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All communications to the Editorial Department should reach the offices, 23, Strutt Street, Manchester, early in the week in order to receive attention in the next issue.

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NON-UNIONIST MILLS.

Last week in the columns of *The Cotton Factory Times* notice was taken of the suggestions in our article of the previous week, pointing out that the Employers' Associations were failing in their duty in not providing facilities for non-unionist operatives to obtain employment, not only in a time of strikes and lock-outs, but for a permanency. Of course, as was to be expected, the quality of non-unionist labour is greatly depreciated: we are assured that the unions absorb everything that is good or of any value in industrial skill, intelligence, and

energy, and that all the non-unionist labour is of a very poor class and hardly fit to associate with the superfine quality that has been gathered into the folds of unionism. The latter is declared to be as anxious as we are for relief from the presence and contemplation of so much incapacity, and would gladly welcome the setting aside of a few mills in order that the incapables might truly demonstrate their qualities to employers. Such, in spirit if not in words, are the statements of the operative leaders in their organ. We should have much more faith in their declarations if we could find that their actions displayed the slightest consistency therewith: but they do not. Where or how could they have had a finer opportunity of putting their strong desires into tangible embodiment than was given them during the late strike at the Stalybridge Spinning Company's mill? After a three months' strike, the gates of the company's mill were thrown open for the reception of non-unionist labour,—and with what result? A declaration of war was immediately issued from the unionist offices, all the forces of unionism from far and near were gathered together, and the place was invested with the unionist armies and a perfect siege established. A fusillade of stones, brickbats, and other missiles was poured upon the free workers whenever opportunity offered, whilst the investing unionist forces kept up a continual rat-tat-too upon the pavement with their iron-bound clogs. These were the paid soldiers of the union, and their actions never at any time manifested the intensity of the desire of their leaders, expressed in the article to which we are referring, that they would be glad to see non-unionists gathered into mills allotted to their employment solely. Indeed, so opposite were their dispositions in this respect that more than one of them are now doing a term of hard labour upon the treadmill or its equivalent, for the excess of their zeal. Really it is quite time their dull dupes began to see through such shallow pretences.

CLOTH MANUFACTURING BY THE TURKISH GOVERNMENT.

It would seem that the Turkish authorities are considering the propriety of establishing State factories for the supply of the textiles needed by the State. At any rate this is a fair inference from the circumstance that two officers, Rassun Bey and Hudavertz Effendi, are visiting Germany by the Sultan's orders, in order to purchase machinery for an Imperial Turkish Cloth Factory. Apart from India, Turkey is the largest purchaser of British cotton goods.

THE STUDY OF COSTUME.

It is sometimes a matter of wonder, both in this and the other countries of Europe, how France has succeeded in ruling the world of fashion for such a long period, and how she has been enabled to repulse every attack upon her supremacy in that field, come from whatever quarter it might. The allegation that the French, as a people, are gifted with such a superfine taste as to almost intuitively direct them to the best sources for the materials and design, and so to dispose of these as to bring out of them better results than other people can, we do not for a moment believe. In our opinion the origin of their excellence is entirely different. It lies in that foundation of all genius: a capacity for working hard and taking infinite pains with the matter they have in hand, which in this respect is congenial to the national taste. This is preëminently so in matters pertaining to the dress of both sexes, but especially to that of women. The French are assiduous students of the development of costume, and having perfected themselves in

the true principles of the art of dressing, they are enabled to explore every source of inspiration with the greatest advantage, and always with some considerable degree of reward. Thus the fields of Nature, the truest and best fountain of inspiration, are never neglected by them, and in this respect Nature is bountiful to them in the provision of blue skies, and golden corn-fields, and a wealth of flowers, the store of which is annually replenished abundantly in the sunny clime of France. But beyond this the French have another great resource, of which fashion designers or manufacturers rarely make use in this country. We refer to their great devotion to the study of the development of costume. They know well that in the comparatively unexciting lives of the ladies of past centuries, in the times when needlework, embroidery, and dress formed almost the sole resource ladies had of whiling away their time, taste in dress was highly cultivated and the finest results were obtained. Of these, many of which have been handed down to modern times in the stained-glass windows of churches and the illuminated missals of monasteries, they are the most careful students. They have a literature of this kind tenfold more extensive than ours, in which choicest specimens of the olden days are reproduced in highly artistic and beautifully printed illustrations in the colours of the originals: and out of these studies and these materials are drawn many of the results that charm the rest of the fashionable world decade after decade, and give them the palm of excellence. They naturally then receive the more tangible rewards of their achievements from the commercial success of their efforts, whilst our people and others go on wondering what are the means by which they accomplish it. Our designers cannot command it, because in the first place they have not the means, and if they had they could not appreciate them owing to lack of the culture, out of which this success is drawn. We are glad however to think that of late years there has been an increasing amount of attention given to these matters in England, and that if this be continued, as we venture to think it will, some considerable improvement will be witnessed.

THE DEVELOPMENT OF COSTUME.

As evidence of the truth of the closing remarks in the preceding note, we would point to a lecture on "The Chronology of Costume," delivered on Thursday of last week, by Mr. Philip Newman, at the rooms of the Society for the encouragement of the Fine Arts, in Conduit-street, London. The chair was taken by Mr. Edmeston, F.R.I.B.A. The lecture, which was profusely illustrated with lime-light pictures thrown on a screen, covered the period from the ninth to the beginning of the present century. Mr. Newman pointed out that the successive phases of human attire observed a law of development, and were not the fruit of blind impulses or caprice. This principle was especially manifest in the history of the cucullus or cowl, which at one time was a headdress common to all classes of society, though at a comparatively early period it became a distinctive garb of the monastic orders. The transition from chain to plate armour was vividly illustrated from the many examples of monumental brasses in our churches. In the mediæval period the extant examples of costume were almost confined to the military and ecclesiastical orders, although in the illuminated manuscripts a glimpse was now and then caught of the attire of the poorer classes. Mr. Newman amusingly drew attention to the occasional imitation in the Middle Ages, as in the 13th century, of the dress of men by the gentler sex. The wimples and gores, which were found in

the brasses of the 13th century were a feminine adaptation of the camaille of the helmets of their male relatives, and in the Elizabethan period the broad skirts, long waists, and farthingales, were doubtless suggested by the exaggerated trunk hose and doublets of the men. A cursory reference was made to the sumptuary laws, especially of the early Tudors. The effect of tragic associations on fashion was shewn in the case of Mrs. Anne Turner, who was executed for complicity with the poisoning of Sir Thomas Overbury, and appeared on the scaffold in a ruff of the approved colour. This colour thenceforth went as completely out of fashion as in our generation black satin disappeared after the execution of Mrs. Manning in a dress of that material. The lavish outlay in personal adornment was shewn in the expenditure of £25,000 on the trossieu of a lady in the early part of the last century. Pepys and Evelyn were naturally drawn upon for illustrations of the contemporary taste. It was instructive to observe the sobriety shewn both by men and women in their dress after the Plague and Fire of London, which endured into the middle of Queen Anne's reign. Still they found that Queen Mary's lace bill for 1694 was stated by Mrs. Bury Palliser to have amounted to no less than £1,918. The Hanoverian period was copiously depicted by the help of the caricaturists Gilray and Rowlandson, and the eccentricities of the French Revolutionary period were also the subject of illustration. We are confident that if our designers and others would explore the fields suggested in this and the preceding note, and supplement the paucity of materials in our own literature by resorting to the treasures contained in the French, they would find an abundant reward.

THE PROFESSIONAL TRADES-UNIONISTS AND ENGLISH TRADE.

Recent events demonstrate quite clearly that the public are getting tired of the officious meddling of the professional trades-unionists with industry and commerce. The "climbing down" done by these gentry during the past few weeks has been something marvellous, and will become much more so provided employers in every industry will simply combine as efficiently as it has been demonstrated they can do and have done in several of them. That climax of stupidity, the engineers' strike in the Tyne and Wear districts, which recently ended after impoverishing a population of over 250,000 persons, and inflicting almost irreparable injury upon a great trade, is an illustrative instance of the benefit of a compact organisation amongst employers. The firmness of the Durham coal owners, in the long and impoverishing strike at their mines, with the widespread misery and poverty radiating from it, is another. In this case, where the depression of trade amply justified the demand of employers for a reduction of wages of 5 per cent., the said reduction having to be made upon the highest point that colliers' wages have ever attained, it has been resisted at a cost far beyond that which many years of prosperous labour can recoup, especially if we include the suffering and poverty induced beyond its borders amongst those who really never were partisans on either side, but by the stoppage of supplies of coal and coke necessary for the conduct of their respective industries, were thrown upon the streets to subsist on their own resources. The absolute folly of the engineers' strike has only been paralleled by the malice towards their employers developed in this Durham affair. Not content with quarrelling with their employment, the colliers have maliciously prevented their employers, at their own great cost, from keeping the pits in a condition fit for the resumption of work when the workers were

tired of the disagreement. The outrages inflicted upon the men who were keeping the pumps going and the mines free from water were such that the work had to be suspended, with the result that many mines have been drowned, and will probably never work again. Hundreds of colliers will thus become competitors with their fellows for the diminished employment. Is such a result likely to tend to keep up wages? We should think not. Owing to the damage thus wilfully wrought, the employers now insist upon a reduction, not of five, but of 13½ per cent. in wages. We are not aware whether the decline in coal values is such as to have called for this increase in the original demand, but if not, it is certainly justified in the way of an indemnification for the wanton damage inflicted upon the property of the employers by the sheer maliciousness of the trades-unionists. This principle of indemnity for mischief wrought, whether from ignorance or malice, will have to be recognised and enforced, as a few lessons of such a kind will afford the best education that can be given upon economical questions in the realms of industry. There would be more caution displayed by both leaders and led in such a case. It is all very well, after paralysing industries such as those to which we have referred, and establishments like the Stalybridge and the Accrington Spinning Companies to go back when the game is up, recommence employment and be "as you were before you were," to use the comic phrase of the volunteer drill sergeant. This, however, is not good enough, or ought not to be, for employers whose property has been damaged or subjected to enforced idleness and loss by proceedings of this kind. Neither ought it to be good enough for the public, out of whose pockets must come the payment of the damages in the enhanced prices of the articles it purchases. A little experience in this direction will perhaps help to restrain undue admiration for the doings of the professional trades-unionists who, during the past few years have been far too much regarded as the evangelists of an industrial millennium. This gospel, as preached by them, is a fraud not only upon the public at large, but upon the working men themselves, and it will be an act of egregious folly if the public or the working classes themselves at the forthcoming Parliamentary election should return its preachers to the House of Commons, and thus provide them a more conspicuous platform from which to propound their economical and industrial crudities than any they have heretofore possessed. We gladly recognise that several of the members sent by the working men have been good selections, and have done them credit. It will not be denied, however, that other Parliamentary champions of their cause have been conspicuous and mischievous failures both in the House and out of it, and that the sooner they are relegated to their original obscurity the better it will be for everybody concerned. Amongst new aspirants of this class for the next Parliament we regret we hardly find a single one who has any claims deserving success.

