daylight hues of all colours, so that the operators need never get astray in the use of colours or in the selection of them one from another. To render this advantage with certainty, and to induce the fullest assurance in reliance upon it, is a matter of no small moment in the conduct of industries wherein the correct perception of colours is at all times essential.

We illustrate some of the latest types of electrical apparatus suitable for use in textile factories as constructed by the eminent electrical engineering firm of Messrs. Woodhouse and Rawson United, Limited, of 88, Queen Victoria-street, London, E.C., and Cornbrook, Manchester.

Fig. 1 shows a continuous current dynamo. The magnet circuit consists of the two pole-pieces joined by an iron core, upon which is wound the coil used for magnetising the iron. The current is generated, as is well known, by the rapid rotation of the armature in the powerful magnetic field between the two magnet poles. It is collected by the brushes, which lightly press upon the commutator as it rotates, and conducted to the lamps by suitable copper cables. Owing to the necessity of keeping the speed of the dynamo constant, it will generally be found advisable, unless a battery of accumulators be employed, to use a small separate steam engine for the dynamo, instead of driving it from the ordinary shafting.

For use in small workrooms the incandescent lamp remains without a rival. Where, however, larger areas have to be illuminated, small are lamps, such as the "Midget" (Fig. 2), may be employed with advantage.

These give about 250 candle power each, at a cost for current of about one-third of that required for an equivalent amount of light from incandescents as at present manufactured.

Another important factor in successful electric lighting is a good switch. Fig. 3 shows

a type of which thousands are in use, which combines with compactness the indispensable additional advantage of "quick break."

It is now becoming general to use "double-pole" switches on all main leads. In Fig. 4 is illustrated one of the most efficient types, which is coming into great favour for this purpose.

Fig. 5 shows a new type of mercury magnetic cut-out, which is an improvement upon the well-known Cunynghame Woodhouse and Rawson type, of which Sir David Salomons says, in his work on "Electric Light Installations," that it was "by far the best of all present patterns." These are found to be invaluable in places where there is any risk of overrunning, for breaking the circuit whenever an excess of current, which would otherwise break the filaments of the lamps, occurs.

Electro-motors have not in mills and factories as yet received the attention they deserve. The simplicity of construction of a motor, which, supplied with current from electric lighting mains, will work at a constant speed, no matter what variations of load may be put on it, is a great feature in its favour. There are many purposes in such establishments as we have named for which such a source of power is eminently suited. In some types of motors the field magnets are wound with two sets of wire, one of fine containing many turns, and one of thick, round which the current supplied to the armature runs in such a direction as to weaken the strength of the magnet poles. In order to start such a motor under the most favourable conditions, Messrs. Woodhouse and Rawson manufacture the switchboard illustrated in Fig. 7, in which a locking arrangement is fitted to the various switches, which prevents any mistakes being made.

Telephones are extremely useful for communicating between the office and the various departments in a large mill. A great deal of attention has lately been paid to their manufacture, and in Figs. 8 and 9 are shown two types specially suitable for such a purpose. Managers will find the "inkstand" receiver (Fig. 8) convenient for keeping on their office tables, and so saving them the trouble of moving in order to speak into the telephone.

The rapid improvement in electrical appliances, and the steadily extending use of electricity as a means of lighting, a source of power, and an instrument of rapid communication, renders it very desirable that manufacturers and others should frequently review the subject very carefully, as it will not do in these days of progress to continue relying upon a judgment for the formation of which the materials of four or five years ago only were available. Should our readers desire information upon the probable cost or other particulars of an installation of a lighting or any other arrangement, they may advantageously apply to Messrs. Woodhouse and Rawson.

FACTORY INSPECTORS.—We hear that Mr. Godfrey-Fawcett, the inspector for Norwich district, has resigned, and that Mr. J. H. Bignold, the inspector of Plymouth district, will succeed him. Mr. J. Jones, of Manchester, will be removed to Plymouth, leaving vacant the Manchester district, which will probably be filled by Mr. Shaw, at present junior inspector for a London district. Mr. Whymper, the chief inspector, is away on sick leave.

AN OPENING FOR BRITISH TRADE IN EAST AFRICA.—The British Vice-Consul at Quilimane, in Portuguese East Africa, in his last report, points out that there is only one British firm there. This is a branch of the African Lakes Company, and this, having its chief interest in the interior, does little more than agency and transport business in Quilimane. There is no doubt, says the Vice-Consul, that a British house, with a fair capital, a London agency, and an energetic manager on the coast, well informed, well supported, and experienced in tropical commerce, could do a profitable business. Within the past three years one German, one French, one Italian, and one Portuguese firm have commenced business, and not one has failed. Another French firm is soon to begin business. All European and some of the Indian merchants import largely from England all sorts of goods, whilst from Bombay come quantities of goods of British manufacture as well as of Indian. A well-managed bank agency, too, could be made to pay if it had agencies in the different parts along the coast and had direct connection with Bombay.

VISIT OF WEAVING STUDENTS TO Messrs. BUTTERWORTH & DICKINSON'S WEAVING SHED, BURNLEY.

On Saturday last the students of the cotton weaving classes at Burnley, Nelson, and Accrington, taught by Mr. James Holmes, paid a visit to the weaving shed of Messrs. Butterworth and Dickinson, loom makers, Burnley. These three classes number 200 students. There were present in addition students from Brierfield, Rochdale, and Clitheroe, making a total of about 300.

Messrs. Butterworth and Dickinson are loom makers and also makers of the preparing machinery required in weaving on a very large scale, being owners of Globe and Saunderson Bank Ironworks. For the purpose of experiment, and also in order to be able to shew, conveniently to their customers, the working of the various machines they construct, they have a weaving shed in Westgate, and it was this place the students visited. They were met in the warehouse by Mr. Tattersall, the manager, and it was decided to split up the party into groups of twenty, each group being under the guidance of one of the Honours grade students in connection with the Burnley Weaving school, namely, Messrs. Thornber, Hargreaves, Guthrie, Anderson, Metcalfe, Sagar, Turner, Hyde, Baldwin, and Butterworth.

The engine was run specially for the purpose during the whole of the afternoon, and each student was provided with a programme, which set forth some of the machines it was desirable they should notice.

The rooms were visited in the order here given:—

TAPE ROOM.

This room was in charge of Mr. Thomas Butterworth, who explained the slasher sizing machine and all its working parts; particularly the patent driving arrangement, slow motion, marking and measuring motion, patent yarn beam presser, and patent friction; he also gave an interesting description of the working of the machine generally.

WINDING ROOM.

Containing ordinary cop twist winding frames, with the traverse worked by the mangle wheel, and eccentric wheels to give barrel shape to the bobbins. *Brinelow's self-stopping beaming frame.* When an end breaks in this machine, the pin falls down a fixed distance only, when it comes in contact with a winged roller; it arrests the action of this roller, and forces out a V clutch, and stops the machine. No destruction of pins occurs from the blow given by the winged roller, this being so light that the pins are never bent or broken, and can only want replacing when lost.

Singleton's self-stopping beaming frame. When an end breaks in this machine, the pin it supports drops between two revolving rollers, and causes their separation, and by this means stops the machine. These machines were run by an attendant who explained their working.

WEAVING SHED.

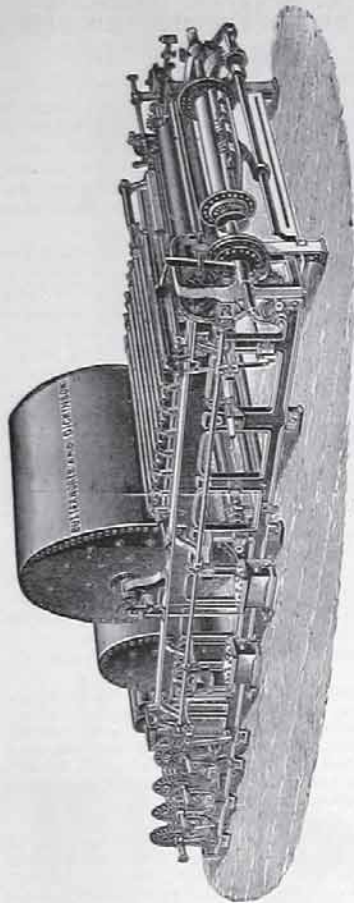
In charge of Mr. Dixon. The shed contains a few hundred looms, almost every loom differing from another in some particulars. *Dobbies* were the first to claim attention. *Catlow's patent double-lift dobby with single barrel.* To this machine is fixed an easing bar which lifts the heavy-ended levers slightly, just before the pegs begin to act upon them, and in this way reduces the strain upon the pegs, so that there is less liability of their being broken; small iron pegs are used in some of the lattices.

Catlow's patent double-lift dobby, with double barrel. This dobby having two lattice barrels, enables much broader pegs to be used than usual, consequently there is much less fear of mistakes being made in weaving a pattern, through the levers slipping off the narrower pegs, or through the pegs breaking. The two barrels are geared together by a toothed wheel, and both run in the same direction, making the working of the lattices quite easy.

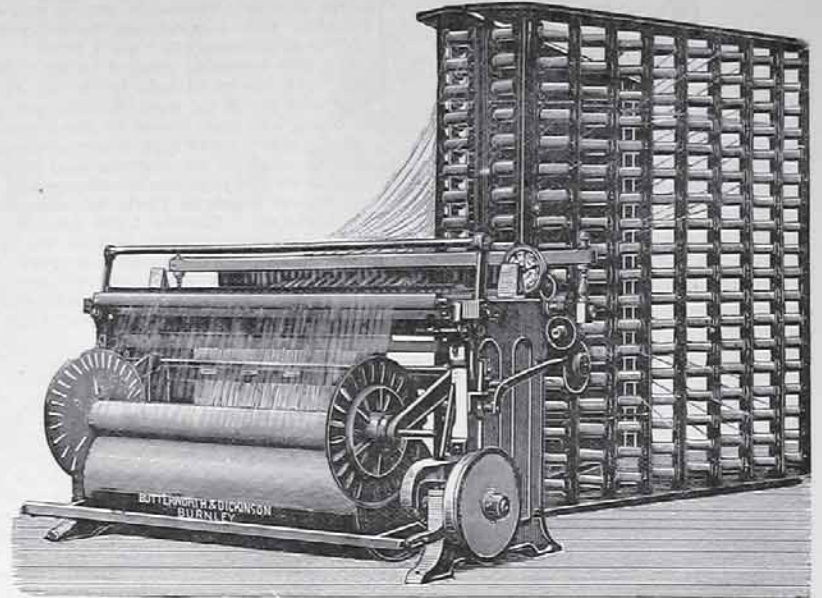
Single-lift dobby. This is worked from the crank shaft, allowing the heads to be brought level at each pick all the heads being dropped to the lowest point at each pick; those which have to be lifted are raised by the lifting knife. In addition to these dobbies, there are many more differing in detail only.

Wright Shaw's Skip Box Loom.—This loom is a drop-box loom, and a very useful one. By means of three needles the box can be raised or lowered one box or it can skip a box; one of the needles (the centre one) puts a larger cam into action and determines when the box shall skip; the two outside needles determine whether the movement of the boxes shall be up or down.

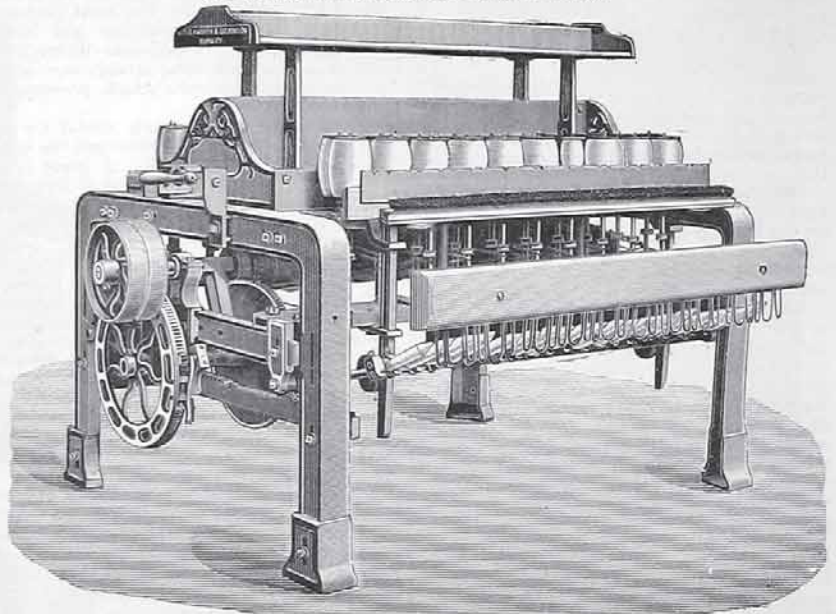
Diggle's Drop Box Loom.—By means of a chain, made up of links of various sizes, a lever is made to rise or fall; this lever by means of a long rod is connected with the shuttle boxes, so that as the lever is made to rise or fall by the varying size of the links, it causes the shuttle box to move up or down.