GERMAN WOOLLEN MANUFACTURERS AND THE AMERICAN TARIFF.

The methods adopted by Continental manufacturers to evade the consequences of the McKinley tariff are as numerous as they are ingenious, but, as our reports of re-appraisals shew, they are not always successful. One of the most interesting evasions of the tariff is that which has for some time been adopted by some German manufacturers of woollen dress goods intended for the American market. The cloth has been imported into New York in the grey, and was intended to be dyed there in the piece before being placed upon the market.

The pieces are shrunken by boiling and other artificial means, so that the importers have been able to get them in at an average of 2½ cents per yard less than they would have been compelled to pay had the goods been shipped in their natural condition. In the dyeing and finishing process, to which they are subjected upon their arrival, the goods can be easily extended to their original width, which is increased from seven to eight inches in the operation. By this device a large portion of the duty is saved, and the importers obtain a decided advantage. The Appraisers have advanced the value of the goods about 17 per cent. since the matter was first brought under their notice. There appears to be some doubt, however, as to whether the existing law provides for cases of this kind. It is in fact a moot point whether the charge of fraud can be substantiated, for the assertion that the goods were shrunken purposely to evade the duties proceeds from interested parties. Should the General Appraisers uphold the ruling of the local appraisers, the increased valuation would apply to all past invoices, and the importers would be liable to a penalty of between \$30,000 and \$40,000, which renders the case one of decided importance. In consequence, however, of the silence of the law with respect to the specific case in point, the goods being actually imported at a width of less than 38 inches, though this is afterwards extended to 45 inches, some doubt is expressed as to the success of the Custom House officials in maintaining their point, and should they be sustained the case would, in all probability, be carried by the importers into the courts. The decisions rendered hitherto by the Appraisers have not as a rule favoured the importers, and what the result would be in the case of such an appeal is a matter open to much doubt.

CALICO-PRINTING AND THE SYNDICATE.

The proposal for reviving the moribund project for the formation of a calico printers' syndicate is not likely to result in anything. As far as we have been able to ascertain very few substantial houses are willing to sell their businesses to a company such as that which it is proposed to form. If they did it is probable that part of the purchase money would have to be taken out in shares; and this would not be a very cheering look-out, seeing that the syndicate would have to bolster up many firms whose income, to say the least of it, must necessarily be precarious. If the shares depreciated in value under such a strain, the purchase money would practically only be represented by the amount paid in cash. Under the circumstances we repeat that the likelihood of any successful combination of firms engaged in the calico-printing trade being formed appears remote. Our views on this matter were fully expressed a year or so ago, and subsequent events justified them. Syndicates, like slaves, cannot breathe in our English atmosphere. They must go to "free" America to find a congenial home, and the fact may be commended to the notice of company promoters generally. We are not sufficiently protectionist to stand the presence amongst us of monopolist syndicates, even when their object is apparently good. In the calico-printing trade there are undoubtedly abuses which call loudly for remedy, but these can be attended to by other means than the formation of a syndicate. The existing Calico Printers' Association is a body which, with the loyal support of the trade, should be able to do much to relieve it of the burdens that are now felt to be so oppressive. The progress of the syndicate promotion scheme will be watched with interest by many who, while wishing

success to any scheme calculated to benefit the trade, refuse to recognize the practicability of the project referred to.

THE CLAMOUR FOR MORE FACTORY INSPECTORS.

The professional trades-unionists continue to clamour for increased factory inspection. Notwithstanding the snubbing given to the Lancashire contingent led by Mr. James Mawdsley the other day, the pre-arranged programme drawn up for obtaining this result must be carried out. To have let it fall through would have deprived a number of these gentry of a trip to London at the expense of their constituents, who provide the money. Accordingly the Yorkshire brigade waited upon Mr. Matthews on Monday. (By the way, it seems these interviews are generally contrived for Mondays, the reason probably being that it affords the best facilities for making a nice week-end visit to the big city.) In Yorkshire there is as yet only a very indifferent organisation amongst the textile trades, so that the rôle of interviewers had of necessity to be taken up by those officious nobodies who have banded themselves together in the various towns under the misleading and false name of trades councils, which has given to their proceedings in the estimation of many unthinking people a greatly exaggerated importance. There is not a tradesman amongst the whole lot of them, and their assumption of such a name is a piece of impertinent arrogance. Both the members of these councils and their constituents, if they have any, are simply artisans and labourers, and not "tradesmen" at all. To trade is to barter, or to buy and sell; to be engaged in the exchange, purchase, or sale of goods, wares, or merchandise; to traffic, to bargain, to carry on commerce as a business. We are aware that across the Atlantic an extended meaning has been given to this word, and it has been made to include artisans and labourers. But this is like many other alterations that have originated in that country: it is a degradation of the language and confounds things essentially different. It has not, therefore, been adopted, nor is it likely to be, in this country. It was a conglomeration of pretenders of this class who waited upon Mr. Matthews on Monday to solicit the appointment of another Factory Inspector in the district under the charge of Mr. J. D. Prior, an inspector formerly connected with Manchester trades-unionism, and one owing his present position to their influence. So far as we are aware, Mr. Prior has discharged his duties in a manner satisfactory to all parties. The deputation, of course, appropriated the time and services of the local M.P.'s, of whom four attended it to the presence of Mr. Matthews. The deputation commenced by making the usual allegations of the insufficiency of the inspectorate to perform the duties, and rung the changes on this idea throughout the interview. In another column we give a brief yet instructive report of what passed, and refer our readers thereto. They will find that Mr. Matthews was fully equal to the requirements of the occasion, in rendering their ignorance of the purposes of the law and the functions of the inspectorate manifest, if not to themselves, at least to independent observers. There was, however, one suggestion he made that will require the careful examination of every employer if it be attempted to carry it into effect: namely, that the trades-unions should become volunteer guardians of the observance of the Factory Acts and prosecutors, in alleged cases of their infraction. This we regard as an indiscretion of Mr. Matthews, and a perfectly gratuitous suggestion on his part. It would have been much more pertinent to the purpose to have told them to inculcate amongst those they assumed to represent a better observance of the laws themselves, which would

relieve the country from the cost of an enlarged inspectorate, and their employers from risk of prosecution for acts committed, as we have often shewn, by the workers themselves. In fact only this is required to render the observance of these laws practically perfect. We would beg the Home Secretary to bear this point in mind when next a similar deputation approaches him.

NEWS FROM PAKHOI.

Pakhoi is a Chinese seaport, opened to foreign trade, if we remember aright, about 15 years ago. It stands on the northern shore of the Tonquin Gulf, but is not yet a flourishing centre. The imports are valued at from £800,000 to £900,000 per annum, and consist of cotton yarn and piece-goods, woollens, raw cotton, llama braid, opium, kerosene, matches, and flour. The exports are worth about £200,000, included amongst which last year were 9,344,718 lb. of indigo, valued at £61,324. Consul Scott has written a very intelligent account of the trade of the port last year. There was a decrease in the imports of cotton yarns last year of nearly 3½ million lb., valued at £114,000. Cotton piece-goods decreased in value by £12,600. Mr. Scott accounts for this state of affairs by the sudden recognition at Canton of the transit pass system inwards. It is possible that the Pakhoi inward transit trade, at present confined to kerosene oil and matches, may be extended to cotton yarn and cloth, in which case the cotton trade may be retained by the port. Probably with a view to the interests of the purely local *likin* officials, the *likin* tax on cotton yarns was reduced one half last January. The trade was then flourishing, and Mr. Scott supposes that the reduction was made owing to the knowledge that an attempt to send cotton yarn inland under transit pass was being mooted at Canton, which, it was rightly feared, would reduce the Pakhoi import, and so lessen the emoluments of the local *likin* officials. No reason for the reduction was stated except a desire to benefit the traders, which was, of course, ridiculous. This reduction will greatly reduce the advantage of forwarding cotton yarn from Pakhoi under transit pass. Of cotton piece goods there is nothing special to be said. The decrease is to be attributed to the diversion of the trade *via* Canton and the West River. There is no cause to reason that there is any falling-off in the demand in the districts supplied hitherto from Pakhoi. During the year the piece-goods trade has not been harassed, as it was in 1890, by constant changes in the amount of and mode of levying the "Ching-fei" or so-called "battery tax." Early in the year this illegal impost was, by order of the high provincial authorities at Canton, farmed out to a syndicate of merchants, who guaranteed the sum of \$6,000 yearly. The rates were left as before, but as the syndicate was composed of the piece-goods merchants themselves and the amount of the tax guaranteed was very greatly reduced, they no doubt took care that it should not interfere greatly with the trade. The tax amounted to only a little more than ¼ per cent. on the total value of the cotton and woollen piece-goods trade, woollens being also included in the levy. The grey shirting trade was principally responsible for the falling-off in cotton piece goods. Velvetens shew a slight increase.

"UNCHOPPED" COTTON PIECE-GOODS.