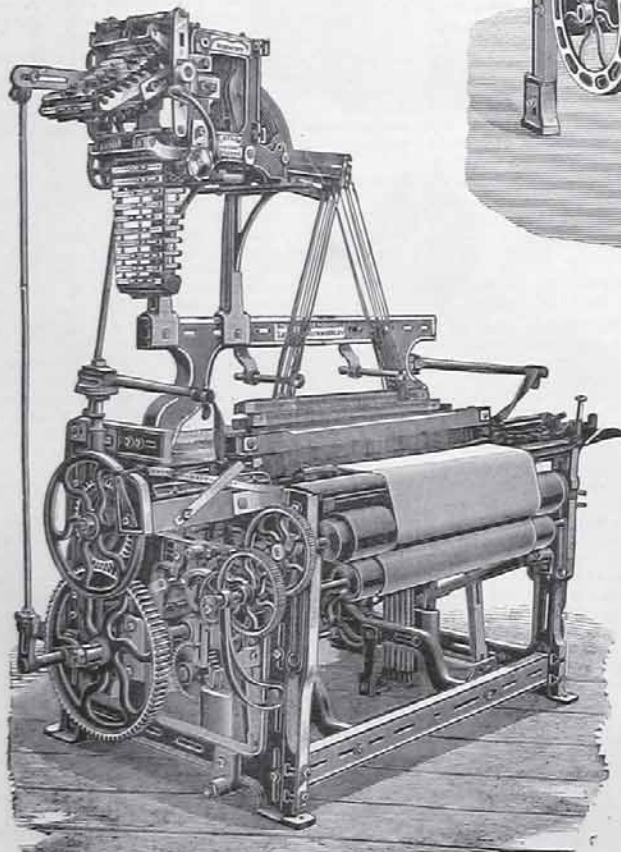
SIZING MACHINE.



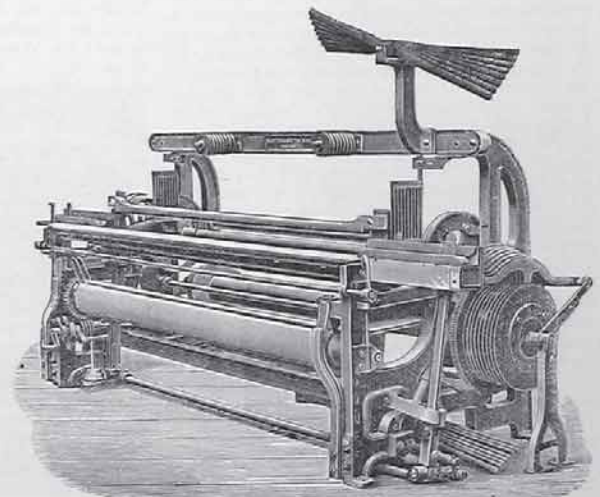
SELF-STOPPING WARPING MACHINE: SINGLETON'S PATENT



COP-WINDING MACHINE, WITH MANGLE-WHEEL TRAVERSE MOTION.



STRONG CALICO LOOM, WITH PLANED FRAMING, AND WITH CATLOW'S PATENT DOBBY.



FUSTIAN LOOM.

Pick's Drop Box Loom (Skip Box).—This is a neat contrivance for working the shuttle boxes one box at a time, or skipping a box if required.

Ordinary Circular Box Loom.—The barrel carrying the pattern card is worked from the bottom shaft by means of a cam; resting on the topmost card are two levers each with a small pin at the end; a hole in the card allows this pin to drop through, the other end of this lever being then pushed outward, acts upon a catch, pushing it over the edge of the lifting knife, so that at the next stroke this catch is brought up and causes the box to turn one division only, when the pin belonging to the other lever falls through a hole in the card it causes the box to move in the opposite direction.

Patent Selvage Motion for Plain Sides.—In the making of satens, jeans, and other figured cloths it is requisite to make a selvage either plain or nearly plain, or it curls up in the process of bleaching. The method for a long time has been to use what are termed "boats," which make an imperfect plain side; if a dobby is used it is quite easy to make plain selvages by using skeleton staves, but when using tappets it is rather different. To meet this difficulty Messrs. Butterworth and Dickenson have placed a split tappet on the bottom shaft; this tappet acts upon a treadle which is attached to one of two skeleton staves, which make the plain selvage; the other staff is brought back by means of a spring.

Split Motions for weaving two or more narrow widths of cloth in broad loom. Instead of using beads or doups to make a centre selvage, which will not unravel when cut, an ingenious arrangement consisting of four needles which cross each other in weaving produces the desired result.

Letting Back Motions.—In weaving thin twills and other light fabrics there is always a tendency for the loom to make thin places; to prevent this, both catches are lifted at the same time, and the train of wheels run back for two picks, when their action is arrested by another catch.

Head Levelling Motion.—In weaving figured goods with tappets, what is termed an open shed is formed, i.e., all the heads are never brought level at the same time, and in the case of a weaver having a smash it takes a long time to take up the broken ends. By means of a foot lever connected with the treadles, all the heads can be brought level when the loom is stopped; before the loom is again set in motion the foot lever is released.

EXHIBITION ROOM. (In charge of Mr. Tattersall.)

Sectional Warping Machine.—The back part of this machine is similar to an ordinary beaming frame with Brimelow's self-stopping arrangement attached; in front is the machine where the sections are made. The varying speed of the section as it increases in size is obtained by means of two friction bowls pressing and revolving in contact with a friction plate; the friction bowls are under the control of the presser. When a section is started the bowls are pressing against the plate very near the centre, and driving the section at its quickest speed; as the section increases in size the presser descends, the friction bowls are forced outward, and drive the section slower so as to keep the speed of the yarn constant. There is also an arrangement for making all the sections of warp equal in diameter and length, when the machine has made the same number of revolutions. The measuring roller is half a yard in circumference; on the end is a worm driving a worm wheel of 40 teeth; on the same stud as this worm wheel is a wheel of 20 teeth driving a wheel of 100 teeth, so that for every complete revolution of the wheel of 100 teeth 100 yards have passed the measuring roller; this wheel moves a star wheel one division only for every 100 yards.

Double Drum Winding Machine.—Two rows of drums are arranged on two separate shafts, one on each side of the frame. Resting on the drums are bobbins, carried round by the friction generated between the revolving drum and the bobbins. The yarn is in the hank, and placed upon swifts, which are weighted to prevent them from over-running. A latch and catch enables the attendant to lift the bobbin from the drum to piece a broken thread; the traverse is worked by means of a small pinion and a mangle wheel, on the same principle as the traverse of the winding frame; the pinion engages on one side and then on the other of the mangle wheel, and thus reverses the direction of motion of the traverse.

Pirn Winding Machine.—The tin roller is driven directly from the driving pulley; the pirn cup gives shape to the pirn, and the traverse is worked by means of heart-shaped cans.

Fustian Loom with Woodcroft tappets.—To this loom Woodcroft tappets are fixed; these tappets are made up of sections, called risers and sinkers, which rest positively on levers or treadles, the movement of these levers being communicated to the top and bottom jacks respectively, causing the heads to rise and fall. The shaft is worked picking from the crank shaft, and is on the principle of an ordinary underpick loom, but differs in the mode of working, inasmuch

as an ordinary underpick is worked from the bottom shaft.

Single Lift Dobby with Leno motion.—This loom was weaving a pretty pattern, a combination of stripes, figured and douped. The dobby is worked from the crank shaft, and the Leno motion is worked by the dobby.

Turkish Towel Loom.—With two warps, one of which is held very slack in the weaving. The loom allows the reed to give way for two picks, so that the weft is not beaten up to the fell of the cloth within half-an-inch. At the third pick the reed is held firm and the three picks are beaten up to the fell of the cloth, at the same time it brings about half-an-inch of the slack warp forward, and throws it in the form of loops on to the surface of the fabric.

Jacquard.—This loom is a single cylinder, double lift, and is weaving a fancy towelling.

The students were all highly gratified, everything being thrown open for their inspection and information and explanations given of the different machines by the workers in charge. All the machines are cleaned with scrupulous care. And the arrangements made for the success of the gathering were due entirely to the management of Mr. Tattersall, manager for Messrs. Butterworth and Dickinson.

A NEW COTTON MILL IN FRANCE.

Mr. James Parkinson writes from Vincesy, Vosges, France, to the *Bolton Evening News* as follows:—The engines belonging to the Société Cotonnrière de l'Est were successfully started last Friday by M. Badin, the president of the company. The mill is situated at Vincesy, Vosges, France. It is a fine structure, being built after the style of most of our Lancashire mills, and is to contain 60,000 spindles. Messrs. Potts and Co., of Oldham and Manchester, are the architects. The mill has been promoted by both English and French capitalists, many of whom came to witness the start. There was no christening ceremony, as in the case in most of our Lancashire mills on these occasions. The engines, which were made by Messrs. Hick, Hargreaves, and Co., of Bolton, went off in a very satisfactory manner, running fully an hour without a hitch. The company afterwards adjourned for dinner, where speeches, toasts, etc., followed in quick succession. After dinner the guests paid another visit to the mill to inspect the progress of the setting up of the machinery, which has been made by the well-known firm of Messrs. Platt Bros. and Co., Limited, Oldham. The whole of the visitors seemed to be highly satisfied at the progress the mill is making. The shafting has been supplied by Messrs. Hick, Hargreaves and Co., of Stalybridge; the steam-pipes by Messrs. Dawson and Birkham, Pendleton; the sprinklers by Messrs. Dawson and Taylor, Bolton; and the hoists by Messrs. Barker, Oldham.

On Saturday evening, the *monteurs* were enabled through the generosity of the directors to have a dinner to themselves, which was arranged to take place at seven o'clock at the Café de la Gare, where they had a very nice spread to which they did full justice. The names of those present and the firms they represented are as follows:—Messrs. T. Manuel, J. Mitchell, J. Hindle, J. Harwood, E. Manuel, representing Messrs. Hick, Hargreaves, and Co.; Messrs. A. Nuttall, G. Greenwood, G. M. Caussidiere, J. Winterbottom, James Taylor, J. Stowell, and V. Caussidiere, representing Messrs. Platt Bros. and Co., Limited; Messrs. J. Parkinson, W. Wood, and F. Wilson, representing Messrs. Horsfall and Birkham, Pendleton; and Mr. W. Parker, for Messrs. Dawson and Taylor, Manchester. After dinner Mr. G. M. Caussidiere was voted to the chair. The Chairman expressed thanks to the directors of the mill. It was not often that so many Englishmen met together on the Continent, and he hoped the company for whom they were working would be a great success. He asked all to join with him in drinking to the health and prosperity of the managers and directors of the Société Cotonnrière de l'Est. Mr. W. Parker next sang "The Men of Merry England," followed by an encore song of "Fair English Girls." Toasts were also drunk to each firm represented, and well responded to. The toast to our wives and sweethearts aroused much enthusiasm. The rest of the evening was devoted to singing, reciting, etc., the principal contributors being Messrs. Parker, Taylor, Greenwood, Mitchell, Wood, Hindle, Nuttall, and G. M. Caussidiere. Everyone did something towards the evening's entertainment, which reflected great credit upon all present.

THE SUPPLY OF COTTON.—The visible supply of cotton for the world is 1,074,000 bales larger than at this time last year; 1,660,000 larger than in 1891; 1,951,000 larger than in 1889. Of American there is an excess of 1,173,000 as compared with this time last year; one of 1,802,000 as compared with 1890; and one of 1,921,000 as compared with 1889. And yet cotton is being forced up in price!

Bleaching, Dyeing, Printing, etc.

METHODS OF SILK DYEING: THEIR PRINCIPLES AND PRACTICE.—IV.

(Continued from page 293.)

The fourth method of dyeing silk resolves itself into a group of processes, which are those used in the application of the adjective or mordant-dyeing dye-stuffs, both of natural and artificial origin. The number of these dye-stuffs is great. Those of natural origin have long been in use for dyeing silk, although a few have been more or less displaced by the coal-tar colours. The artificial dye-stuffs that require a mordant are numerous, but have been strangely neglected by the silk dyer, although they are capable of yielding fine, bright, and fast tints. Silk dyers have hitherto been rather too conservative and not over-anxious to try new things, especially when there are a few difficulties in the way, and the first unsuccessful result has been in many cases sufficient to deter them from further trials.

The dye-stuffs applied by the methods of dyeing now to be described comprise cochineal, logwood, fustic, weld, Persian berries, cochenon bark, Lima wood, and the red-woods, madder, alizarine, alizarine colours in general, gallean, galloxyanine, flavazol, anthracene yellow, galloxyanine, gambine, azo green, etc.; and additions to these are continually being made.

The mordants used are salts of chrome, iron, alumina, tin, etc. The essential principle underlying this fourth group of methods is that the colouring matter (or, in the case of the natural dye-stuffs, the colouring principle thereof), being of acid character and properties, combines with the base of the mordant, forming thereby a coloured body generally spoken of as a colour-lake, which possesses the property of being insoluble in water. Therefore, when it gets properly fixed on the silk fibre, it forms, as a rule, a fast colour in every sense of the term as understood by dyers.

The problem that the dyer has to solve in using these dye-stuffs is to bring about the combination in the best possible manner, as it is only when such has been done that the colour is fast; otherwise, it is apt to rub or wash out.

Three modes of working are at the command of the silk dyer in using this group of dye-stuffs: in the first the dye-stuff and the mordant are applied in the same bath; in the second the silk is mordanted first and dyed afterwards; while in the third the silk is first treated with the dye-stuff and then with the mordant—each mode of working having its advantages in particular cases. These methods will now be considered more in detail.

The first is used in dyeing cochineal scarlets, using tin crystals as the mordant; in dyeing Persian-berry yellow with alumina; with fustic and tin yellow; with azo-green, flavazol, and a few other dye-stuffs, one characteristic of all being is that the colour-lake formed by the union of the mordant and dye-stuff is slightly soluble in acid; therefore the dyeing is always done in an acid bath. The principle of the method is that the mordant and dye-stuff combine together to form a colour-lake. This is kept in solution by the acid, which is added to the dye-bath. The silk causes, especially when the bath is heated to the boil, a dissociation, and the colour-lake is deposited on the silk. The hotter the bath the quicker will be the rate of deposition, but in such cases the colour-lake is liable to be loosely fixed on the fibre, and hence the colour will rub and soap off a good deal. It is, therefore, best to enter the goods at a comparatively low temperature, say from 120° to 150° F., then slowly raise to the boil, working $\frac{1}{2}$ to $\frac{3}{4}$ hour at this heat, or until the required shade is obtained.

The mordants that best lend themselves to this method of working are tin crystals, alum, acetate and fluoride of chrome, and copperas; a little sulphuric acid or oxalic acid may be added to secure the necessary amount of acidity in the dye-bath.

The second mode of working is most generally used; it is applied to the dyeing of blacks on

silk from logwood and tannin materials, and to the dyeing of yellows, reds, browns, greens, and violets, from the natural and artificial colours. The first operation is that of mordanting. In some cases, as in mordanting with iron liquor, it suffices to steep the silk in the liquor for some time, and then to rinse with water; while in mordanting with alum it is sufficient to steep the silk in a basic solution of the mordant for from 6 to 10 hours; the fibre has the property of attracting the mordant and fixing it in a suitable condition for the subsequent dyeing. The chrome salts are the most difficult to use as mordants for silk. The method used in wool dyeing—that of boiling the fibre in a bath of bichromate of potash and sulphuric acid or tartar or oxalic acid—does not give good results with silk, although it may be used, there not being a sufficient deposition of the oxide of chrome on the fibre; moreover, the silk takes a dark yellow tint, which affects to some extent the shade of the colour subsequently dyed on it. The best method of applying chrome mordants is to use either the acetate of chrome, or the newer product, fluoride of chrome, boiling the silk in a strong bath of either of these for an hour or an hour and a half, then removing the silk and passing it into the dye-bath. The dyeing is done in a bath of the dye-stuff either with or without the addition of soap—best without wherever it is possible. A little acetic acid should be added, especially when the water used in the dye-bath is calcareous or limy; from $\frac{1}{4}$ to 3 gills of acid to 20 gallons of dye liquor will be sufficient. The goods should be entered into the bath while it is cold, and worked in it for about 15 to 20 minutes; then the temperature is slowly raised to the boil, and kept at that point for one hour, by which time the colour will have been properly developed and fixed. The silk is now taken out and washed, the colour brightened by a passage through a weak soap bath, a wash in water, and a final passage through an acetic acid bath.

Working in this way very good results can be obtained, and the colour is properly fixed on the fibre. For all alizarine dye-stuffs it is the only method available, and any attempt to shorten it can only end in failure, resulting in the colour being loose, rubbing a good deal, and being liable to wash off; while there is also a risk of unevenness in the shades.

(To be continued.)

THE USE OF METALLIC SALTS IN DYEING.

Although it was known that in dyeing cotton with cutch and other natural dye-stuffs, a subsequent passage through a solution of a metallic salt, such as potassium bichromate or sulphate of copper, had some influence on the fastness and depth of colour of the dyed fibre, yet it is only recently that attempts have been made to ascertain the action of metallic salts upon the shades obtained in dyeing cotton with the coal-tar colours. The earliest mention of such an attempt appears to be that of Fayolle, given in the *Moniteur Scientifique* in 1864-5. Fayolle gives a description of a modification of Durand's process for dyeing rosaniline brown, and says that if the brown-dyed fibre is passed through potassium bichromate solution, considerably darker shades are obtained.

The author has dyed two patterns with Helvetia brown R: one dyed in the ordinary way on cotton mordanted with chestnut extract and antimony oxalate; the other dyed by first boiling in a bath of the dye-stuff and salt and then passing through a bichromate bath. The shades differ very much: the second is the darker and is faster to light than the first, which is fast to washing. But in only a few cases can bichromates be used advantageously, as with indamine blue, paraphenylene blue, and other blues of a similar composition. In all cases the colouring matters should be properly fixed on the cotton with tannin and tartar emetic: if they are simply dyed on with salt and sodium acetate then the action of the bichromate results in the destruction of the blue colour. In the case of the mordanted blue the colour becomes rather duller and

darker by the bichrome treatment, and does not appear to be so solid.

F. Bayer and Co. have patented a process whereby fast colours are obtained from dye-stuffs derived from diamidophenol ethers, the process consisting in treating the dyed fibre with solutions of copper, nickel, or zinc salts. Benzoazurine, heliotrope, azoviolet, chrysamine, and other colours derived from tetrazo-diphenyl ethers and dioxynaphthalene sulphonic acids are affected by this reaction. Copper has a very powerful action on chrysamine, but this cannot be taken advantage of in practice, as the shades that are obtained lack brilliancy. By treating cotton dyed with chrysoidine with copper sulphate better results are obtained, the shades being fast to soaping.

The author has made experiments with primuline of Brooke, Simpson and Spiller, or the auroline of Read Holliday and Sons, in the development of a red by dyeing the fibre in the usual manner with 5% of dye-stuff and 20% salt, then diazotising with 1½% nitrite of soda and 3% sulphuric acid; next, developing a red with beta naphthol, after which the fabric is passed through an ammoniacal solution of copper oxide and washed. The red obtained is very fast to light, to washing, alkalis, and acids, and is bright. Nickel salts do not give such good results as copper, the shades not being so fast to light. They are also more expensive. Zinc salts do not alter the shades so much as copper salts, but the colours are not much improved in fastness over the untreated colours.—SOXHLETT, in *Farb. Must. Zeit.*

PRINTING TULLE AND GAUZE WITH ANILINE COLOURS.—M. Michel de Vinant, in his "Practical Treatise on Dyeing and Printing," gives the following directions for boiling a thickening, which is used in mixture with alcoholic solutions of aniline dye-stuffs, for printing tulle and gauze in the piece. In one litre warm water 75 grms. powdered gum tragacanth are steeped for 48 hours, then 4 litres water are added, and the mixture heated to complete dissolution of the gum. While heating upon an "open fire" the mass must be continually stirred, in order to avoid burning of the gum, and at the same time $\frac{1}{2}$ kil. purified alum is added. When all are dissolved, the solution is passed through a sieve. On the other hand, 625 grms. rye-flour are stirred into 5 litres water, boiled for a few minutes, and the gum solution added and boiled for five or six minutes longer, when the mass is taken off from the fire and passed through the sieve. When cool, the alcoholic solution of an aniline dye-stuff is added, the whole is again passed, and this colour printed and steamed, but not washed. The colour leaves the materials flexible and transparent and produces a pretty effect.

PRINTING red or alizarine on an indigo-blue ground has always been a difficulty, owing to the fact that the alumina required to act as the mordant for the alizarine cannot by the usual discharge processes be fixed on the pieces. In the latest issue of the *Bulletin* of the Mulhouse Society is a communication from M. Brandt, describing two discharge mixtures, which, if printed on an indigo-dyed piece, discharge the blue and cause a fixation of the alumina on the fabric at the same time. One of these has been in use at a few places since 1884, although it has not found its way into the text books. In this method a discharge is made by taking a solution of chlorate of alumina of 15° Be., thickening this with dextrine, then to every litre adding 200 grammes of bromide of sodium and 25 grammes each of sulphide of copper and iodide of potassium. This mixture is printed on, and the pieces are steamed for one minute and a half, and finished in the usual way. The action which takes place is that the sulphide of copper becomes oxidised to sulphate of copper by means of the chlorate of alumina, the latter body becoming fixed on the fibre, while bromine is liberated from the sodium salt and discharges the indigo. The iodide of potassium is added for the special purpose of making the colour keep longer; without it, decomposition goes on; with it, any copper which passes into solution by becoming oxidised is immediately precipi-

tated out and thus rendered harmless. The second mixture differs from the preceding only in the use of bisulphite of soda in place of the sulphide of copper, and the iodide of potassium is not added. After printing and steaming a white design on a blue ground is obtained, and it only remains to pass the pieces through an alizarine dye-bath to produce a red design on a blue ground. It may occur to an intelligent calico-printer that by printing on an acid discharge both red and white discharges may be obtained on the same blue ground.

News in Brief.

ENGLAND.

Accrington.

A strike occurred in the early part of the week at the Commercial Mill, Clayton-le-Moors, the weavers leaving their work on the groundless assumption that their trades-union committee-man had left his employment through being made uncomfortable at his work. For this supposition there was not the slightest ground, the man having left, as he stated, for other and entirely different reasons, which did not afford a shadow of justification for their action. Their course of conduct shows how ready the operatives are to indulge in the most foolish vagaries that may inflict inconvenience and loss upon their employers.

At the annual meeting of the Accrington Mechanics' Institution on Wednesday night, the Town Clerk (Mr. Aitken) said the Town Council had made overtures for the purchase of a plot of land, about an acre in extent, for the purpose of erecting thereon a Technical College. The owners had made a most favourable offer of the land to the Corporation. The family who made the offer were very much interested in technical education. He had no doubt if pressure were brought to bear upon the Town Council the thing would soon be put on a proper footing. The following resolution was passed:—"That in the opinion of this meeting it is desirable to secure the amalgamation of all science classes in the town under the control of a central authority, the Town Council if possible, and request the directors to take such steps they may deem desirable to secure this end."

Blackburn.

Mr. Bickerdyke has been re-appointed as the representative of the Chamber of Commerce on the Council of the Technical School, his three years' term of office on the Council having expired.

Bolton.

Messrs. Witter and Son, of Bolton, sprinkler makers, are very busy.

At the Police Court, on Monday, orders for abatement of smoke nuisance were made against Messrs. Barlow and Jones, Limited, and Messrs. J. Haslam and Co., Limited.

Brighouse.

The silk dressers' strike is still in progress. This is now the fifteenth week of the struggle. On Tuesday a deputation from the men had two interviews with Messrs. Ormerod Bros., one extending over two hours. Mr. Hanson Ormerod expressed himself in favour of the men's requests being granted, but his brother (Mr. Charles J. Ormerod) will not concede the demands for the advance of a halfpenny per pound for a certain class of silk, and refused to meet the deputation.

Bury.

A deputation from the Central Association at Manchester will attend a special meeting of the Bury Federation of Employers with the view of urging them to join the general movement, and either "shut down" or go on short time until the Stalybridge dispute is settled.

On Tuesday evening, the local Cardroom Operatives' Association called a special meeting of the members in regard to increasing their levies to the Amalgamation during the continuance of the Stalybridge dispute. Mr. Eidsford, of Accrington, and Mr. Aspin, the local secretary, addressed the meeting, and it was resolved that an additional levy be paid of 5½d. per week by the men, 3d. by tenters, and 2d. by back-tenters. It was also decided that if a lock-out takes place in Bury district, the levy shall continue for three months after again resuming work. The Ramsbottom and Summerseat branches of the same association have agreed to a similar levy.

Gilthorpe.

We regret having to announce the death of Mr. R. Brown, J. P., cotton manufacturer, of Foulshykes Mill, which occurred on Monday morning. Deceased was 67 years of age, and was a Conservative and a churchman. In 1874 he was appointed a magistrate for the borough. He was held in high esteem by his work-people, and was greatly respected throughout the town. It is feared that Foulshykes mill will go into the market.

Colne.

It is expected that the Stone Bridge Weaving Shed, which will hold 500 looms, will shortly be occupied by Mr. R. Broughton, manufacturer, of Skelton-street, Colne.

Glossop.

The employés of Messrs Wood Bros., cotton spinners, have subscribed for a very handsome present which will be handed to Capt. John Wood on his returning from his honeymoon. The gift consists of a pair of solid silver fish carvers and 12 pair fish eaters, enclosed in a case bearing a silver plate with appropriate inscription. The total weight of silver is 55 oz.

Heywood.

There are no signs of a resumption of work at the mills in Heywood. In the immediate district other mills have ceased work, and there is a prospect of still more being affected. At Castleton about 200 operatives have been thrown out of employment by the stoppage of Messrs. Orr's Mill. The majority of these operatives (the spinners and cardroom workers) are connected with the Rochdale associations, but 70 of the weavers and winders are in the Heywood Weavers' Association, and will be thrown on its funds. The employers in Heywood are leaving the decision when to restart in the hands of the Masters' Federation, and the operatives appear to be content to leave their interests in the hands of their officials.

On Saturday afternoon the frieze stone of the Burns Ring Spinning Co.'s mill, Manchester-street, was laid by Mr. J. S. Hargreaves, of Hooley-bridge. The mill is being erected on the site of the Gooden Mill, and is to hold 45,000 ring spindles and preparation. Mr. J. W. Heywood, chairman of the directors, presided on the occasion. The mill will be erected on the architects' patent system of concrete fireproof flooring. The walls will be of brick with stone dressings, and the roof will be formed into a water tank. The motive power will be generated by three Lancashire boilers, 30ft. by 8ft., supplying steam to patent quadruple inverted compound engines built to stand a working pressure of 200 lb. per square inch. There will be a fuel economiser in four sections of 64 pipes each. The power will be transmitted from a pulley on the crank shaft of the engines by ropes direct to smaller pulleys on the shafts of the various rooms. The steam engines will be built by Messrs. John Musgrave and Sons, of Bolton. The whole of the machinery, except that in the blowing-room, will be supplied by Messrs. Brooks and Doxey, of Union Ironworks, Gorton, and Junction Works, Miles Platting, Manchester. The carding engines will be their patent frictionless engines with rigid concentric bends (Wilkinson's patent). The blowing machinery will be supplied by Messrs. Lord Brothers, of Todmorden. The boilers will be supplied by Messrs. Tinker Bros., Hyde. Messrs. Stott and Sons, of Manchester and Oldham, are the architects and consulting engineers.