Mr. Scott cannot trace the importation of any unchopped cotton piece-goods into Pakhoi. If falsely marked goods do exist in the market, either with or without the knowledge of the piece-goods merchants there—all Chinese, by the way—it may be taken for granted that the fraud is carried on by firms in Hong Kong, from

whence all Pakhoi's piece-goods come. The responsibility begins in China with the importers. It would undoubtedly be rather a delicate matter for the Chamber of Commerce to deal with, but any other remedy, so far as China is concerned, such as that suggested by urging the Chinese local authorities to prosecute and punish the guilty, will never have the least effect unless each case as it arises be brought forward by foreigners and urged through the foreign consuls concerned; then no doubt the Chinese culprits, if the culprits are Chinese, would be punished. But from the representations of the Chamber, the real sufferer is the consumer far away in the interior, to whom consuls are unknown, and his own courts, if he can be said in a Western sense to have any, a mortal dread. For some reason the import of woollen piece-goods shews a very large increase both in quantity and value, the figures being 27,169 pieces valued at £50,583 for 1890, and 39,132 pieces valued at £72,499 for 1891. Long ells and the different kinds of cloth, broad, medium, and habit, shew the largest proportional increase. Nearly all woollen goods are destined for Yunnan.

BRADFORD SPINNERS AND MANUFACTURERS.

Another of the great textile trades, that of Bradford, is giving expression to its dissatisfaction with the manner in which business is conducted in the fulfilment of contracts. As in Lancashire, so in Yorkshire—all goes well as long as it suits one to sell and another to buy, and the seller to deliver and the buyer to accept the articles sold and bought. But it is different when the conditions of the market have so far changed that one or the other party to a contract conceives it would pay him better to get out of it, or to delay its execution. It is the Bradford spinners who just now are feeling deeply aggrieved at the conduct of their customers in having made purchases of yarns and refusing to receive them, or unduly delaying giving spinners the necessary particulars on which to work. "When contracts are placed," says a writer in the *Leeds Mercury*, "it is usually agreed that they are to be delivered as required, and spinners complain that when prices in the open market are below those of a contract made, the manufacturers, when pressed for particulars, reply that the goods are 'not required.' Again, when the contract prices are against the buyer, it is alleged that unjustifiable complaints are made when goods are delivered. Fault is sometimes found because they are too late, or something is said to be wrong in the quality, the colour, or the twist. Law-suits and arbitrations are the outcome of these unfair practices, both of which are risky proceedings for the spinner in a small way of business and with little capital to spare. The costs are usually heavy, and in some cases the small spinner runs great risk of finding his way into the Bankruptcy Court if the verdict is against him."

This is exactly a reduplication of complaints we not long ago placed before our readers, and discussed at length in relation to matters of a like kind in the other textile trades. Of course it would hardly be fair to assume, as might be done from this statement, that all the black sheep of the trade are in the manufacturing branch of the industry, and all the white ones in the spinning fold. We should like to hear from manufacturers what is the treatment they receive when the cases described are reversed. Do they always find that spinners are willing, ready, and anxious to deliver the yarns they have sold when the contract prices are below those current in the market? Do they never suffer loss through having to

duplicate their purchases of yarns at higher rates in order to fulfil their obligations to merchants? Is loss never inflicted upon them by the delays caused by the non-delivery of yarns by spinners, nor by the substitution of other yarns for those they cannot get, and on which their contract has been based? We fear another complexion would be put upon the matter by the answers that would be given to these queries. Whether a man becomes a spinner or manufacturer makes little difference; he is still "a man, for a' that." We are afraid that neither pursuit has the power to transform him into an angel; at least we have not met many of such transformations yet, and would willingly journey into Yorkshire to find them could we have a convincing assurance that specimens are fairly numerous there. But, banter apart, the complaints that are being made are clearly well grounded, and could, as we have hinted, be duplicated from the other side. We know such complaints are frequent and numerous enough in other sections of the textile trades, and their general prevalence is a convincing demonstration that there is something needing reform in the commercial side of these great pursuits. The question for consideration is—What is to be done, and who shall do it? Such recurring grumbling as this will never do any good, and many things proposed to be done under the influence of the irritable feelings engendered are either impracticable or would produce a condition of things worse than those they were intended to remedy. What should be done we will briefly discuss.

We may first glance for a moment at what is being proposed in this instance. "In face of these facts," says the writer to whom we have already referred, "and believing that in many instances their position is used to their disadvantage, a certain section of spinners have suggested the formation of a society, the objects of which shall be to expose manufacturers disposed to indulge in unfair practices, and for the purpose of forming a fund which shall be used for the vindication of the rights of spinners." It must be obvious to any man having the slightest acquaintance with the facts of the case, or the principles of organisation, that such an association would be inevitably doomed to failure, as the basis of association is much too narrow, and would quite fail to attract members in sufficient numbers to make it a strong one. Its influence could easily be neutralised by the formation of a society of a similar kind amongst those against whom its force would be directed, and thus matters would be no better, the only result being that the number of the disputants would be increased. No wonder that this proposition has not been received with any unanimity of sentiment. It has apparently been favourably received only amongst the small and financially weak section of the trade—those who are either unable or unwilling to defend themselves from aggression. These people believe the truth asserted in the old adage that "in unity there is strength," but their views are not sufficiently comprehensive. They should seek to make their union as wide and all-embracing as possible, because every adherent thereto would diminish the strength of the opposing element and increase their own.

What is required is to make an effective and powerful union, to combine within its circle not only weak spinners but strong ones also; and not only spinners, but manufacturers as well. To attract these, such a union will not only have to combine with the object of making certain unfairly-minded persons deal uprightly, but it will have to associate for the defence of every legitimate interest of the trade. All sections of the trade could agree upon such a programme, which would include the fair dealing of spinners with manufacturers and manufacturers with

spinners;—also the defence of their common interests against the aggressions of the semi-socialistic modern trades-unionists. One of its great functions would be to bring the strength of the united trade to bear against the attacks made upon employers' interests through the Legislature by the so-called Labour leaders, whose views are ignorantly pandered to by both professional and amateur politicians and legislators. And above all it would require to keep a careful watch upon the hostile attitudes assumed towards our commerce and industry by our foreign competitors acting through their respective Governments. These, with other matters that could be enumerated did space permit, would form planks in an attractive platform that would draw all sections of the trade together, and at least every enlightened individual in each into the circle of the union, by which an aggregate of strength would be attained that would, if judiciously used, achieve great results in enhancing the interests of the trade.

Having thus got an instrument capable of being used with effect in every direction, its power could be easily used to regulate the principles upon which the commerce of its members was carried on. Unquestionably commercial contracts urgently require revision, to prevent such disputes as we have referred to, and the losses that accrue to individuals whenever they are carried into courts of law for legal arbitration. It is an incontestable fact that winners in law-suits come off very badly, and that the course of procedure is much more designed for enabling lawyers to take the wool off the backs of both plaintiffs and defendants than for administering justice. In connection with such an organisation as we have very roughly sketched there ought to be a commercial council, composed of representatives of spinners, manufacturers, and merchants, whose first duty it should be to revise, in a very careful manner, the present methods of doing business, and to clearly define and embody them in a formal contract, or, perhaps better, in a code of rules which should render the settlement of disputes easy on and by reference to them. These should say when a spinner should be entitled to enforce the fulfilment of a contract by a buyer, and when the latter should be entitled to demand it from a spinner; and in the event of refusal in either case, should have the power to award damages, and a slight penalty for breach of contract. The same should apply also to merchants. Any aggrieved party should be entitled to claim the intervention of the Council, which should then, as early as possible, make its enquiry and give its award. Non-compliance with this, unless for very special and satisfactory reasons, should involve a suspension of the privileges of the defaulter in connection with the association; and wilful persistence therein, expulsion from membership and prosecution by the Association for the recovery of the award. Thus the whole force of the trade would be brought to bear against a wrong-doer, and in favour of upright dealing. It would be only in the rarest cases that an individual would resist such pressure as we have indicated and compel the Association to go to the law courts to enforce redress. This is the sort of union and this the sort of tribunal that is wanted in every branch of the textile industries. Until they are formed and got into thorough working order, great as these industries are they will never be able to defend themselves as ably and as efficiently as they would be capable of doing with them.

THE weaving firm of Johann Herych and Son, at Wildenschwert, in Bohemia, are enlarging their premises by a building which will provide accommodation for 200 looms.

Reviews of Books.

THE FACTORY AND WORKSHOPS ACTS, 1878 to 1891. BY ALEXANDER REDGRAVE, C.B., late Chief Inspector of Factories, etc., and JASPER A. REDGRAVE, one of H.M. Inspectors of Factories. Fourth edition. Containing all the exceptions granted by the Secretary of State. Price, 6s. London: Shaw and Sons.

This hand-book of factory legislation ought to be in the possession of the principal of every establishment subject to the special legislation which is gathered within its covers. If spinners, manufacturers, and others would carefully peruse it several times, and then have it handy for particular reference when wanted, it is very probable that less would be heard of prosecutions for inadvertent infractions of the provisions of the various Acts. This edition contains the consolidated Factories and Workshops Act, 1878; the Factories and Workshops Act, 1883; the Factories and Workshops Act, 1891; and the Cotton Cloth Factories (Steaming) Act, 1889. Also there are given such portions of the Truck, Elementary Education, Public Health, Protection of Children, and Shop Hours Regulation Acts, as come within the supervision of the inspectorate. It will thus be seen that the book embraces everything that can be regarded as necessary to become thoroughly acquainted with these various enactments. It will be seen, too, from a study of this mass of legislation how unjust in its incidence much of it has become, owing to the changed conditions under which the textile industries especially are now conducted. A thorough comprehension of this phase of the matter by the trade would be a great step towards effecting the repeal of the obnoxious and unjust clauses and provisions from which they suffer, as when once fully comprehended, no body of intelligent, self-respecting men could rest under such tyranny. In order to contribute to the attainment of this end, we shall be pleased to forward the volume post free to our readers all over the country, and beyond, if desired, on receipt of the published price. It is highly necessary that principals should also place the work in the hands of their managers.

Bleaching, Dyeing, Printing, etc.

NEW PATENTS RELATING TO DYES.

New colouring matters derived from coal-tar compounds still keep being discovered, and the first intimation that is given of them is in the form of a patent specification, so that the discoverer or his employers may have the monopoly of its manufacture for some years to come. Several such specifications now lie before us. Their contents naturally vary very much; sometimes they are very short, and contain matter of general interest to dyers and textile colourists; at other times they are very long, and filled with long and abstruse chemical names and formulae only understandable by a good chemist. Of the latter kind it is almost impossible to make anything like a popular summary. The patentees always err on the side of saying as little as they possibly can about their new products.