Halifax.

Mr. John Lister, County Councillor, of Shibden Hall, presided at Halifax, on Saturday evening, over a meeting of workmen. About a fortnight previously Messrs. Clayton, Murgatroyd, and Co., silk spinners, dismissed from their employment Mr. J. H. Beaver, President of the Halifax Trades and Labour Council. He had been in the service of the firm over seventeen years. The Labour party aver that he owes his dismissal to the work he has accomplished in organising labour in Halifax and district; and Saturday's meeting was convened to take his case into consideration. There was a crowded and enthusiastic attendance. A committee was appointed to formulate some scheme, with the object of appointing Beaver organising secretary in connection with the trades in Halifax. The speakers included, in addition to Mr. Lister, the Rev. F. E. Millson, Mr. David Hirst, Mr. Dyche, and Mr. Sarry Whitley.

Horwich.

The firm of Messrs. Kippax and Co. have just erected a weaving shed at Horwich, the contractors and subcontractors, numbering about 70 persons, held a social gathering and dinner at the Bee Hive Hotel. Mr. J. B. Crompton presided, and was supported by Messrs. Kippax and Mason, managing directors.

The long pending dispute between the Messrs. Southworth, manufacturers, of Clitheroe and Horwich, and their workpeople at Lee Mill, Horwich, ended on Wednesday. For a considerable time the hands have been "weaving up," the Weavers' Union having decided that they must not work at a reduction of 5 per cent. under the list prices, which the employers proposed as necessary to cope with local disadvantages. As this shed holds 400 looms, and is almost the only opening for female labour, the hands if left to themselves, it is said, would have been willing to accept the proposed reduction, but the officials of the Weavers' Union would not permit any deviation from the standard list. Messrs. Southworth, therefore, determined to close the mill, and began to gradually remove the looms as soon as the warps were finished. They commenced to run the mill about 1877, and are now among the largest manufacturers in Clitheroe.

Huddersfield.

A serious fire was averted at Royal Edge Dyeworks, Meltham, on Tuesday night. The works belong to Messrs. Jonas Brook Bros., the well-known thread manufacturers. About 10.15 fire was observed in a stove in the yard where cotton wraps were drying. The firm's fire brigade quickly turned out and got the fire under, but damage to the extent of about £500 was caused.

Keighley.

The annual meeting of the members of the Keighley Technical Institute was held on Tuesday. In the report the generosity was recognised of Mr. Prince Smith, loom maker, in bearing the entire cost of the raising of the tower and fixing therein of a public chiming clock in memory of his late father, who was for many years a substantial supporter of the institute. The balance-sheet showed that the expenditure had been £1,659 and the income £1,169. The Chairman (County Alderman John Brigg) observed that he considered the large adverse balance more apparent than real, owing to the readjustment of accounts. The officers and committee were elected, Mr. Holden, M.P., being re-elected president, and Mr. John Clough treasurer.

Liverpool.

We deeply regret to announce the death of Mr. George Williams, one of the partners in the firm of Messrs. C. and G. Williams, cotton brokers, Tempest Hey, Liverpool. The deceased gentleman, who was in the prime of manhood, being only 41 years of age, had for some time past been residing at Blackpool, and it was there he died at two o'clock on Sunday morning last from *angina pectoris*, after very brief warning. Some years ago he made a business trip to the Cotton States, and there contracted a serious illness, which left him liable to painful spasmodic attacks which a year or two ago were pronounced to arise from disease of the heart. He was attending business on the Manchester Exchange yesterday week, and whilst on his return had a severe attack in the train, which, however, passed away, and left him able to attend to business on Saturday. He retired on Saturday evening, apparently fairly well, but another attack occurred that ended fatally on Sunday morning at 2 o'clock. Great sympathy was manifested in business circles with Mr. Charles Williams, his brother and partner, on the sad event becoming known, and the flag on the offices of the Liverpool Cotton Association was hoisted half-mast. The deceased gentleman had for many years regularly attended the Manchester Royal Exchange, where he had a numerous circle of friends and acquaintances, who highly esteemed him for the fine qualities of character that always distinguished him, and who will much miss his cheery greeting in the future. The remains were interred at Plein-stall, near Chester, his native place, on Tuesday last, amidst the sincere regret of numerous friends.

London.

The great advances which have been made of late years in what is practically the revived industry of British silk manufacture is strikingly exemplified by the annual exhibition, which was opened on Monday in Regent-street, London. It may at once be said, after a minute inspection of the beautiful and delicate fabrics on view, that they are not surpassed by any turned out by the most renowned Continental or Oriental looms. Not only Spitalfields, but Bradford, Macclesfield, Yarmouth, and Scotland are represented, each having specialities of its own, and each showing products of the highest order of excellence, whether it be in the heavy and gorgeous brocades, the exquisite brocades, or the beautiful satins all radiant with the most delicately blended and harmonious colours. Perhaps the loveliest thing in the exhibition is a "chrysanthemum" brocade, a substantial all-silk fabric, having a mother-of-pearl white ground, with flowers in varying shades of gold and foliage of soft green, and with the further combination of a pale gold ground, and with flowers in deeper shades of gold and foliage in tender tones of green. Spitalfields never turned out a more perfect specimen of artistic design and workmanship than this. Very beautiful, too, is a Macclesfield figured satin, with a white clouded ground, the fabric being of the extraordinary width of 34 inches. The brocades intended for court trains are gorgeous specimens of design, while the Scottish tapestries of silk and chenille seem almost like reproductions of the old needlework tapestries.

Manchester.

Mr. William Birch, jun., has retired, and his shipping business will be continued by his relative—Mr. Arthur W. Robinson—as sole principal under the old name of William Birch, jun., and Co.

Messrs. the Hanover Mill Co., of London-road, Manchester, for the last few months have been testing different makes of ring spinning frames, and as a result have placed the contract with Messrs. Guest and Brookes, of the Phoenix Iron Works, Manchester, to fill their mill. Messrs. Guest and Brookes are supplying a considerable quantity of new frames and converting a number of throstle frames to the new system.

Many of our readers both at home and in the United States will be interested in the following announcement: On the 20th inst., at All Saints Parish Church, Newton Heath, Frederick W. Wilson, of Messrs. Wilson Bros., Limited, Toxtford, to Miss M. Wood, fourth daughter of Thomas Wood, Esq., (Messrs. Thos. Wood and Sons, engineers, Newton Heath.) Mr. and Mrs. Wilson have taken up their residence at Holyrood, Prestwich, Manchester.

On Saturday afternoon a meeting of delegates of the Amalgamated Association of Operative Cotton Spinners was held in Manchester, at which it was unanimously decided to make a levy of 2s. per week per member for distribution to the spinners now locked out in South-East Lancashire. There was a large attendance. Mr. T. Ashton, of Oldham, who presided, reported as to the negotiations that are in progress between the operatives' representatives and the employers' federation on the subject of arbitration in connection with the Stalybridge dispute. It was decided to leave the matter in the hands of the executive. The levy added to the ordinary contribution makes up a weekly subscription of 3s. 3d.

A social gathering of the employés and friends of Messrs. Matthews and Yates, Limited, ventilating engineers, of Todd-street, in this city, was held last Saturday afternoon, in the British School, Pendlebury, on the occasion of the opening of their new Cyclone Works, Swinton. After a substantial repast, and whilst the room was being cleared for the subsequent convivialities, the company repaired to the works, which immediately adjoin the Swinton Railway Station. These works are equipped with every facility for turning out the different specialities, from the sheet to the finished article. After a thorough inspection the company returned to the school, where a varied programme of music, etc., was gone through, Mr. Joshua Smale, silk manufacturer, of Macclesfield, presided.

Mossley.

The building of the mill of the Milton Spinning Co. has now reached its last storey. When completed it will hold over 90,000 spindles.

Macclesfield.

Mr. Joseph Wright, for many years head of the firm of Messrs. Potts and Wright, silk manufacturers, Macclesfield, died suddenly on Tuesday at Llandudno, where, accompanied by Mr. Collier, of Alderley Edge, and Mr. J. Birchough, head of the firm of Birchough and Sons, Macclesfield, he was spending a brief holiday. The deceased gentleman had been Mayor of Macclesfield, and was for over a quarter of a century a member of the Town Council. He was a J.P., president of the local Fair Trade League, and was on Thursday evening to have presided over a meeting in Macclesfield Town Hall in connection with Colonial Federation. He had been three years in succession president of the Macclesfield Chamber of Commerce. Mr. Wright has frequently spoken at meetings in favour of Fair Trade, and was one of the most public spirited men in a town which cannot be said to possess an excess of men who regard the good of their fellows as a primary consideration. It may be remembered that the deceased gentleman was present at the recent meeting in Bradford where Lord Masham had such a disagreeable reception. He recently commenced to write a series of articles on the Macclesfield water supply, pointing out in forcible language some very unpalatable truths. Although his educative influence has unfortunately suddenly been checked, he will be long remembered in the silk town as one of the most intelligent manufacturers ever engaged in the local trade.

Nelson.

On Monday an adjourned meeting of the members of the Nelson Weavers' Association was held. A resolution was proposed that labour candidates be nominated in opposition to all cotton manufacturers seeking election upon the Nelson Town Council next November, and who supported Messrs. Evans and Berry during the late strike at Walverden Shed, Nelson; but it was decided to oppose with labour candidates all manufacturers seeking election to the Council.

Northallerton.

At a recent meeting of the shareholders of the Tar-paulin, Brattice Cloth and Linoleum Co., Limited, Northallerton, it was decided, owing to the greatly increasing demand for their linoleum, to increase their capital in order to duplicate the manufacturing capacity of the works by the erection of additional buildings and printing appliances. Agencies have been established throughout Great Britain, France, Germany, Holland, and Australia, although it is only a year and a half since this manufacture, entirely new to the district, was begun. The chairman of directors is Mr. G. W. Elliot, M.P., and Mr. Charles Alexander is general manager and secretary.

Nottingham.

Mr. R. H. Beaumont, the secretary of the Nottingham Chamber of Commerce, has received a communication from the Foreign Office containing some new regulations issued by the Spanish Government

with regard to certificates of origin of goods for Spain, amongst which are the two following, which are of great importance to Nottingham traders:—

To prove the transit of the products of treaty countries through non-treaty countries, a certificate shall be exacted from the Custom House of origin of the treaty country, or from the authorities of the town whence the goods are despatched for Spain, and in this certificate shall be specified the class, marks, numbers, gross weight, and the nature of the contents of the packages, and the name of the station whence the goods were forwarded, and that of the station at which they are to be delivered in Spain.

This may be given separately, or may be written on the certificate of origin according to the convenience of the person forwarding the goods.

Oldham.

The directors of the Oak Spinning Co. are making arrangements for the tripling of the engines, to be carried out during the period of the lock-out.

The horse-power of the steam engines of the Holly Mill Co. is 1,300, and not 130 as inadvertently stated in our last week's issue.

Mr. Nicholas Shaw, of Crompton, who has recently returned from Brazil after fulfilling an engagement, has been appointed carder to the Ellenroad Spinning Co., which will be shortly at work.

The local machine makers are very busy with jobbing work at the respective mills in the town. Millowners are having their machinery put in order, to be ready when work re-commences.

The Pine Mill Co., whose premises are on the point of beginning to produce yarn, have had fixed one of Messrs. Green's (of Wakefield), economisers, specially designed to work with high pressure boilers.

On Saturday afternoon the students of the cotton classes held at Hollinwood Store and King-street Store, paid a visit, under the leadership of their teacher, Mr. Wellington Whypp, to the Hollinwood Spinning Co.'s mill.

The number of mule spindles stopped in the Oldham district by the employers' lock-out is about ten millions, represented by 182 firms, while about 1,200,000 are working, owned by 48 firms. Of the former ten firms are partially stopped, and eight partially working.

The Elm Spinning Co., which has been filled with machinery by Messrs. Hetherington, of Manchester, has recently declared a dividend of 20 per cent. on the half-year's working. This company is being carefully watched by Oldham people owing to the whole of the machinery coming from beyond the local border.

Advantage of the lock-out is being taken by the Prince of Wales Spinning Co. to have new boilers placed in and the steam engines converted to triple expansion. The three steel boilers are being supplied by Messrs. Tetlow Bros., of Hollinwood, while the work in connection with the engines is being carried out by Messrs. Pollit and Wigzel, of Sowerby Bridge. The whole of the alterations are expected to be completed in about another week.

A curious statement bearing on the lock-out was made at the meeting of the Crompton Spinning Co. on Tuesday evening. The Chairman remarked that it was somewhat singular that the company should stop for the present lock-out on the night of the stocktaking, as they did in the last industrial warfare in the district, when the mill was closed until the following quarterly stocktaking, and he wondered whether it would be so on this occasion. Then they paid a dividend to the shareholders of 4½ per cent. The company has now a reserve fund of £3,495.

Meetings have been held this week by the branches connected with the Oldham Operative Spinners' Association relating to the cleaning question. Two propositions, it seems, were placed before the meetings. One was to the effect that all minders be forbidden to do any cleaning during meal hours; the other being that no minder be allowed to clean, oil, or piece straps or bands during the meal hours. The respective districts, we understand, are pretty unanimous on the subject of stopping work during meal times, and there is a strong disposition that a certain time should be set apart for this purpose.