One very short patent deals with the use of anthrachryson for the production of colouring matters. This body is a tetraoxanthraquinone, and has the formula $(OH)_2 C_6 H_2 (CO)_2 C_6 H_2 (OH)_2$. Hitherto it has not found any application in the tinctorial arts, for it does not possess any dyeing properties; but the Farbwerke have found out that by treating it with fuming sulphuric acid under certain conditions it is converted into a dye-stuff dyeing chrome-mordanted fibres a fine and fast blue. Of the nature of the new dye-stuff they say nothing, but the probability is that it is not dissimilar to a product of the Farbenfabriken—alizarine cyanine, which is produced in a similar manner from an anthraquinone derivative, and which is a pentaoxanthraquinone. When the new

dye-stuff gets on the market we shall perhaps know more about it.

Following this patent of the Farbwerke it may be appropriate to notice a patent of the Farbenfabriken, which also deals with the production of anthraquinone derivatives. They take oxychrysin, which is a trioxanthraquinone, and by treatment with sulphuric acid and manganese convert it into a tetraoxanthraquinone, which dyes chrome-mordanted wool Bordeaux red shades, somewhat resembling those obtained from the dye-stuff known as alizarine Bordeaux—with which it is probably identical. By taking alizarine Bordeaux and treating it with sulphuric acid and manganese it is converted into what is called alizarine cyanine I, a pentaanthraquinone, while further action results in the formation of alizarine cyanine II, a hexaanthraquinone. This dyes chrome-mordanted wool a greener shade of blue than does the cyanine I. A number of other mordant dye-stuffs are also described in the same patent, but the technical description is of too vague a character to admit of useful abstraction.

The dye-stuff called Nile blue has been favourably known among dyers as a fine and fairly fast basic blue, which is used with some success in dyeing cotton. This is prepared by taking a compound known as nitroso-diethyl-amidophenol, and combining it with *alpha*-naphthylamine. The makers of Nile blue now patent the production of another and similar dye-stuff dyeing greener shades of blue, by using what is called benzyl-*alpha*-naphthylamine. The dye-stuff seems to be easily made: it is known commercially as Nile blue BB.

In 1885 Messrs. Cassella and Co. patented the production of their naphthol black, a dye-stuff which since then has been used in large quantities by wool and silk dyers for the production of blacks of a very fine character. Naphthol black was one of the earliest members of a group of dye-stuffs characterised by having two azo groups in their composition. In the case of naphthol black one special feature was the presence of *alpha*-naphthylamine as a central component. A new patent describes the preparation of a black dye-stuff in which this central naphthylamine is replaced by monosulphonic acid of *alpha*-naphthylamine. Although nothing particularly definite is said about the properties of the new dye-stuff, still it may be judged that it would be rather more soluble than naphthol black and perhaps will dye more easily.

A patent taken out by the Farbwerke describes the production of new blue dye-stuffs on the lines of their well-known patent blue, which are said to excel all hitherto known blues in the direction of being fast to light, acids, and washing—the three characteristics which a first-class dye must possess. Whether the dyes fulfil all that their makers say they do time only will tell, when they have been put on the market and have been practically tried by dyers. The patent blues are of a most complex composition, and their chemical names are enough to frighten any ordinary reader, so we refrain from giving them.

In a patent taken out by Messrs. Brooke, Simpson, and Spiller, we find described a new scarlet dye-stuff, capable of dyeing cotton without a mordant, and which is said to resist the action of weak acids. This is prepared from a new colour base, azoxy-ortho-toluidine, the preparation of which is described in the same patent. This base is diazotised in the usual way, and then combined with sodium naphthol sulphonate. We have not yet come across this new dye-stuff as a commercial product, which is rather surprising, as a scarlet dye of the properties of the one under notice would meet with a good sale among dyers.

BLUE dye-stuffs capable of dyeing wool from acid baths blue shades, (which have the merit of being easy to discharge, so that woollen fabrics dyed with these new products can be subsequently printed with a discharge colour, and so white or even coloured designs on a blue ground are obtained) can be produced by combining diazodiphenylamine with certain naphthol acids.

EPOCHS IN DYEING.

With the steady progress which has been made and the many developments which have taken place in the coal-tar colour industry, there have naturally been important changes in that branch of industry which concerns itself with the application of colour to textile fabrics—namely, the great dyeing industry. What changes have taken place in the methods of dyeing since the introduction of Perkin's mauve and Hofmann's magenta! Before then it was largely a system of rule-of-thumb, and while there is still some of this old system yet left, the modern dyer works on a more scientific basis. Part of this change is no doubt due to the fact that the dyer now works with compounds of whose composition definite knowledge exists—which was certainly not the case with the old-fashioned colouring matters of natural origin.

In 1856 appeared Perkin's mauve, the introduction of which unquestionably marked an epoch in the history of dyeing, for with its appearance began to be made those changes in methods which have made dyeing a simpler trade than it used to be. Following close on this came the introduction of magenta, first placed on the English market by Messrs. Simpson, Maule, and Nicholson, the predecessors of the present firm of Messrs. Brooke, Simpson, and Spiller; although a dyer at Coventry, named Hands, first took up its manufacture. The next epoch in the history of dyeing was marked when Perkin in this country, and Graebe and Lieberman on the Continent, first made alizarine on the manufacturing scale. The changes which this substance has made in Turkey-red dyeing, wool dyeing, and calico-printing have been great. Then a few years later came the introduction by Witt and Griess of the azo oranges and scarlets, which have caused quite a revolution in the methods of dyeing wool. Finally, the introduction of Congo red in 1885 again marked an epoch in the history of dyeing, especially of cotton dyeing, for following it there has come in rapid succession a class of dye-stuffs having the property of dyeing unmordanted cotton—a property shared by no other class of coal-tar colours, and only by safflower, annatto, and turmeric among natural dye-stuffs, and by these but to a limited extent, nowhere near approaching the powers of the new class of coal-tar colours.

A few years before this Messrs. Read Holliday and Sons developed a process for the production of insoluble azo colours directly on the fibre. Unfortunately dyers have not devoted as much attention to this method of dyeing as its merits deserve, but there is a probability that in the future it will be of great service to dyers, owing to the greater prominence which it has been given by the introduction of Primuline in 1888 by Messrs. Brooke, Simpson, and Spiller; for this dye-stuff was not only able to dye cotton directly without a mordant, but by first passing through a diazotising bath of sodium nitrite and then into a bath of some developer, new and fairly fast colours were developed on the fibre, the particular colour depending upon the kind of developer used. Thus, with *beta*-naphthol a bright red was obtained, while with *alpha*-naphthol a maroon was the result; with resorcin an orange; with phenol a deep yellow; and with naphthylamine ether a blue can be obtained. Unfortunately these colours are not perfectly fast, although they are dyed on a large scale in many works, and for certain classes of fabrics they possess certain advantages over some of the direct reds.

The introduction of the coal-tar colours has given an impetus to the printing of woollen and silk fabrics. Although these operations were carried out before on a limited scale, yet the wool and silk printer found himself beset with difficulties when he used the old-fashioned natural dye-stuffs in his trade. The application of the coal-tar colours to this particular branch of textile colouring presents very few difficulties, and these are readily overcome; hence it is not wonderful to find that silk and wool printing are now coming to the front.

RECIPES FOR DYERS.

The following are mostly translations from foreign sources. We do not guarantee the results from these recipes, but give them for the purpose of shewing our readers what their foreign competitors are doing:—

DARK BRONZE ON LINEN.

For 100 lb. linen. Prepare a dye-bath with
15 lb. fustic extract,
7½ lb. cutch,
10 lb. sumac,
1¼ lb. bluestone.

Work in this for one hour, at 150° F., then in a fresh bath treat with

1½ lb. bichromate of soda
for 10 minutes at 160° F. After rinsing re-enter into the original bath; then pass into a fresh bath of

2½ lb. iron sulphate,
for ½ hour, after which the goods are treated to a warm bath of

½ lb. alum,
2 oz. auramine,
¼ oz. Bismarck brown,

for ½ hour. Lift, wash, and dry.

DARK BLUE ON WOOL.

For 100 lb. wool. Dye in a bath for one hour, at the boil, with

3 lb. sulphon azurine,
1 lb. benzo-azurine,
10 lb. Glauber's salt.

RED ON HALF-WOOL.

For 100 lb. goods. Prepare a dye-bath with

2½ lb. soda,
2½ lb. Glauber's salt,
2½ lb. benzopurpurine 4B,

enter the goods at the boil, and work for one hour.

CHOCOLATE BROWN ON HALF-WOOL.

For 100 lb. goods. Prepare a dye-bath with

5 lb. salt,
5 lb. Glauber's salt,
2½ lb. benzo orange,
½ lb. benzoazurine 3 G

½ lb. sulphon azurine,
working at the boil for one hour; lift, wash and dry.

PALE TOBACCO-BROWN ON SCHAFFE SILK.

For 100 lb. silk. Prepare a soap bath broken with sulphuric acid, and add

1 oz. induline NN,
5 oz. new yellow,
¼ oz. orchid extract

Work at the boil till the bath is exhausted.

PALE BORDEAUX ON SILK.

For 10 lb. silk. Dye the silk in an acid bath, with ¼ lb. gold orange; then dye in a broken soap bath with ¼ lb. No. 2 magenta B.

SEA GREEN ON SCHAFFE SILK.

Dye in a water bath at 180° F. with

1 per cent sulphuric acid,
¼ " light green S,
¾ " quinoline yellow,
¾ " safranine,

to shade. Lift, wash, and dry.

BLUSH-GREY ON RAMIE YARN.

For 100 lb. ramie, mordant the yarn by first passing into a bath of

1 gallon Turkey red oil,
9 gallons water.

Dry, then steep for 6 hours in a bath of

10 lb. chrome chloride.

Then wash well, and dye in a fresh bath of

1½ lb. alizarine indigo blue SN,
1½ lb. alizarine green.

Enter the goods in the cold, work ½ hour, raise slowly to the boil, and work for 1½ hours longer. Lift, wash, and dry.

PALE NAVY-BLUE ON SILK.

Dye a bottom with 4–6% silk blue B on a boiling soap bath; then in a fresh acidulated bath dye with light green and methyl violet to shade.

GOLD ORANGE ON WOOL.

For 100 lb. wool. Mordant by boiling for one hour in a bath made with

3 lb. bichromate of potash,
2½ lb. tartar.

Lift, rinse, and dye in a bath of

10 lb. Glauber's salt,
2½ lb. anthracene yellow C,
2½ oz. diamine fast red F.

Enter the wool at 140° F., then, after working for ½ hour, raise to the boil, and continue working for 1½ hours. Lift, wash, and dry.

PRUNE ON TUSSAH SILK.

Prepare a bath with 5% archil red, $\frac{1}{4}$ % fast red, $\frac{1}{4}$ % citronine, and a little sulphuric acid. Work at the boil to shade. Lift, wash, and dry.

NAVY-BLUE ON WOOLLEN CLOTH.

For 100 lb. cloth. Prepare a mordanting bath with

4 lb. bichromate of potash,
2 lb. tartar,
 $\frac{1}{2}$ lb. sulphuric acid,

working at the boil for $1\frac{1}{2}$ hours; rinse, and enter into a new bath made with

8 lb. alizarine cyanine R,
6 lb. alizarine cyanine CG,
2 lb. acetate of ammonia.

Enter at about 100° F., work for $\frac{1}{2}$ hour, then heat slowly to the boil, and work for $1\frac{1}{2}$ hours. Lift, rinse, and dry.

WARM BROWN ON WOOLLEN CLOTH.

For 100 lb. cloth. Mordant by boiling for $1\frac{1}{2}$ hours in a bath of

4 lb. bichromate of potash,
2 lb. tartar,
 $\frac{1}{2}$ lb. sulphuric acid.

Wash; then enter into a dye-bath made with
7 lb. anthracene brown N,
8 lb. fustic extract,
2 lb. acetic acid,

working in the manner usual with alizarine dye-stuffs.

BROWN DRAB ON COTTON.

For 100 lb. cotton. Prepare a bath with

$\frac{1}{4}$ lb. cotton brown N,
 $\frac{3}{4}$ oz. diamine yellow N,
 $\frac{3}{4}$ oz. diamine black BO,
15 lb. phosphate of soda,
3 lb. soap

Work at the boil for one hour.

MEDIUM GREY ON JUTE.

For 100 lb. Steep over night in a bath made with 3 lb. tannin; wash, and enter into a cold bath of 3 lb. copperas; work $\frac{1}{2}$ hour, then add $1\frac{1}{2}$ lb. nitrate of iron; work $\frac{1}{2}$ hour, then lift, wash, and dry.

DARK GREY ON LINEN.

For 100 lb. goods. Boil for one hour in a bath of

12 lb. Glauber's salt,
3 lb. soap,
1 lb. diamine black RO,
2 oz. diamine fast red F,
2 oz. titan yellow.

Wash and dry.

REDDISH-BROWN ON JUTE.

For 100 lb. goods. Prepare a bath with

15 lb. salt,
3 lb. benzo brown G,
1 lb. titan yellow Y.

Boil for one hour; then wash and dry.

PALE BLUE ON COTTON.

For 100 lb. cotton goods. Prepare a bath with

10 lb. salt,
3 lb. soda,
3 oz. diamine blue 3 B.

Work for one hour at the boil; then lift, wash, and dry.

BLUE ON LINEN.

For 100 lb. linen goods. The dye-bath is made with

15 lb. salt,
5 lb. soda,
 $1\frac{1}{2}$ lb. diamine blue 2 B,
2 lb. diamine blue EX.

Dye at the boil for one hour; then wash and dry.

DYERS AND PROOFERS.

Mr. C. A. Fawsitt, in the course of a paper on "Dry Heat Vulcanizer," read before the Glasgow Section of the Society of Chemical Industry, said that the co-relation of different dyes and pigments with rubber proofing was little understood as yet. He further said that the operations of the dyer and the proofer should be brought more into partnership, instead of standing quite distinct as at present. It is to this latter statement that we are about to refer, and we think that an apology for doing so is hardly needed, considering the great interests which are involved in the waterproof garment manufacture of to-day. It should be known that the processes under which the various manufacturers conduct their business are more or less in the nature of trade secrets, and therefore the fewer there are "in the know" the better for the preservation of the secret. On this head objection may be felt by the waterproof manufacturer to admitting

the dyer to his council, always supposing that the latter had not enough to do in his own business without going into the mysteries of the waterproof or other kindred trades. We think it would be more to the point for the waterproofer to give instructions to the dyer as to the dye he should use. Of course here it may be urged that the dyer also has trade secrets, but the proofer would only stipulate for certain conditions to be fulfilled, and there is no doubt that this is being done more and more at the present day. To take the case of those two great enemies to rubber proofing, grease and oxide of copper, the dyers are now fully aware that these must be absent or practically so from goods intended for proofing purposes. Formerly this was not so, and there can be no doubt that the numerous cases of decayed proofings which occurred some ten or fifteen years ago were caused by the high percentages of grease to be then found in the cloths. Whether the effect of oxide of copper in small quantities as has been stated may be open to question, but as it is certain that this body in any quantity quickly determines the destruction of the rubber, it is better to be on the safe side and demand its absence. We grant that the amount of knowledge which the proofer has as to the good or bad effect of the larger portion of the dyes and mordants on rubber proofing is not at all complete, and much room still remains for research. Beyond the two agents already mentioned, there is little more to condemn with absolute certainty. An attempt has been made by an eminent chemist to shew that oxide of chromium is highly injurious to rubber, but we cannot acquiesce in this statement. Regarding the evidence on which these statements depend, they are most generally found to proceed from experiments made in favour of one side or the other in a legal action. Litigation not unfrequently arises between the proofer and the dyer as to who is to blame when a claim is put in by a customer for proofing that has "gone wrong." The proofer says that the injurious action of the dye has caused the mischief, and the dyer retorts that the proof is a bad one and the cause of its own decay. The case goes before a jury, who are bewildered by the opposing statements of analysts, who, however eminent they may be in the matter of food and drugs, have but a superficial knowledge of the rubber manufacture. One chemist, finding oxide of copper present to the extent of '01 per cent. in the cloth, claims victory for the proofer, while the other, finding possibly something in the proof which he considers to be injurious, claims for the dyer. Such cases as these, requiring an intimate knowledge of the manufacture, combined with considerable analytical skill, should surely be submitted to experts, and the arbitration system of settling such disputes should need no recommendation. So little is really understood as to the chemistry of rubber itself that it is quite possible that oxidation occurs more rapidly in one season's growth than in that of another. Several cases of decay have come under our own notice where no other explanation could be offered. We do not intend to pursue the subject of the decay of rubber further in this place, and merely mention the above to shew that there are many problems in the technology of water-proofing still to be solved. As to the best method of doing this, we are not prepared to adopt Mr. Fawsitt's suggestion of calling in the practical dyer to advise, nor yet to take the figures or statements made in courts of law by the chemist for the winning side as necessarily reliable. Rather let the proofer work out these problems himself, of course with the best scientific aid he can afford, and then by giving the dyer instructions to work as regards the dyes and mordants which are or are not allowable, we may expect much good to result. Certainly the avoidance in the witness box of the undifying spectacle of opposing experts, with more or less qualification for the title, would be one result to be looked for in an improved state of affairs.

A NEW DYE-STUFF DYEING WOOL FROM ACID BATHS

a pure flaming red colour is prepared from nitrosophthol sulphonic acid by heating with aniline and aniline hydrochlorate, sulphonating the product so obtained, and then again sulphonating the product of the first sulphonation, which, of itself, is a dye-stuff dyeing fibres of a violet-red colour.

Designing.

THE ANALYSIS OF PATTERN.—XIII.

THE WEIGHTS OF CLOTHS.

(Continued from p. 327.)

A large number of fancy dress fabrics, usually included under the heading "crammed stripes," require distinct treatment under the second heading, since whether they are true crammed stripes or only those in which two distinct

materials are employed, the treatment of each material separately is much to be preferred.

The method of finding the weight of the latter class of goods—viz., those in which two distinct materials are employed—is very easy, as the following example will demonstrate:—

Warp.

12 threads	2/50's salmon worsted.
12 "	2/50's white worsted.
12 "	2/50's green "
12 "	2/50's white "
12 "	40/2 blue silk.
12 "	2/50's white worsted.
12 "	2/50's green worsted.
12 "	2/50's white "

— 96 threads in pattern.

12's reed 4's.

Weft.

Same as warp; 48 picks per inch.

Piece to be woven 48 in. wide in loom, 60 yards long:

Then, 48 threads per inch \div 96 threads in pattern = $\frac{1}{2}$ pattern per inch, or 1 pattern = 2 in.

Therefore, 48 \div 2 = 24 patterns in piece, an

$48 \times 24 \times 60 = 4$ lb 15 oz. of white worsted.

25×560

$12 \times 24 \times 60 = 1$ lb 4 oz. of salmon worsted.

25×560

$24 \times 24 \times 60 = 2$ lb. $\frac{1}{2}$ oz. of green worsted.

25×560

$17 \times 24 \times 60 = 8$ oz. of blue silk.

40×840

The weight of weft yarns will be exactly the same, minus the take-up in weaving of the warp.

The above is not a true "crammed stripe," since a true cram has more threads in one portion than in another, as instanced below:—

Warp.

40 threads	of mohair, 4 in a reed = 10 reeds.
20 "	cotton, 2 " = 10 "
12 "	mohair, 4 " = 3 "
40 "	cotton, 2 " = 20 "
12 "	mohair, 4 " = 3 "
20 "	cotton, 2 " = 10 "

— 14's reed 4's. 56 reeds in pattern.

Piece to be woven 56 in. wide:

Now it is very evident that here also the extent of pattern must first be found, and if the number of reeds occupied by the pattern be ascertained, then this, divided into the reeds across piece, will give the answer, i.e.:

$56 \times 14 = 784$ reeds across the piece, and $784 \div 56 = 14$ patterns across the piece; then 14×16 splits of mohair $\times 4$ threads in a split = 896 ends of silk, 14×40 splits of cotton $\times 2$ threads in a split = 1,120 ends of cotton.

Having the counts of mohair and cotton with the length of warp, etc., the weight of cloth may now easily be found as previously shewn.