At the meeting of the Council of the Oldham Chamber of Commerce on Monday evening a discussion took place on the Boiler Inspection and Registration Bill. Mr. E. Ingham (consulting engineer) in supporting the Bill explained that it simply meant that all the boilers in a district shall be examined once in thirteen months by the millowner himself, or some competent person he thought adequate to the task, and that a registration should be kept of all boilers which should be declared safe on the certificate of some competent person. So far as this (the Oldham) district was concerned we stood very favourably indeed. The far greater majority of boilers in this district were all periodically inspected; but in some of the other large manufacturing towns there was an awful condition of things in regard to their boilers. Although we had the largest number of steam boilers of any town in the world, we had fewer explosions, owing to the fact

that we had a proper class of boilers and of men to look after them. The object of the bill was to get at the wrong-doers, who did not care for life, or for property to some extent.—Mr. J. Beardoe Grundy (Ashton-under-Lyne), asked for the number of lives lost by those "wicked men" who did not insure their boilers. He understood there were 14 last year. Really they were making all that bother about a paltry 14, whereas in other things they were losing hundreds. He could shew them ice carts in Brown-street, Manchester, and they were losing hundreds of lives every year by filling little boys' stomachs with ices, and here they were asking for legislation for the loss of 14 lives. Football and cricket were something out-and-out compared with boiler explosions, and they were again asking to have a bill on account of the loss of 14 lives. He asked them as business Oldham men, was it reasonable, was it right, to have anything to do with such a paltry bill on account of the loss of fourteen lives—aye, if there were 30, or if there were 100, when they were losing more in other ways?—It was resolved to adopt the report of the law committee, and oppose the Bill. It was decided to support the Steam Engines (Persons in Charge) Bill.

Preston.

About 2 a.m. on Friday of last week the night watchman engaged at Messrs. Barhall, McMinnies, and Co.'s mill, Farrington, was fired at and seriously wounded by small shot. A young man who had shortly before been in his company has disappeared.

The sessional work of the Harris Institute Cotton Class is drawing to a close, and the last of the arranged visits took place on Saturday, to Mr. Alderman Maynard's Bold-street Mill. Mr. Tipping, the manager, conducted the students through the mill. Mr. Seed, mule overlooker, and Mr. Farrington, carder, also acted as guides. The visit proved very instructive, and on the motion of the teacher, Mr. Hannan, seconded by Mr. Billington, a vote of thanks was passed to the firm for allowing the visit.

In the Preston County Court on Tuesday, Regina Ecclestone, a four-loom weaver, sued Messrs. Walsh and Cocker, manufacturers, of Ashton, for 17s. 6d., in lieu of a week's notice.—Mr. Forshaw appeared for the plaintiff.—The evidence adduced was that on the 30th of March, Robert Dawson, tackler, told the defendant that she would have to wash her looms when she downed her beams. Hot water was provided, also brushes and wipers. However, she refused to do the work, and the manager told her that if she persisted in her refusal she would have to leave. She replied, "I will go whoom," for it was not her work to wash the looms.—The defence was that the weavers had to clean their looms, and some of them had done so.—His Honour, Judge Coventry, said that, as the plaintiff was engaged as a weaver and not to wash the looms, she was entitled to recover, and he therefore found for the amount claimed.

Rochdale.

The Rochdale Cotton Employers' Association on Saturday received a deputation from the Federation of Master Cotton Spinners, and in response to their appeals decided at once to suspend work until a settlement of the present dispute is arrived at. The mills in Rochdale are therefore closed.

Sowerby Bridge.

A fire broke out on Tuesday at the large mill of the Shepherd and Blackburn Cotton Spinning Co., Ltd., by which damage amounting to £2,000 was done.

Stalybridge.

It is understood that the Federation of Employers are about to agree to provide an adequate allowance to those non-unionist hands who were lately employed at the mills of the Stalybridge Mill Co., Limited.

Stockport.

Mr. John Hadfield, of Edgeley, has obtained the first prize for cotton spinning at the Stockport Technical School, which makes the fourth first-class prize he has gained at various examinations for cotton spinning.

Yeadon.

Mr. Joseph L. Jackson, lately designer at J. J. L. and C. Peate's Nun Royd Mill, Guiseley, has commenced manufacturing on his own account in partnership with Mr. George Pinder, at Manor Mills, Yeadon.

SCOTLAND.

Dundee.

The reduction of 5 per cent. on the wages of the Dundee mill and factory operatives will mean that from £1,200 to £1,500 less than at present will be paid in wages each week in Dundee. Several manufacturers intend also to reduce still further the hours of labour.

A mass meeting of mill and factory workers was held in the Barrack Park on Saturday afternoon, when resolutions were carried declaring that the reduction of wages was an unfair and cruel proceeding, and that the union be requested to supplement the evidence recently given before the Royal Commission on Labour, with special reference to the present action of the employers in Dundee.

Forfar.

Messrs. Craik and Messrs. Don, manufacturers, have resolved to close their factories on Saturdays until further notice, owing to the scarcity of jute.

Glasgow.

The following table gives the value and destination of the exports of cotton and linen goods from the Clyde for last week, and also the totals to date for the year. The first line refers to cotton goods, and the second to linen:—

India and China.	U.S. and Canada.	W. Indies & S. America.	Australasia.	Africa and Egypt.	Continent.	Totals.	Totals for year to date.
£66,179	7,200	4,499	—	870	—	72,748	1,463,575
149	10,966	373	—	24	—	11,512	319,897

The following are the total values of the export for the same seventeen weeks of last year:—Cotton, £1,338,937; linen, £286,568.

Perth.

The magistrates and Town Council have manifested the high esteem in which Mr. and Mrs. James F. Pullar are held by them, as well as by the whole citizens, by presenting them with a silver tankard on the occasion of their silver wedding, and expressing their sincere wish that they may be long spared to each other in health and happiness.

IRELAND.

Belfast.

On Friday afternoon of last week, the annual meeting of the Flax Supply Association of Ireland was held in Belfast, the Rt. Hon. John Young presiding. The secretary having submitted the report, which dealt largely with the growth of flax in Ireland, the Chairman moved the adoption of the report. In doing so, he said that when they considered there were between 60,000 and 70,000 hands employed in the trade, and that they had 850,000 spindles, it was not surprising that the committee, in framing the report, took a wide view, and looked into the condition of the trade all round. The vexed question of the importation of foreign yarns into Belfast was up, and the report shewed that those imports had increased 8 per cent. last year, while the export of their own yarns to foreign countries had decreased. That was a matter to be regretted, as was also the fact that they did not produce enough flax to keep their spindles employed. At present they had to contend against countries where there were spindles that could produce yarns under more favourable circumstances generally, and the owners were thus enabled to come here and undersell them. He hoped the circumstances of the production of yarns would soon be equalised, not by lowering the price of labour here, but by raising it in competing countries, and by shortening their hours of labour so that they would correspond with our own; and, if that were done, then they could meet them fairly and fight the battle of competition successfully. It was impossible for the society, though it had tried, to increase the growth of flax in the South and West of Ireland. That portion of the country was naturally pastoral and devoted to agriculture for the purpose of raising cattle. The flax industry was peculiarly fitted for the small farmer. He is able to provide the labour without the outlay of a shilling in bringing it to perfection. When he comes to reap the price of his crop there is no reduction to be made but that of scutching. It was right that every effort should be made to induce farmers to grow flax. Mr. C. C. Connor, ex-Mayor of Belfast, seconded the motion, and the report was adopted.

Miscellaneous.

COMMERCIAL IMPERIAL FEDERATION.

The following important telegram was despatched from Ottawa, Canada, per Reuter's agency, on Tuesday:—

"The Dominion House of Commons yesterday discussed for several hours a motion brought forward by Mr. McNeill, to the effect that when the Parliament of Great Britain admits Canadian products to the British markets on more favourable terms than it grants to foreign products, Canada will be prepared to extend corresponding advantages of reduction of duties to British manufactured goods. Mr. McNeill, in an eloquent speech, contended that Great Britain was the natural market for the Dominion, and said that it would be to the mutual advantage of the mother country and the Colonies if a preferential arrangement were made. Public sentiment in Great Britain was, he said, shaping in that direction. Colonel Desjardins, member for L'Islet, seconded the motion, which was supported by Messrs. Sazen and Skinner. Mr. Gilmore

ridiculed the proposal, and avowed himself to be an uncompromising free-trader. Mr. Macdonald, son of the late Premier, warmly endorsed the motion, and said that the scheme, when adopted, would be greatly to the advantage of Manitoba and the North-West, which a few years hence would be able to supply corn to the whole of Europe. Mr. Watson said that the resolution was unnecessary and absurd. The Hon. G. Foster, on behalf of the Government, asked for the adoption of the resolution, which was a message of goodwill to the mother land. He believed that the obstacles at present in the way would eventually be overcome, and a great inter-imperial union effected, which would enable the British Empire to withstand the tariffs of the entire world. Mr. Davies strongly opposed the resolution as being impracticable, and moved an amendment that Canadian goods should be admitted free into Great Britain, British goods being allowed a reduced duty in Canada. Sir John Thompson declared this amendment to be a subterfuge in view of the Liberal policy of discrimination against Great Britain, and urged the House to adopt the original motion. The amendment was then rejected by a strict party vote of 98 to 64, and Mr. McNeill's motion adopted with the same majority."

The Times, commenting on the above, in a leading article on Wednesday, says:—

An important motion was carried yesterday in the House of Commons at Ottawa, pledging the Canadian Dominion to reduce the duties now levied on British manufactured goods as soon as the Imperial Parliament "admits Canadian products to the British market on terms more favourable than it grants to foreign products." The Government supported the resolution, which was moved by Mr. McNeill, on the ground that it "was a message of goodwill to the mother land," and their spokesman, Mr. Foster, predicted that "the obstacles at present in the way would eventually be overcome and a great inter-imperial union effected, which would enable the British Empire to withstand the tariffs of the entire world." The Opposition put forward an amendment, which Sir John Thompson, the Ministerial leader, treated as a subterfuge in view of the Liberal policy of discrimination against the mother country, and which is, on the face of it, hollow and unmeaning. To demand that Canadian goods should be admitted free into the United Kingdom is a mere rhetorical phrase, for we tax no Canadian products except spirits, and Canadian whisky is not likely to compete successfully with Scotch or Irish in the home market. At the same time, these Canadian free-traders would retain the right of levying duties on British products. The amendment was rejected, and the motion adopted, on a strict party vote by a majority of 98 against 64. The event is not without significance. For the first time since the great self-governing Colonies have begun to develop a protectionist policy, we have had a distinct and formal offer of an interchange of advantages between the parent and the daughter nations which might conceivably form the basis of an Imperial Customs Union. In dealing with the proposals for an arrangement tending towards that kind of union, such as Mr. Howard Vincent brought forward a few weeks ago in the debate on the Address, we have more than once pointed out that in the absence of any proof of a desire on the part of the principal Colonies to enter into serious relations of reciprocity it was impossible to discuss the subject to any good purpose. We are bound, in fairness, to take note of the fact that the Parliament of the Canadian Dominion has made an offer which is backed by the other leading colonies of Australasia and South Africa, would be deserving, at any rate, of careful consideration.

We have not disguised our opinion that if the Colonies, as a whole, and without *arrière pensée*, were prepared to enter into a Customs Union with the mother country on mutually advantageous terms, there would be a strong body of public opinion in favour of meeting the offer, if possible, even at the cost of some departure from the rigorous doctrines of free trade. Those doctrines were founded on the principles of political economy as it was understood when Mr. Mill's authority stood at its highest point, and when Mr. Cobden's theories of *laissez faire* were regarded as the ripest fruit of statesmanship. But in these days *laissez faire* has come to be a phrase of reproach; even professors of the "dismal science" itself pooh-pooh the teachings of Adam Smith and his school, while Parliamentary legislation and the popular cries of both parties set at naught the standard of supply and demand. In these circumstances, it would be mere pedantry to insist on applying to our fiscal policy rules we enforce nowhere else. Expediency must be the measure of right in questions of imports and exports as in other things. It is certain that for the consumer generally absolute free trade is the best, but it is not certain that the interest of the

consumer, as such, is the only thing that ought to be considered. If, by not too great a departure from the strict lines of free trade, it were possible to bind the great self-governing Colonies in close and permanent commercial alliance with the mother country, securing not only a vast reserve of political strength, but the command of large and rapidly growing markets, it would probably be thought well worth while to incur some sacrifice. When nations like the United States, Russia, and France are strengthening their exclusive systems against us, and when Central Europe is involved in a network of commercial treaties, it is not pleasant to contemplate the possibility that, under protective tariffs of increasing stringency, our Colonial trade may slip from us and the political allegiance of our Colonial fellow-subjects may be gradually broken down.