OTHER NECESSARY CALCULATIONS.

There are many other forms in which warp and weft calculations may occur, but the following formula will probably prove all that is necessary:—

Let C = counts, W = width in loom, L = length, N = number of ends or picks per inch, and P = weight in lbs. Then $\frac{N \times W \times L}{C \times 560} = P$, or $N \times W \times L = P \times C \times 560$ for worsted, 256 for woollen, or 840 for cotton.

Now this is a complete formula; consequently, if one of the terms be missing, the sum worked out will give that term—i.e., the number which will complete the equation—so that all the following questions are here involved:

(1) To find the counts when ends or picks per inch, width, length, and weight are given—

$$\frac{N \times W \times L}{P \times 560} = \text{counts in worsted.}$$

(2) To find the length when ends or picks per inch, width, weight, and counts are given—

$$\frac{N \times W}{P \times C \times 840} = \text{length, if yarn is cotton or silk.}$$

(3) To find the width when ends per inch, length, counts, and weights are given—

$$\frac{N \times L}{P \times C \times 256} = \text{width for a given weight of woollen yarn.}$$

(4) To find the ends per inch when width length, counts, and weight are given—

$$\frac{W \times L}{P \times C \times 200} = \text{ends per inch if the counts of yarn are Galashiels system.}$$

With these formula not only should the analyst be able to work out any calculations which are likely to occur, but he should also be able to reason the matter out on reference to the particulars already given.

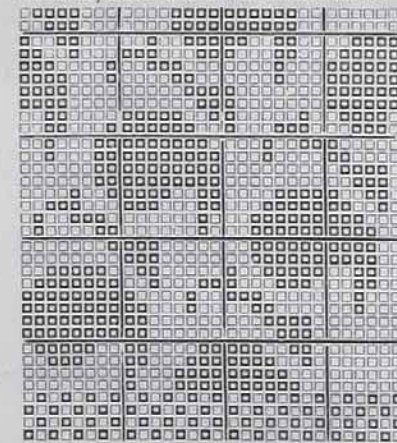
As already intimated, the above systems, although answering all requirements when dealing with cloths in the loom, require certain modifications in application to the cloth in the finished state. These modifications will be considered fully later on.

CHANGING THE WEIGHTS OF CLOTHS.

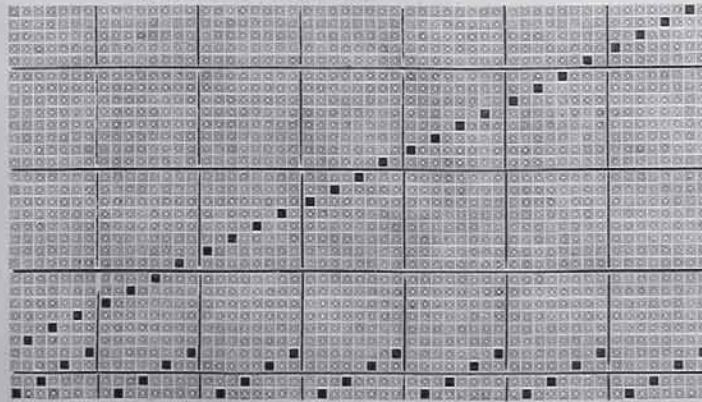
There are three ways in which the weights of cloths may be changed—viz., by change of counts; by changing the number of ends and picks per inch; or by a combination of both the foregoing. The latter method is undoubtedly the correct one, but since all three methods may be useful to the analyst for modifying cloths in weight, each shall be briefly considered.

Since counts in reality equal weight, a direct change of counts of yarn in a cloth necessarily implies a direct change of weight, inversely. For example, if a cloth woven with a 20's yarn = 1 lb. per yard, a cloth woven with a 10's yarn will weigh 2 lb. per yard, or as 20 is to 10 inversely. This is exceedingly simple, and at first sight would appear all-sufficing. Such, however, is not the case, since although it is true that the weight is changed in the right proportion, it is also true that the diameter of the yarn is increased, while no deduction from the ends per inch has been made; consequently, if the first cloth is a perfect one, the second cannot be perfect, and vice-versa.

Again, the required change in weight may be made by the ends per inch, 80 ends giving double the weight of 40 ends per inch, and so on. But the same objection must be raised to this as was raised to the counts: if one cloth is perfect the other cannot be; and so for the true method we turn to the third method, in which both counts and ends are changed, and the same perfection of structure thus retained.



DESIGN 1: PEGGING PLAN.



DESIGN 1: DRAFT.

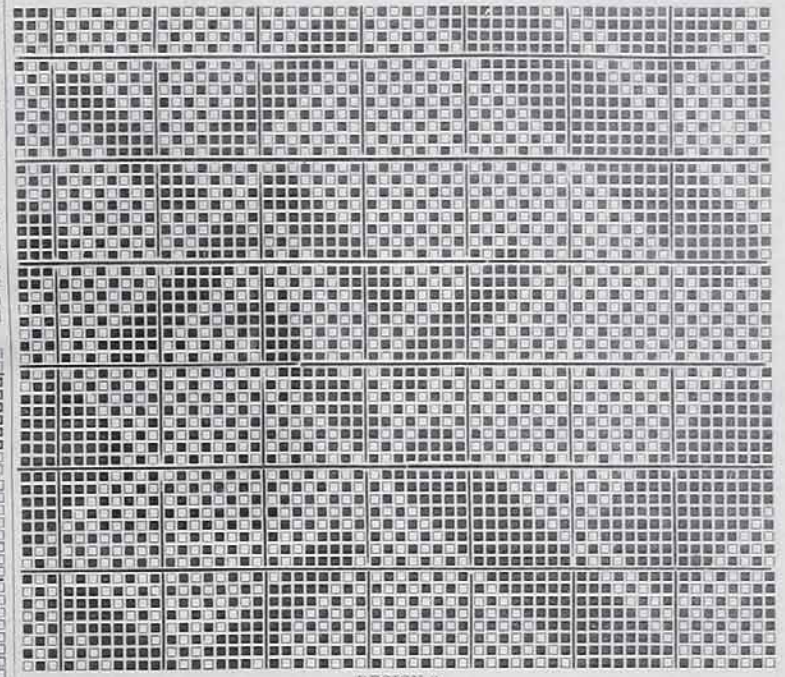
NEW DESIGNS.

COTTON SHIRTING.

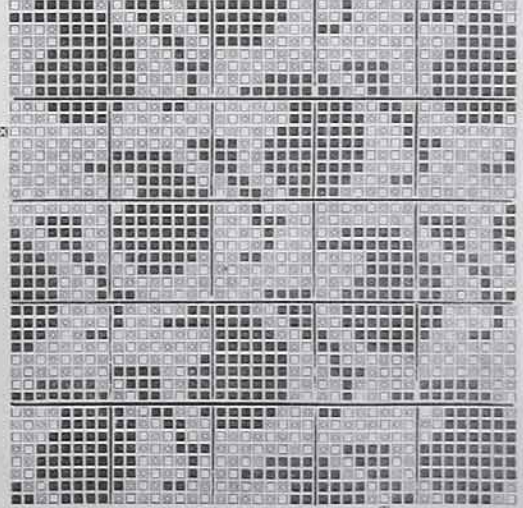
Design A is for a fancy shirting, which will require a dobby for the weave; 30 shafts for the figure, and four for a plain ground, 30 to the round; it may be worked out by 30 shafts, straight-over draft. Omitting the 4 plain shafts in this case, the pegging plan would be found within the bounds of the design as indicated by the crosses at bottom and one on the margin, 30 ends, 30 picks; the dots must be developed by the weft. Warp, 20's cotton, 30 dents per inch, two in a dent, 60 picks, 16's weft for one quality. For a fine cloth for ladies' wear, 40 dents per inch, two in a dent, 30's twist, 80 picks per inch of 30's weft, woven all grey and well bleached, or piece-dyed in fancy colours; if the warp is all bleached white, cream, or faint primrose ground, a most desirable effect could be produced by the use of dark dahlia weft, which would make the figure very prominent. We give a number of weft shades suit-

able for the warp grounds alluded to: dark Humboldt, red brown, dark Gobelin's blue, terra-cotta, dark heliotrope, dark golden brown, peacock blue, dark stone drab, dark apricot, dark olive, dark lead, and dark slate; any of these shades in the weft will give beautiful results. The warp ground can also be extended in various tints to suit these wefts, as in light, dark, or mid cream, very light lilac, gold, very light blue greens, pinks, dove, silver grey, very light lavender, yellow drab, light buff, and shrimp. The greatest range possible may be obtained also by light-tinted wefts and dark warp grounds.

Design B is merely a suggestion for a fancy shirting cloth on a plain ground. Carrying out the design to the full extent it will be found to occupy a great number of ends and picks, and would require a Jacquard harness. The idea may be developed for cotton zephyr dress goods, and would require a warp 40's twist, 45 dents per inch, two in a dent; 90 picks per inch of 40's weft, and same colours used as are given for Design A; or woven grey and bleached, or piece-dyed, with good finish.



DESIGN 2.



DESIGN 1: SHIRTINGS.

Machinery and Appliances.

IMPROVED SINGLE DRUM HANK- WINDING MACHINE.

MAKER: MR. JOSEPH STUBBS, MILL-STREET
WORKS, MANCHESTER.

The battle of the winding machines gives no sign of drawing to a close. As in that between rival makes of other machines, the struggle is for the victor's crown—the highest approval of the trade, indicative of the attainment of perfection. On the surface the process of winding yarns from cops, bobbins, or hanks, to other bobbins, or *vice versa*, is so exceedingly simple that one wonders however makers and inventors find openings in the construction of winding machines through which to expend such an undoubted amount of ingenuity as they manage to do. Yet when the matter is looked at with the eye of an expert who is familiar with the varied requirements of the different processes of winding it becomes obvious that it is far from being the simple thing that at the first blush it seems to be. Especially is this the case when simple thread winding is left, and the threads are doubled, tripled, quadrupled, or multiplied by other figures, while at the same time they are required to be wound evenly in length, tension, and parallelism of arrangement. Hence it is that we are frequently being called upon to chronicle some improvement or other in the details of the numerous machines made for these varied purposes in winding.