We hail, therefore, the action of the Dominion Parliament as a most encouraging sign of loyalty and good will, but we cannot pretend to ignore the immense difficulties that have to be faced if the question comes to be seriously raised. In the first place, though Canada is a most important Colony, we could not for a moment think of establishing a differential tariff for the advantage of the Canadians alone. Were Canada to be joined by the colonies of Australasia and South Africa in opening the Colonial markets freely to British goods, there would be a substantial basis for negotiation. But trade advantages, however liberal, even if a strict party vote gave a sufficient assurance of finality, would not, when offered by a single Colony, justify British statesmen in proposing to lay duties on food supplies and raw material at present untaxed, coming from foreign countries. For this is what the Canadian proposal comes to. We cannot give the Colonies—setting aside our dependencies in the East and the West Indies—"more favourable terms" than we grant to foreign countries except by laying new burdens on the products of the latter which compete with those of Canada, Australasia, and South Africa. But what are those products? Breadstuffs, meat supplies, wool, timber, hides. These have all been long free from taxation in this country, and it would be a serious undertaking to frame a new tariff which would lay imposts on Norwegian timber to give an advantage to Canada, on wool and hides from South America for the benefit of the sheep farmers and cattle owners of New South Wales and Queensland and the Cape, on wheat from the United States and Russia to protect the growers of South Australia and Manitoba. We have no tax in existence of which we can relieve the Colonies which practically do not produce tea or tobacco, except it be the wine duty, which would affect only a comparatively small interest in South Africa and Australia. Many practical men are now convinced that it was a mistake when Mr. Lowe abandoned the shilling duty on corn, which nobody felt, in preference to the niceties of economical symmetry. That duty, if it still existed, might be waived in favour of Colonial grain producers. As matters stand, we should have to undertake a task hardly less formidable than that of the framers of the new European tariffs. Until we see much more clearly than at present what the colonies are willing to do and how far they are agreed, we cannot reopen a question so long closed at the risk of incalculable disturbance to trade. If, however, there is a general disposition on the part of the Colonists to move in the direction indicated, the lead given by Canada may be widely followed and may possibly create a new situation altogether.

The garrison at Rosswein, in Saxony, having been withdrawn, the various buildings required for their accommodation are to be converted into factories. At Gleichau, also in Saxony, the civic authorities have decided to facilitate the development of manufactures by pointing out appropriate sites and granting relief as to the rates.

The Foreign Committee of the American House of Representatives has prepared a resolution, the adoption of which it recommends, requesting the President to invite the Mexican Government to designate three Commissioners to meet a corresponding number of United States Commissioners in order to negotiate a treaty establishing a greater measure of reciprocity in the commercial relations of the two countries. The report accompanying the resolution states that the Mexican market for better grades of goods, which is at present controlled by Great Britain, France, Germany, and Belgium, would be open to American manufacturers if these could only obtain the advantage of discriminating duties, or if in lieu of these duties a system of unrestricted reciprocity prevailed between Mexico and the United States. There can be no doubt, adds the report, that the exercise of a little enterprise on the part of the United States manufacturers and the producers of foodstuffs would speedily give them the control of the Mexican markets.

The Committee on Agriculture (U.S. House of Representatives) has reported a substitute Bill for the Hatch Bill to govern dealings in "options" and

"futures." As a result of the combined protest of the various exchanges and financial bodies and onslaughts by the Press, a distinction has been drawn between short selling and sales for future delivery when the seller is possessed of or has acquired the right to future possession of the product sold. To deal in options or in speculative futures (short selling) a licence costing \$1,000 per annum is required, and a tax on each transaction is imposed of 5c. per pound or bushel, on which sales are made. Fines or imprisonment or both are penalties for infringement. Practically the Bill kills purely speculative business. The most disturbing feature of the whole thing is that good authorities at Washington regard the passage of the measure as by no means uncertain. Being, in part, a Bill to raise revenue, it is privileged and can be called up without passing through the course to be followed by an ordinary Bill. The Committee is reported as determined to push it to an issue in the House, and a majority of the Senate is said to be prepared to give it a favourable reception. What is to become of the cotton men under such an Act?

A REPORT on the aloë fibre industry of the Somali Coast Protectorate, prepared by the British Consul at Aden, has been sent to the Foreign Office by Sir E. Baring, with the recommendation that the matter should be brought under the notice of British Chambers of Commerce. It is hoped that the production of the fibre may be developed, and trade in it expanded, to the advantage of the people and of the revenues of the Egyptian Government. A bale of the fibre consigned to Bombay was sold there at £16 ros. per ton. It has been valued in London at about the same price, and it is said to be obvious that larger supplies would meet with a ready sale. There are, it is stated, vast quantities of the aloë growing in Somaliland. The people themselves will do nothing towards making a trade in the fibre; indeed, they have not the means to work it profitably, though they use it extensively for ropes and other articles.

Letters from our Readers.

ASHWORTH versus LAW.

(TO THE EDITOR OF *The Textile Mercury*.)

SIR,—The letter signed "Samuel Law and Sons, Limited," appearing in your last issue, is so obviously contradictory and wide of the positions laid down in my letter of the 12th inst., that your permission of a reply thereto would be esteemed a favour by the trade in general.

First, let me say, your correspondent's "reputation of any connection with or knowledge of my letter or personality," might have had some force if such matters were or had been, claimed as being material to the issues raised. The mention of them therefore could have no other object than that of throwing dust in the eyes of your readers. Your correspondent next makes an extraordinary statement, *i.e.*, "We would point out that, by our machinery, we do and always have ground down the sides of card teeth to any depth required by our customers." The italics are mine. Now, let us see whether this statement is borne out by the evidence of the "three days enquiry and judgment," which, your correspondent rightly states, was "lucid enough to all who wish to understand it." I will take the judgment first. The portion of it to which I refer, bearing upon the statement of your correspondent, to any depth required, reads as follows: "The machine of Wilkinson is the same as the machine of the defendants. There is the emery disc, the V-shaped emery disc, revolving with its axis parallel to the axis of whatever it is acting upon. The material it operates upon is a flexible material of some sort. By the revolutions the emery disc passes to some extent between the teeth, and to some extent side grinds, and, by a motion which is not material, it reverses from side to side of the cylinder, or whatever it is that it is operating upon, and passes between the teeth. That is the same both in Wilkinson's machine and in the defendants' machine."

These carefully spoken words, "to some extent side grinds," can by no stretch of imagination be interpreted to mean "to side grind to any depth required." But, in order to obtain a full view of their gravity and importance, they must be connected with the allusion in the last sentence to the Wilkinson and defendants' machines, which it will be observed are described and twice stated to be identical. Both these machines were exhibited in Court, that of Messrs. Law and Sons being described by the Solicitor-General on the second day's proceedings, page 1, as "the machine now in use." Given, therefore, your readers are told what the Wilkinson machine accomplished in the matter of side grinding, they will know what value may be placed upon your correspondent's statement to which reference is made. Perhaps Mr. Wilkinson's own testimony here may be sufficiently definite to settle the point at issue. In his letter to the plaintiffs, May 19th, 1886 (second day's

proceedings, page 52), he says: "I certainly did not grind cards before the date of the Ashworth patent, 1880, set both in cloth and leather foundations (made by card-setting machine), by running a V-shaped emery disc down between the wires, so as to grind the sides of the teeth to any required depth."

It is self-evident, therefore, if the machine of Wilkinson is identical with the defendants' machine, and which on their own showing is the one now in use; and further, if Wilkinson did not grind the sides of card teeth to any required depth, the claim of your correspondent that his firm "does now, and always has ground down the sides of card teeth to any depth required," is not only inconsistent with the evidence, but is not based upon strict matter of fact.

Then again, your correspondent, in answer to the remark in my previous letter that "the Wilkinson patent of 1878 did not claim the prior use of deep side-grinding, etc.," confuses that statement of fact, which he does not attempt to refute, with the "decision arrived at by the Court." That the Wilkinson machine was constructed from the drawings to the Wilkinson specification, perhaps he will not deny; if so, then it will be interesting to learn (after the terms quoted of the judgment in reference to this particular machine and its bearing upon the whole case) the explanation he may offer to his statement that the "Wilkinson patent specification had nothing whatever to do with the decision arrived at by the Court."

It only now remains for me to point out to your readers that your correspondent has quite ignored the broad facts laid down in my previous letter, which, shortly stated, are: (a) That the method of sharpening the teeth of wire cards adopted and now in use by Messrs. Law and Sons is identical with that of Wilkinson's, which side-grinds to a limited depth by passing a V-shaped emery disc over the tops of the wires; (b) that the Ashworth patent of 1880 grinds down the sides of the teeth by the aid of a plough to any required depth, and is the first known practical method of obtaining that result; (c) that the whole of the evidence goes to prove the foregoing distinctions; and (d) that, the almost general acceptance of the Ashworth patent of plough pointing over all other known methods is practical evidence in further support of the true issues to which I have drawn the attention of your readers. Lastly, in using the term "non-suit" in relation to the result of the action to the plaintiff, I did not use it in the legal sense, but simply with regard to its relative application.—Yours, etc.,
April 27th, 1892. CHARLES J. HALL

Textile Markets.

COTTON.

MANCHESTER, FRIDAY.

The contest in the spinning division of the trade continues to extend in area. Nearly all the establishments in the chief spinning districts that have no weaving attached are stopped, and those that are working for the supply of their own looms are doing so under a penalty of heavy contributions to the funds of the Employers' Association. Some of the spinning mills in the Rochdale district, whose directors manifested some indecision or weakness of purpose, opened their mills last week, but being waited upon and impressed with what would be the consequences of their persistence in working, all closed again on Saturday for an indefinite period. Five out of the six spinning mills of Darwen have placed their operatives under notice; and a meeting of the Blackburn spinning trade will be held on Monday, at which their action will be determined. The great spinning district of Bolton is also apparently about to fall in line with the remainder of the trade, and either to close or run such very short time as will effectually cut off contributions from that source to the operatives' unions. The offer of arbitration made by the operatives, as we anticipated last week, has been of no avail, as, in truth, there is absolutely nothing to arbitrate about, which they themselves substantially admit, and the only point for which they now seem to be contending is that the Stalybridge Spinning Co. shall take back all the strikers who left work and dismiss those non-unionist operatives who have entered their services since. This the Employers' Federation refuses to do, and on this ground the contest is likely to continue until one or the other side surrenders. This is not likely to be the operatives.

During the past twelve months we have had frequent occasion to point out in connection with the estimates and manipulations of the figures relating to the cotton crop, how cautious spinners required to be in order not to be misled by the unscrupulous tactics to which a limited number of those persons engaged in handling cotton in one form or another did not hesitate to resort. In some instances our strictures were deemed too harsh. But yesterday an instance was afforded of this conduct, which cannot be too severely denounced in the interests of spinners and manufacturers. A rumour was started,

and strongly affirmed, that the dispute in the spinning trade had been settled, and that the mills would immediately resume work. Many telegrams and other messages were received in Manchester enquiring into the truth or otherwise of this statement, which were immediately answered in the negative. But the lie had got the start, and the mischief was done. Many people this morning will be regretting their easy faith.

COTTON.—On Saturday the market exhibited few symptoms of activity, spots being quiet and futures unsettled, yet holders insisted upon higher prices, the result being that the official rates were advanced $\frac{1}{16}$ d. Futures recorded frequent fluctuations, and finally closed with a loss of 1 to 2 points. On Monday the market was pervaded by a great variability of sentiment, attended by considerable fluctuations in futures, which finally closed steady with a loss of $\frac{1}{4}$ to 2 points. Spots were unchanged. In Indian, Oomra, Dhollerah, and Bengal were advanced $\frac{1}{16}$ d. On Tuesday the adverse influences of the cotton trade dispute became felt to a greater degree, and a rapid decline set in, the market closing with a loss of $\frac{1}{16}$ d. on spots, and $\frac{1}{4}$ to 5 points on futures, and considerable depression of feeling. This condition became more intense on Wednesday, the speculative section opening heavy with a decline of 2 points, and continuing to decline with little interruption until the close, when a loss of 3 to 4 points from the previous day's closing prices was registered. For American there was very little enquiry, and prices were reduced $\frac{1}{16}$ d. Egyptian was weaker, and considerably easier to buy, though the quotations remained unchanged. Yesterday, to the surprise of everybody, Liverpool took a sharp upward turn, based upon the wide promulgation of an utterly false statement that "the lock-out had broken down, and the mills were resuming work." Though this report was contradicted a great advance took place in futures, the market closing with a gain of 4 to 5 points, and $\frac{1}{16}$ d. in spots. Other growths were unchanged, excepting Broach, which in "good and fully good" was advanced $\frac{1}{16}$ d.

The following particulars of the business of the week are from the official report issued by the Liverpool Cotton Association:—

	Import.	Forward.	Sales.	Stock.	Export.
American	64,078..	..	1,494,390..	..	..
Brazilian	814..	..	51,160..	..	..
Egyptian	9,656..	..	116,120..	..	..
West Indian	1,114..	..	30,620..	..	..
East Indian	500..	..	36,710..	..	..

Total .. 76,162..48,286..37,000 1,729,000..4,043

The following are the values of futures at mid-day on each day of the week—American deliveries—any port; bases of middling: low middling clause; (the fractions are in 64ths of a penny):—

PRICES OF FUTURES AT 1.30 P.M. EACH DAY.

	Satur- day.	Mon- day.	Tues- day.	Wednes- day.	Thurs- day.	Friday
April..	3-58 59	3-58 8	3-52 53	3-48 V	3-51 52	3-55 56
April-May	3-58 59	3-58 8	3-52 53	3-48 V	3-51 52	3-55 56
May-June	3-59 V	3-58 59	3-53 b	3-48 49	3-57 8	3-56 8
June-July	3-61 62	3-61 b	3-56 b	3-51 52	3-54 55	3-59 8
July-Aug.	4-0 1	4-0 5	3-59 5	3-54 55	3-57 b	3-61 62
August..	4-2 b	4-2 3	3-51 62	3-57 b	3-60 b	4-0 b
Aug.-Sept.	4-5 b	4-5 b	4-0 V	3-59 60	3-62 63	4-3 8
Sept.-Oct.	4-5 6	4-5 b	4-0 V	3-59 60	3-62 63	4-3 8
Oct.-Nov.	4-6 b	4-6 5	4-3 8	3-62 b	4-1 b	4-8 V
Nov.-Dec.	4-10 11	4-10 11	4-5 6	4-1 8	4-3 4	—
Dec.-Jan.	—	4-13	—	—	—	—

Price of Mid. American.	3 15-16	3 15-16	3 15-16	3 15-16	3 15-16	3 15-16
Estimated Sales including Spec. and Export.	6,000 500	7,000 1,000	5,000 1,000	5,000 500	7,000 2,500	6,000 1,000

The following are the official quotations from the same source:—

	G.O.	L.M.	Md.	G.M.	M.F.
American.....	3 1/2 .. 3 1/8 .. 3 7/8 .. 4 1/8 .. 4 1/8				
Pernam.....	.. .. .. 3 7/8 .. 4 1/8 .. 4 1/8				
Ceara.....	.. .. .. 3 7/8 .. 4 1/8 .. 4 1/8				
Paraiba.....	.. .. .. 3 7/8 .. 4 1/8 .. 4 1/8				
Maranhã.....	.. .. .. 4 .. 4 1/8 .. 4 1/8				
Egyptian.....	.. .. .. 4 1/4 .. 4 3/8 .. 4 3/8				
Ditto white.....	.. .. .. 4 1/2 .. 4 3/8 .. 5 *				
M.G. Broach ..	.. .. .. 3 1/8 .. 3 1/8 .. 3 1/8				
Dhollerah ..	2 1/4 .. 2 1/4 .. 3 3/8 .. 3 1/4 .. 3 1/4				
Oomra ..	2 1/8 .. 2 1/8 .. 3 1/8 .. 3 1/8 .. 3 1/8				
Bengal ..	.. .. .. 2 1/8 .. 2 1/8 .. 3 .. 3 1/8				
Tinnivelly ..	3 1/8 .. 3 1/8 .. 3 3/8 .. 3 1/8 .. 3 1/8				

* Nominal.

YARNS.—Owing to the exceptional circumstances of the market on Saturday yarns maintained to the full the firmness that had arisen during the week, and showed a tendency to go dearer. The business of the week was, however, seen to have been very limited on the basis of the higher rates demanded. These on home-trade yarns were from $\frac{3}{8}$ d. to $\frac{1}{4}$ d. per lb. from the lowest points touched, and on shipping yarns $\frac{3}{8}$ d. to $\frac{1}{4}$ d. It will be seen from this that so far as quotations went Liverpool had captured all the advantage. On Monday the market continued to show a hardening tendency, owing to the darker aspects of the dispute in the trade. The demand on home-trade account was not large, but a slight increase was discoverable in that for export, in which prices were the turn harder. On Tuesday the position of the dispute in the spinning branch of the trade tended to impart hardness to prices, producers very generally demanding $\frac{1}{4}$ d. advance from the recent lowest rates. All classes of yarns were worse to buy, but the hardening tendency came from the wrong side, as there was no improvement of demand, and very little business was discoverable. Yesterday showed no material change from this condition, home-trade yarns continuing very strong, and, especially in welfs, becoming daily more scarce. The deficiency in this respect threatens to stop looms very largely considerably before warp yarns are exhausted. Consumers are already showing great hesitation about giving out further orders at present prices, as considerable loss is being already entailed. Yarns are becoming scarce on every hand, as buyers found yesterday, and very extreme rates are demanded, especially for welfs. Not much business, however, is going on, as it is becoming clear to manufacturers that they had better close their sheds than pay the prices now demanded.

CLOTH.—The market developed no change in the cloth division on Saturday from its aspect during the week. There was the same paucity of demand, difficulty of obtaining orders, and the same impossibility of securing any improvement in prices. On Monday cloth remained much as before, with a dull enquiry, and a tendency to harden up on the basis of the exceptional state of affairs prevailing in the spinning trade. On Tuesday cloth producers looked in vain for any improved demand for their productions, or for the slightest sign in any direction of a change in the early future of recouping themselves for the advances in yarns and cotton. On Wednesday this state of things continued without much change, though here and there an increased enquiry was met with for special and well-known makes of both shirtings and printing cloths. It was rare, however, that much business resulted, as the forces influencing the market are of a very conflicting character and uncertain in their duration. Manufacturers, however, feel that the depletion of yarn stocks will have given spinners a great command of the market at their expense, which may endure for months to come, and they are therefore very unwilling where they can possibly avoid it to enter into contracts for cloth at prices that offer no compensation for this serious contingency. In the cloth section of the market yesterday, many manufacturers were compelled to advance quotations owing to the condition of the yarn market, but this simply precluded all chance of the transaction of what little business was offering. Scarcely anything was done.

The market to-day is, to a great extent, paralysed, owing to the dispute in the spinning trade. The sale of yarn is confined to stock lots, and these are held for high prices, which are only exceptionally obtained. No business is being done in cloth, as manufacturers do not know what to quote, and can make no engagement as to delivery. But, indeed, they are rarely tempted, as buyers have exceedingly little business to offer.

WOOLLENS AND WORSTEDS.

BRADFORD.—There is little change in wool. The better grades are steady, but there is no improvement in prices. Efforts to effect an advance check business. Colonial wools are steady. Mohair and alpaca are slow. Yarns are without alteration. A steady business has been done for export. There is rather more activity in the home trade. Spinners are well employed. Pieces without alteration; if anything, there is rather more activity in the demand for dress goods for the home market, and manufacturers are generally better engaged. A steady business is doing in goods for export.

ROCHDALE.—At the London sales since Easter wool has advanced 5 per cent. Rates are firmer than was the case a few weeks ago. Yorkshire goods are in slightly improved demand, and better rates are paid.

GLASGOW.—Messrs. Ramsey and Company, wool brokers, in their report dated 26th April, say:—Wool: In the wool market trade is somewhat dragging. Consumers are reluctant to operate beyond their immediate wants, hence the volume of business passing is much restricted. The tone of the London sales of Colonial wools continues good and prices very firm, but so far this has had little or no effect on this market, beyond making holders firmer in their ideas of values.—The

next public sales will be held here on 4th May. *Shetlands*: The numbers amount to a full average for the season with a large proportion of prime stock. Competition has been rather steadier at the reduced values.

HOSIERY AND LACE.

NOTTINGHAM.—The enquiry for the States is slack, and home-trade houses are quiet. For curtains, linens, and nets, the demand is not yet sufficiently large to keep all machinery at work. Plain-nets are firm, but makers still complain that their profits are meagre. Bobbin-nets sell steadily. Mosquito-nets are only in moderate request. Meehlin, Brussels, and Zephyr-nets are quiet. Silk-tulles are only in limited request. In the Levers department good orders are on hand for the Irish, guipure, pearl, and Valenciennes laces. Cheap Maltese and torchon laces are slow. Cotton trimmings and embroideries are dull. Silk laces and flouncings are selling to a moderate extent. In the hosiery trade cotton goods are still dull, and the demand for other qualities of hosiery is not very active. Pants and shirts are steady.

LEICESTER.—Coarse, deep grown, and inferior wools show no material improvement. The Colonial sales have resumed with plenty of home and foreign buyers, and the advanced rates are maintained. The improvement in the yarn trade is gradual. Spinners have plenty of business on their books. Lambs' wool yarns are in good demand. Cashmere and fine yarns are firmer. A fair trade is doing in cotton yarns. The hosiery trade is benefiting by the advance in wool.

FLAX AND JUTE.

DUNDEE, WEDNESDAY.—Depression is the only word which pictures the state of the jute trade. Jute has risen roughly from £12 to £21. Yarn and cloth are not wanted at this rise. Buyers have no confidence in the future, seeing that in all markets there are, notwithstanding restricted production, still stocks of goods. Indeed, from day to day prices of manufactured jute goods still droop, and to give a trade of a reasonable kind, fibre would require, at present prices of cloth and yarn, to be £16 to £17 instead of £20 to £21. In these circumstances some holders of jute are beginning to give way a little, and even spinners, seeing they make far more by selling their stocks of jute, prefer to sell the raw jute and either stop machines or run short time. To-day several spinners have arranged to stop on Thursday night for the week, thus still further restricting production. Jute is easier to buy in all positions, and some business is being done at a fall of quite £1 a ton from the top. Jute yarns are dull, and a further 1/4d. per lb. is given off list prices to effect sales. Jute Hessians are quiet, and for all except the very best special goods a shade less is accepted. Flax is rather easier to buy. There are reports of very unsatisfactory quality, and this makes spinners cautious to buy for b. Flax yarns of good warp quality and tow warps of favourite spins are held firmly; for all other sorts the turn is in the buyer's favour. Linens are in fair demand. The English holidays have interfered with the home trade, and new business is very welcome. The miners' strikes, as well as the difficulties in the cotton trade, at once affect the linen trade of Forfarshire. Manchester men report an utter want of orders from the districts affected by these troubles, and already some of the linen looms which usually supply these markets are put on short time. So are the working people of one class injured seriously by the remote troubles of another. Arbroath is still running short time with the heavy *Caracas* looms, and orders are eagerly taken. The Dundee *Fancy Jute* trade, long so full of life, is very quiet. Only the very best makers are busy in new and pretty designs. The demand for *Kopes*, twines, and cords continues good, and new orders are being placed for harvest twine.

DRY GOODS.

MANCHESTER.—The demand for woollens in the piece has been quiet, as is to be expected seeing that the trade has fallen off so greatly owing to the competition of ready-made clothing manufacturers. For prints of the better class there has been some enquiry from the United States during the week, but low grades of goods are slow and prices unsatisfactory. Orders from the East are more keenly competed for. Australian buyers have placed some good orders for novelties during the week. Their purchases now largely consist of the finest designs in the market. Job lots are at a discount, Melbourne and Sydney buyers being as exacting as those of New York and London. There is only a slight movement in plushes. Lace curtains are steady, but there is not sufficient employment for all the machinery in the trade. This is due more to an abnormal increase in productive capacity than to any decline in consumption. Consumption has, in fact, grown, notwithstanding the competition of cheap and slightly art muslins.

Joint Stock and Financial News.

NEW COMPANY.

LOWESTOFT NETWORKS, LIMITED.
Registered by Bomber, Wright, Thompson and Co., 165, Fenchurch-street, E.C., with a capital of £15,000 in £1 shares. Object, to acquire the fishing-net and cooperage works situate in the Clapham-road, Lowestoft, and to carry on and extend the same in all its branches. There shall not be more than seven directors. The first are T. Davies, D. Gulland, and A. B. Hulson. Qualification, £250. Remuneration, £150 per annum, divisible.

Patents.

NOTICE OF REMOVAL AND CHANGE OF FIRM.

E. K. DUTTON & CO.
(Late DUTTON & FULTON).
CHARTERED PATENT AGENTS.
Removed from 1, ST. JAMES'S SQUARE, to QUEEN'S CHAMBERS, 5, John Dalton St., MANCHESTER.

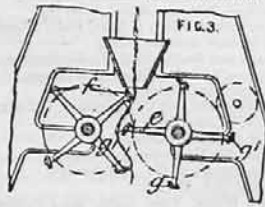
SPECIFICATIONS PUBLISHED.

Each of the following Specifications may be purchased at the Sale Branch, 38, Curator-street, London, for the price of 8d., or may be ordered on the Postal Request, price 8d., which is now on sale at all the principal Post Offices in the United Kingdom.

- 1891.
- 5,653 VAN CUTSEM. Cutting-tulles, embroideries, etc.
- 9,101 TOWNEND. Jacquard looms.
- 9,380 BOYD. Winding yarn.
- 11,298 SCHWIGCH AND BUCHER. Colouring matter.
- 19,397 GOLDSCHMIDT. Dyeing teased fabrics.
- 1892.
- 1,231 LAKE (Leonhardt and Co.). Colouring matters.
- 2,154 BRADBURY. Carding engines.
- 3,745 FISCHER AND ORS. Knitted fabric.
- 3,885 THOMPSON (Lorinser). Spinning machines.
- SECOND EDITIONS.
- 17,168 (1890) JOHNSON (Badische Anilin and Soda Fabrik). Colouring matter.

ABSTRACTS OF SPECIFICATIONS.

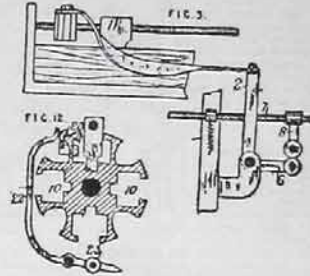
17,803. November 8, 1890. Spinning. J. C. MEYERLIN 55, Chancery-lane, Middlesex.—J. Cardon, Lille, France.



Breaking, scutching, and heckling flax, etc.—In this machine the stick of flax, etc. is subjected to several breaking and scutching operations alternately, and finally to a heckling operation. The breaking apparatus consists of two or more fixed boards a, c (Fig. 3) between which other boards b slide backwards and forwards, being operated by a crank and connecting-rod L or other suitable gearing. All the boards are perforated at d, and the material is passed through these apertures when the latter are in line with one another. The scutching apparatus consists of a pair of four-armed rotatory beaters arranged so that the arms e (Fig. 3) of one of the beaters take to their rotation between those of the other. The arms e carry beater plates f, which are indented at the edge and are provided with curved plates g, g', those g on alternate plates being segments of discs and arranged at right angles to the axle of the beater, while the others g' are segments of an ellipse and are arranged in an inclined position. The heckling apparatus used in this machine is of the well-known kind, consisting of two endless travelling aprons furnished with heckle pins.