We have much pleasure in bringing before our readers two views of a new hank winding machine, which embodies a number of improvements in details, and is just now being placed upon the market by the firm named above, whose world-wide reputation for the production of the best and highest class of such machines obviates the necessity of any commendation from our pen.

The machine, of which we offer two illustrations—one fitted for winding from a creel with adjustable barrels, and the other from rices—is mainly used for winding bleached or coloured yarns, though of course it is equally serviceable for winding any yarn from the hank. The first improvement we notice is in the bobbin cradles, which are mounted on brackets attached to a rail placed within and extending the length of the machine frame. Each cradle is fitted with a new setting-on handle, by means of which the attendant can bring the bobbin very gradually in contact with the driving drum, instead of its being allowed to tumble against it, as is the case in most machines. The jerking start thus made with the last-named method, as is well known, very frequently breaks the threads again, especially when tender and fine yarns are being wound. By the improvement described these breakages may be quite avoided. Another improvement is the introduction of an adjustable weight, which is carried upon a lever attached to and projecting backwards from the bobbin cradle. This is a novel application, so far as this type of machine is concerned, and by its means the pressure of the bobbin upon the drum can be made heavy or light as may be desired. The machine has also been furnished with a bobbin box mounted upon the top of the frame, as seen in the illustrations. An improvement has also been effected in the gearing through which the traverse motion is actuated, which renders the driving of the traverse very simple and noiseless. This consists of the introduction of a pair of helical wheels instead of the bevels ordinarily employed for transmitting power from the drum shaft to the short horizontal shaft carrying the heart cams. The connection

between the vertical and horizontal shaft is effected by a worm upon the bottom of the former, which gears into a worm wheel on the latter. This driving arrangement obviates all the noise and back-lash incident to the ordinary method. The traverse lever is made adjustable in length so as to easily yield any length of traverse as required. An improved strap fork and starting arrangement has also been introduced. This consists of a handle carrying a small pinion which is attached to the base of the fork. The latter is mounted upon a stud in such a manner as to slide backward and forward. The under part of this stud forms a rack into which the pinion gears, and thus by means of the handle the fork is traversed with ease from one pulley to the other as required. Its great merit is its adaptability to any width of pulley, and the facility with which it can be made to govern the length of the traverse of the strap. The rice creel has also been improved and re-arranged. As will be seen, it is now made of iron, and the rices are mounted upon a round shaft extending the length of the frame instead of being dependent from the upper parallel rail as before. This ensures easier adjustment whenever such may be needed. The adjustable barrel creel is also made in an improved manner. The top barrel is fixed, the

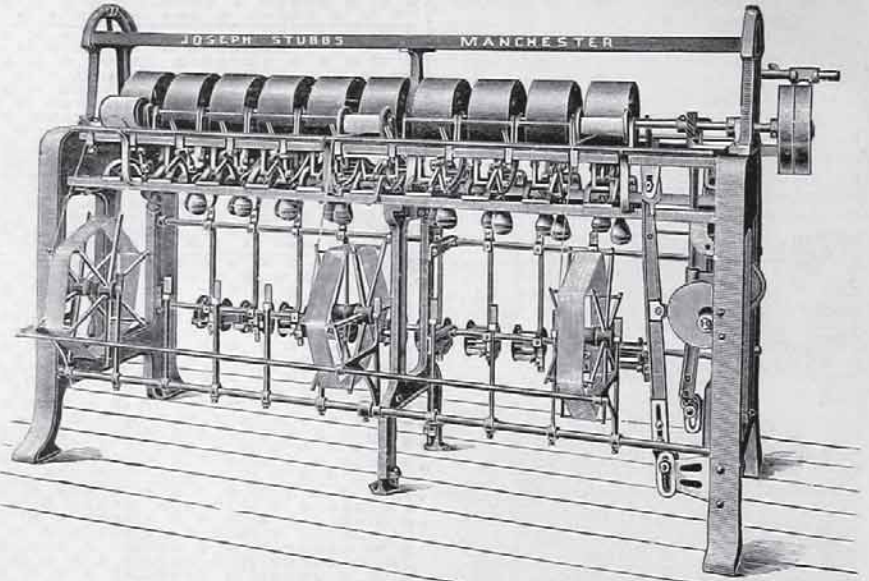
YEW MILL COMPANY, HEYWOOD.

CHRISTENING THE ENGINES.

The ceremony of christening the steam engines at the Yew Mill Company, Heywood, was performed on Saturday afternoon amid considerable manifestations of rejoicing. The engines (described below) are of very handsome appearance, and gave satisfaction to the large number of ladies and gentlemen who were present. These included, amongst others, Messrs. Alderman Lord (chairman of the company), Alderman Isherwood, J. Heywood (manager New York Mill Company), J. A. Stott (Messrs. Stott and Sons, architects), C. V. Haworth, J. McQueen (Messrs. Heiberlington, Manchester), W. W. Wilson (Messrs. Wilson and Topham, Liversedge), W. Wilson (chairman Parkside Spinning Company), J. Franklin, H. Wilde, J. T. Turner, R. Halstead (Messrs. R. Collinge and Sons, Glodwick Mills), and K. M. Sixsmith; also Mr. Byron F. Card and Mr. Mullineaux, mill agent and selling agent respectively of the Roach and Howland Mills, New Bedford, U.S.A., and Mr. Grant, of Fitchbury, Mass., U.S.A., chairman of the Green and Daniels Manufacturing Company, Pawtucket, R.I., U.S.A.

After a few words of introduction, Miss Polly Lord (daughter of Mr. Alderman Lord), in a neat speech, christened one of the engines "Polly;" and Miss Lizzie Hargreaves (daughter of Mr. J. S. Hargreaves, Hooley Bridge, Heywood), named the twin engine "Lizzie." The engines were then allowed to run for about an hour, while the company inspected the mill and machinery, a portion of which was in operation.

Messrs. Stott and Sons, of Manchester and Oldham, are the architects of the mill, and Messrs. E. Taylor and Co., of Littleborough, the builders. The main building



IMPROVED WINDING MACHINE, SHEWING RICE CREEL.—MR. JOSEPH STUBBS, MANCHESTER.

bottom barrel being carried on a centre, and is adjustable for various sizes of hanks.

It will be obvious from the above description that the sum of the improvements is a very considerable one, and that the new machine, which is constructed entirely from new patterns, well deserves the attention of all interested parties. We have not said anything of the quality of the material and the excellence of the workmanship, as to do so would be perfectly superfluous, the machines issued from the firm's establishment having a reputation in this respect that it would be idle for the most querulous person to attempt to gainsay. Mr. Stubbs will be pleased to shew the machine at work to any intending purchaser, and to afford any other information required upon application as above.

EXHIBITION OF COTTON.—The United States, through the Department of Agriculture, will make an exhibit of cotton at the World's Columbian Exposition, and Mr. Alfred B. Shepperson, of New York (author of "Cotton Facts") has been appointed Special Agent to collect everything needed and prepare the exhibit. Every kind of cotton grown in this and other countries will be displayed. Mr. Shepperson is widely known as a close observer and well informed upon cotton cultivation in the United States and foreign countries.

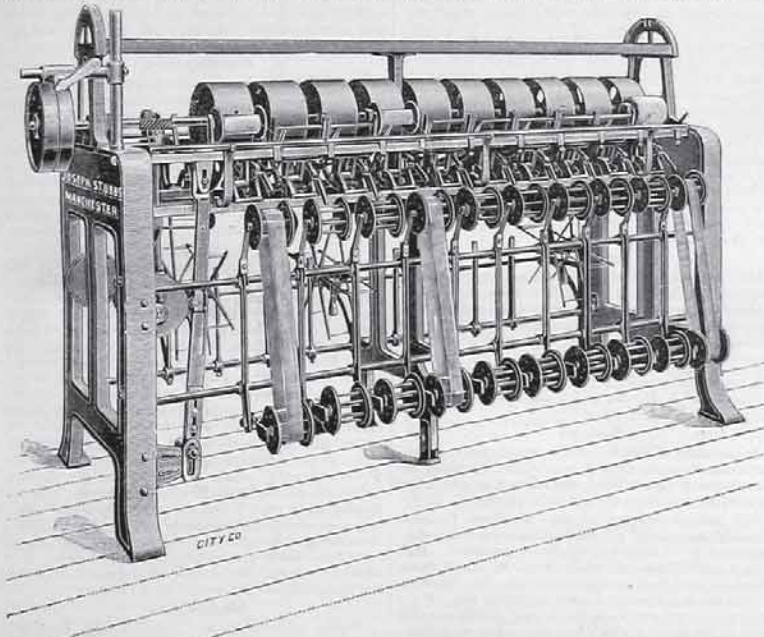
is 272 feet in length by 133 feet in width inside, and five storeys in height, in addition to the basement, which extends under the whole of the building. It is divided in its length into two unequal parts by the rope race. The first storey contains the blowing-room in the short end, and the card-room in the long end. The extent of the card-room is increased by a side shed 210 feet in length by 28 feet in width, containing two rows of carding engines, and enabling the whole of the carding and preparing machinery, as well as the blowing machinery, to be placed in the first storey. The basement extends under the card shed as well as the main building, and iron columns are used between the shed and the main card room to carry the wall of the upper storeys of the mill, thus making the shed and the main card-room one room. The shed roof, which is made of concrete and fireproof, slopes down against these columns about 8 feet from the floor line, and continuous lights are fixed along the upper part of the columns, giving a direct light to that portion of the room in the main building, which is always much darkened when brick butts are used to carry the mill wall above. The second storey contains the cotton and mixing-room in the short end, and a spinning-room of nine pairs of mules in the long end. The third, fourth, and fifth storeys each contain three pairs of mules in the short end, and nine pairs of mules in the long end, making 45 pairs of mules in the mill. The basement contains warehouse, conditioning cellar, waste cellar, and dust cellar. The staircase projects from the front of the mill opposite the rope-race, and there are two twists placed together which project from the front of the mill near the middle of its length. The engine-house projects from the back of the mill centrally with

the rope-race, and the boiler-house is placed in the corner formed by the back of the short end of the mill and the side of the engine-house. The offices are a separate building fronting Peel-street. The chimney and reservoirs which belonged to the Britannia Mills, formerly occupying the site are being utilised, the reservoirs having been made to contain three feet additional depth of water by raising the walls and the general ground level of the site on which the main portion of the excavations from the foundations have been deposited.