17,835. November 6, 1890. Looms. A. SOWDEN, Sowden's Loom Works, Shipley.
Stop-motions for circular box looms to permit the use of a fast reed. The incoming shuttle strikes the picker 11, which comes in contact with the buffer and causes the strap 1 to pull the arm 2 of a lever. The other arm 6 of this lever acts on an arm 8 on the stop-rod 7 causing the rotation of the stop-rod. This turning motion of the stop-rod lifts a finger clear of the reed, permitting the operation of the reed. If the shuttle is "trapped" and fails to reach its box the finger remains down, and coming into contact with the reed causes the loom to be stopped. The means by which the lever 2 acts on the stop-rod 7 may be modified. Instead of straps 1 an ordinary checking strap may be employed,

the levers 2 at each end of the loom being attached to it. In another modification the checking strap is divided, and each part attached to a central sliding rod, on which are inclined which act on a roller on the arm 8 to produce a rotation of the stop-rod.

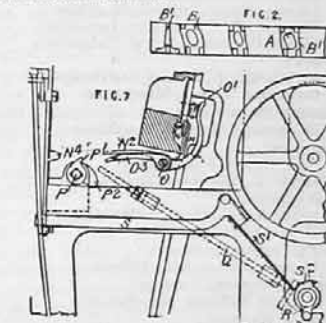


Checking shuttles.—The application of a swell to a rotary shuttle-box is shown in Fig. 12. Each of the cells is provided with a swell 20, which is pressed in by the lever 32. Just before the shuttle is struck by the picker the pressure is taken off the swell by a lever, operated by a cam on the crank-shaft, which acts on the roller 23 and raises the lower end of the lever. This method of relieving the pressure on the swell is applicable also to fixed shuttle-boxes.

17,872. November 6, 1890. Dyed yarns. T. SALEMANN, Dornbirn, Vorarlberg, Austria.

Relates to a process for producing uniformly or variously dyed or shaded cotton yarns or threads. Consists in boiling the sliver or roving with caustic soda or carbonate of soda; forming it into banks; dyeing, squeezing, and drying the roving banks; reeling them, and placing them in a medium or fine bobbin and fly frame, in which the threads are at the same time doubled. The roving thus obtained is placed in a fine spinning machine, where, by repeated doubling of yarns of the same or of different colours, a thread is obtained which may be either of uniform colour, or of varying shades, or of mixed colours.

17,906. November 7, 1890. Looms. H. RAWSON, 1, Conduit-street, Nelson, Lancashire.



Pattern lags and pegs.—Meta pegs B (Fig. 2) are cast singly, or in groups, to metal bases Br, which are secured to the wooden lags A by stitched cover plates screwed to the latter.

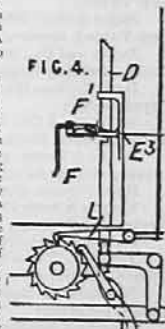
Lance-reed motion.—When the shuttle is trapped the swell O1 (Fig. 7) fails to raise the tongue O3 on the stop-rod O2; a projection P1 on a shaft P is thereupon struck and a cam P2 is raised so that the duck-bills N2 (on a tube on the stop-rod) are prevented from passing beneath the beaters N4, and the reed is thus thrown out. In rotary box looms a slide-bar Q, raised by a tumbler R, keeps the tongue O3 clear of the projection P1 when the shuttle is on the rotary box side of the loom. To prevent breakage of yarn and of the temple fixings, etc., when a shuttle travels behind a flap and grid at the fork end of the rotary box looms the tongue O3 strikes a projection on the web for k lever to stop the loom and apply the brake. In some cases the flaps connected to a blade spring and pressed on by a finger on the tube on the stop rod, so that on tappage the flap is thrown out and the loom stopped.

Brake mechanism.—The web brake lever S (Fig. 7) carries a blade spring S1, which is acted on by a revolving part S2 when the lever is released for the purpose of applying additional brake force.

Change-inn motions.—A cam-worked spring lever pushes the picker and shuttle forwards, and then immediately withdraws the former clear of the latter to enable the boxes to rotate freely.

Picking and checking mechanism.—An endless picking band is passed through a slot in the picker and over the groove at the end of the stick, a toothed tension plate or finger on the latter keeping it in place. The strap may be adjusted as it wears. For connecting and adjusting picking, check, and buffer straps, a fastener is employed made of wire bent in hook form at one end and terminating in a cross-piece at the other. The hook is drawn through two holes in each strap, the cross-piece abutting against one of the said straps.

Dobbies; take-up and web-stop motions.—For arresting the pattern surface of the dobby directly the web falls, the driving catches of the dobby cylinder and the take-up motion are attached to a vertical rod D (Fig. 4) which is raised and lowered by an arm on a rock shaft, a cord connection E3 being made between the retaining catch L of the take-up motion and the dobby cylinder catch. When the catch L is lifted by the web fork action, the dobby catch is also lifted out of action. For arresting

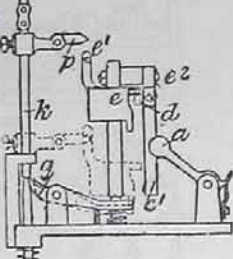


the driving catches, when the web is broken at the opposite side of the loom to the usual web fork, an additional fork F is provided carrying a pivoted piece F' which engages in a notch in the rod D when the web fails.

17,972. November 8, 1890. **Spinning.** T. THORNTON, Sutton, Crosshills, near Keighley.

Combing machines.

Noble's and like combing machines are provided with a stop motion. The slivers, as they pass from the comb circles, support weighted levers or tumblers *a*. When one of these falls owing to the breakage of the sliver, it takes against one of the inclined arms of an oscillating fork *ci*, which when in its mid-position supports a vertically sliding weight *e* by means of a catch *d*. When the fork *ci* is moved aside, the weight *e* is allowed to fall on to a spring catch lever *g*, which normally holds a weighted or spring rod *k* connected to the strap fork in its highest position. When the rod *k* is moved upwards again on restarting the machine a hinged finger *p* thereon engages with a loop *ci* on the weight and raises the



finger *p* thereon engages with a loop *ci* on the weight and raises the

latter to its highest position, the catches *ea*, *d* being so formed as to allow of the parts regaining their normal position. The two tumblers *a* are made of different weights, so that if they should fall simultaneously on to the oscillating fork *ci*, the latter will still be deflected, and the stop motion brought into operation.

18,022. November 5, 1890. **Phenacetines.** B. WILLIAMS, 47, Lincoln's Inn Fields, Middlesex.—(Farbenfabriken vormals F. Bayer & Co., Elberfeld.)

Relates to the manufacture of methyl- and ethyl-phenacetine. Consists in mixing methyl- or ethyl-phenetidine with acetic anhydride in molecular proportions. The acetic acid produced is removed by adding alcohol to convert it into acetic ether and distilling. The residue is distilled in vacuo and yields the acetyl compound in the form of a clear liquid which solidifies in standing. Acetyl chloride or (less advantageously) acetic acid may be substituted for acetic anhydride.

18,082. November 10, 1890. **Spinning.** M. KOLB, Viersen, Germany.

Ring spindles.—In order to adapt ring spindles for the spinning of flax, tow, &c., the track of the traveller is placed on the inside of the ring instead of on its upper edge as at present, and the rings are mounted in pairs on plates secured to the ring rail. The rings may be kept clean by moistening the junction of each pair with water. *Drawings.*

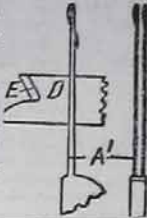
18,087. November 16, 1890. **Floor-cloth, etc.** W. H. GODFREY, C. F. LEAKE and C. E. LUCAS, all of Staines, Middlesex.

Floor-cloth and similar fabrics are manufactured with a marbled or marbled granite surface by causing strips or threads

of material to adhere to that forming the ground. Means are described. *Drawings.*

18,091. November 10, 1890. **Knitting.** J. and W. HEARTH and W. H. WILLS, all of Church Gate, Leicester-shire.

Straight-bar machines.—A greater variety of ribis made in stockings, socks, and other articles by employing needles *A*, with the beards twisted as shewn, and short-rod sinkers *D*, in combination with ordinary needles, and ordinary sinkers *E*. Either sort of needles may be cranked in the stem for use with ordinary sinkers only.



PATENTS.
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Salisbury & Hamer, Blackburn and Manchester.

Bandings, Tape and Tubular:

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Belting:

Fleming, Thos., Son, & Co., Halifax.
Reddaway, F., and Co., Pendleton.
Rossendale Belting Co., Manchester.
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Dixon, John, & Son, Steeton, near Keighley.
Kay, John, Rochdale.
Livesey, Henry, Limited, Blackburn.
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Card Grinding Machinery:

Dronsfield Bros., Ltd., Oldham.

Cement, Mineral Fusible:

Fox and Williams, Manchester.

Chaining Machine:

Hurst, W., & Co., Rochdale.

Cop-Tubes:

Jagger & Co., Oldham.

Cop-Tubing Apparatus:

Jagger and Co., Oldham.

Cotton Driving Ropes:

Hart, Thomas, Blackburn.

Crystoleine:

Wells, M., & Co., Manchester.

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Kenyon & Sons, Dukinfield.

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Dronsfield Brothers, Oldham.

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Musgrave and Sons, Ltd., Bolton.

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Reddaway, F., & Co., Pendleton.

Fire Pumping Engines:

Worthington Pumping Engine Co., London and Manchester.

Grinding Apparatus for Flats:

J. Jones, Dukinfield.

Fustian Cutting Machines:

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Indicators:

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Devoye & Co., Manchester.
McMurdo, James, Manchester.

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Looms, etc.:

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Livesey, Henry, Limited, Blackburn.
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Machinery (Bleaching, Dyeing, Printing, &c.):

Hawthorn, John, & Co., New Mills, Stockport.
Dickinson, Wm., & Sons, Blackburn.
Hall, Robert, & Sons, Bury.
Klauder-Weldon Dyeing Machine Co., Huddersfield.

Mather and Platt, Manchester.
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Machinery (Cotton Preparation, Spinning, Doubling, etc.):

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Brooks & Doxey, Manchester.
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Dobson & Barlow, Ltd., Bolton.
Guest and Brookes, Manchester.
Hotherington, John, & Sons, Ltd., Manchester.
Hall, Robert, & Sons, Bury.
Howard and Bullough, Ltd., Accrington.
Lees, Asa, and Co., Limited, Oldham.
Lord Brothers, Todmorden.
Platt Brothers and Co., Limited, Oldham.
Stott, J. H., Rochdale.
Stubbs, Joseph, Manchester.
Tattersall & Holdsworth, Burnley.
Taylor, Lang and Co., Stalybridge.
Threlfall, Rd., Bolton.

Machinery (Flax, Tow, Jute, &c., Preparation and Spinning):

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Machinery (Sewing and Card-lacing):

Singer Manufacturing Co., London.

Machinery (Thread):

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Brooks & Doxey, Manchester.

Machinery (Silk):

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Dobson & Barlow, Ltd., Bolton.
Guest and Brookes, Manchester.
Hall, Robert, & Sons, Bury.
McGowan and Hadwen, Manchester.
Platt, Brothers and Co., Limited, Oldham.
Stubbs, Joseph, Manchester.
Sykes, John, and Sons, Huddersfield.
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Dobson & Barlow, Ltd., Bolton.
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Hotherington, John, & Sons, Ltd., Manchester

Hall, Robert, & Sons, Bury.
Lees, Asa, and Co., Limited, Oldham.
Platt Brothers and Co., Limited, Oldham.
Stubbs, Joseph, Manchester.
Sykes, John, and Sons, Huddersfield.
Taylor, Lang and Co., Stalybridge.
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Wells, M., & Co., Manchester.

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Kay, John, Rochdale.
Livesey, Henry, Limited, Blackburn.
Wilson Brothers, Limited, Todmorden.

Shuttle Swells:

Hall, Robert, & Sons, Bury.
Livesey, Hy., & Co., Ltd., Blackburn.
Whalley, J., Blackburn.

Sizing and Filling Preparations:

Adley, Tolkien, and Co., Blackburn.
Eastwood, James, Manchester.

Smoke Consumers:

Automatic Smoke Prevention Syndicate, Ltd. Manchester.
Greaves, W. McG., Manchester.

Sprinklers, Automatic:

Dowson, Taylor & Co., Ltd., Manchester and London.

Witter & Son, Bolton and London.

Steam Traps:

Lancaster and Tonge, Pendleton.
Whiteley, Wm., & Sons, Huddersfield.
Crowley and Co., Ltd., Sheffield.

Temples, etc.:

Blesard, James, and Sons, Padiham.
Brooks & Doxey, Manchester.
Hall, Robert, & Sons, Bury.
Lupton Brothers, Accrington.

Tools (Machine):

Hotherington, John, and Sons, Manchester

Ventilation:

Mathews and Yates, Manchester.
Parsons, P., Blackburn.

Pickup, J. H., & Co., Ltd., Bury.

Warping Machinery:

Bethel, J., Manchester.
Hall, Robert, & Sons, Bury.
Livesey, Henry, Limited, Blackburn.
Stott, J. H., Rochdale.

Whiteley, Wm., & Sons, Huddersfield.

Waste (Cotton) Picking Machinery:

Brooks and Doxey, Manchester.

Wool Extractors:

Jarman & Son, Huddersfield