The whole of the buildings (with the exception of engine-house, boiler-house, and office roofs) are fire-proof throughout on Messrs. Stott and Son's patent principle, with cast iron columns, steel girders, and brick arches of 7 ft. span. The conditioning and waste cellars have floors of cement concrete, paved with Messrs. Stott's special bricks; the warehouse, blowing room, and card-room have floors of Rochdale polished flags, except in the card-room, where the drawing, stubbing, and intermediate frames are placed, and where the floor is boarded with 1½ in. white deal boards, covered after the machines are fixed with ¾ in. birch boards. These latter do not wear, and save considerable expense in repairs to frame cans. The cotton and spinning-room floors are boarded with 1½ in. white deal grooved and tongued boards, the sleeper

with steel crank pins 10 inches diameter. Each crank shaft pedestal is a massive casting with broad base, resting direct on and bolted down to the stonework and connected to the low pressure cylinder by a massive frame of the Corliss type, with a separate flat slide above and below the crosshead. The low pressure cylinder of each engine is 40 inches diameter, and behind each and connected to it by distance pieces and bolts is a high pressure cylinder 23 inches diameter. All the valves are piston valves, which require a minimum of power to move them, and have extra large ports and passages. The supply of steam to high-pressure cylinders is automatically regulated by the makers' patent cut off, the governor (without throttle valve) acting through a trip motion which partially twists round the valves and cuts off the steam earlier or later, according to the load on the engine. The piston rods, valve rods, and connecting rods are of Siemens-Martin steel; the connecting rods have solid ends at the crank pin end and marine ends at the crosshead end. The air pumps are vertical, of short stroke, and worked by connecting rods and bell crank levers from the crank pins.

The whole of the textile machinery is being supplied by Messrs. John Hetherington and Sons, Limited, of Manchester, and includes bale breakers, mixing lattices, their patent exhaust openers, intermediate and finisher



IMPROVED WINDING MACHINE, SHOWING BARREL CREEP.—MR. JOSEPH STUBBS, MANCHESTER.

joists being bolted down to the steel girders, and 2½ in. continuous planking placed under the headstocks, each plank being bolted down. The engine-house has a dado 7 ft. high of bluff glazed bricks with moulded base, neck mould, and cap mould in colours to harmonise. The walls above the dado are faced with pressed bricks and painted in two shades of salmon colour. The walls have projecting piers with stone caps, which carry the girders of a 15 ton travelling crane made by Messrs. Hetherington.

There are four Lancashire boilers, each 30 ft. long by 8 ft. diameter, constructed of selected mild steel, to carry 120 lb. per square inch working measure, and made by Messrs. Tetlow Bros., of Hollinwood, to the specification of Messrs. Stott and Sons. The feed-water heater or fuel economiser contains 480 pipes. There is a large duplex donkey and fire pump made by Messrs. Dowson, Taylor, and Company, Limited, and other appliances will be supplied, consisting of a fire escape at each end of the mill, communicating with each storey; pipes up the staircase; and each fire escape with hydrants and valves at convenient points, and the necessary stand pipes, hose pipes, and fittings.

The steam engines are two coupled engines of the compound horizontal tandem type, made by Messrs. Petric and Co., Limited, Rochdale, to the specification of Messrs. Stott and Sons, constructed for a stroke of five feet and intended to run 55 double strokes per minute. The fly rope drum is placed between the engines and is 30 feet diameter, grooved for 48 ropes each of 1½ inch diameter; the crank shaft is of Siemens-Martin steel, and has bearings 36 inches long by 16 inches diameter, and single cranks one at each end, fixed at quarter centres with each other, and fitted

scutchers revolving flat carding engines, drawing, stubbing, intermediate and roving frames, and 45 pair of self-acting mules, containing about 108,000 spindles. The mill is said to comprise the largest card room in the world under one roof, and will hold 120 cards and all preparation to follow. The spindles will consist of about 56,000 weft and 52,000 twist. One-half weft and an equal proportion of twist will be double roving, which necessitates extra preparation machinery in the card-room. The concern is set out for spinning 70's, making a 12-bank roving in the card-room. The counts, however, will average 45's twist and 60's weft. The mixing-room will be fitted up with patented labour-saving lattice machinery, by which one man will be capable of performing the work of three men previously. It is only intended at present, it seems, to set about 60,000 spindles to work. Over one half of the machinery was delivered and erected by Messrs. Hetherington in less than two months from the commencement of delivery.

The cards are clothed by Messrs. Wilson and Ingham's (Liversedge) needle-pointed hardened and tempered steel.

Tea was provided, to which over 1,000 persons sat down, and subsequently, under the presidency of Mr. Alderman Lord, a toast list was gone through, dancing being afterwards indulged in.

It is stated that the balance sheet of the Mulhouse Cotton Spinning Co. (formerly Messrs. Naegly Bros. and Co.) for the first business year, which covers the period from October 1st, 1890, to December 31st last, shows a loss of £11,605. The share capital of the Company amounts to £50,000.

Foreign Correspondence.

THE STRIKE DISTURBANCES IN LODZ, RUSSIAN POLAND.

(FROM A CORRESPONDENT.)

LODZ, MAY 19TH, 1892.

In connection with my letter of the 6th inst., allow me to make the following additional communications concerning the strike of the textile workers in Lodz and district. To their honour I must say that no working people, with the exception of a few rowdies, took part in the attack upon the poor Jewish population. To the shame of Lodz, this large industrial town, with its 250,000 inhabitants, possesses a contingent of over three to four thousand thieves and bad people, most of whom have been many times punished by imprisonment and been sent to Batutzy, a large industrial village near Lodz, for reformatory purposes. By the great extension of the town and the small number of policemen, there is no wonder that these people are committing outrages, when they also do them in peaceable times. The strike of the honest working people has just been to their taste, and as the most of them are Catholics, the first thing has been to attack and rob the poorer class of Jews. Of the rich classes they have been afraid, as they know well that through the telephones, etc., the police are always at their disposal. Only a few streets in the district named Altstadt have been destroyed by the mob; a few persons, among them one Hebrew and six Christians, have been killed, and about 216 Jews wounded. The damage to houses is about £5,000, and to goods about £2,500. Owners of mills are not touched at all, and not one mill has been destroyed. Since Friday evening everything has been quiet. From the General Governor of Poland, His Excellency Mr. Gurka, came a telegram to the chief of the Petrikau government, His Excellency Mr. Hiller, to shoot upon the mob, and orders that the populace shall not shew themselves in the streets after nine o'clock in the evening. And patrols of Cossacks and military were to parade every street.

On Saturday and Sunday all was quiet and in the best order, with the exception of a quarrel between the workers of Carl Scheibler's mill and Cossacks, by which one woman was killed and a few men wounded.

On Monday all workers went to their usual work, but for further security there were posted at every mill a smaller or larger military patrol. After Monday these patrols were withdrawn, as everything seemed to have returned to the regular routine order. The government will now look after the interests of the working classes. The factory inspector is examining into their complaints, and is doing the best he can to obtain better wages for them. The large cotton spinning and weaving mills especially are paying the worst wages, although these concerns are doing the best trade in the country. The wool branch in the country pays pretty good prices, and workers are in most places satisfied.

Mr. Hiller left the town on Monday, after punishing the imprisoned thieves and robbers by very heavy sentences. Some of them have been sent to Siberia for hard labour, and some to prison for five and more years. It is said that German foremen and directors will not be retained any longer in the mills, because the strike began amongst the German workers and Socialists.

To help the poor Jewish families which have been robbed, a committee, under the presidency of the Rabbi Meyzel, and the following highly esteemed gentlemen: Mr. Tsr. K. Poznanski, Adolf Dobranieski, and T. Rosenblatt, has been elected, and many highly esteemed Christian gentlemen, as, for instance, Messrs. Carl Scheibler, E. Herbst, Julius Heinzel, and others, are also taking the greatest interest in the welfare of the poor people, and are helping them in every way.

From the 13th June every factory having 50 workers will be obliged to have its own ambu-

lance corps and hospital with medical help. One doctor will not be allowed to have more than five factories, with a total of 4,000 workers. Our town has about 67 doctors and a few hundred mills, with 50 to 8,000 workers, so that every doctor will earn a good income.

TEXTILE MATTERS IN THE UNITED STATES.

BOSTON, MAY 17TH.

Although we have had a good Cheviot season, fears are expressed by many judges concerning the immediate future of the trade. Suits selling retail at from 50s. to 60s. each have been bought very extensively of late, and it appears probable that they will be enquired for still more largely as time goes on. Good Cheviots have been found by the ready-made clothiers to be suitable articles for this class of trade, and if it is not ruined by the substitution of cheap shoddy material the business may continue for a considerable period.

Mr. W. H. Bailey, of The H. B. Claffin Co.'s Manchester house, with his son Herbert, has been in New York for the purpose of consulting with the firm.

Mr. N. P. Brown, of John Brown and Son, curtain manufacturers, Glasgow, has also been in New York.

Some recent appraisers' decisions include the following:—

Cotton embroidery, from Beyer and Nordlinger, St. Gall—Appraiser added 3 per cent. for commission. No advance on reappraisalment.

Cotton lace, etc., from M. C. Thomson, Glasgow—Entered at 45 per cent., 5 per cent. and 2½ per cent. discounts, advanced to 45 per cent. and 5 per cent. discounts, and a total addition for boxes and cases.

Cotton lace curtains, etc., from F. Wilkinson and Co., Nottingham—Importer deducted 14s. 6d. per case for inland carriage, advanced by addition of an amount equal to 6s. 6d. per case for excessive deduction for inland carriage.

Bleached cotton embroidered by the shuttle, from Alder and Kappolt, St. Gall—No. 5780, 30" dotted Swiss, entered at 11.05, advanced to 11.55 francs per piece of 20 yards. Other similar advances. Discount, 10 per cent. and 3 per cent. and 1 per cent. Add case and packing and 6 per cent. commission.

Coloured cotton velvet, etc., from N. P. Nathan's Sons, Manchester—22" black velvets, 130, entered at 4.65-72d., advanced to 5¼d. per yard. Other similar advances. Add packing and making up.

Manufactures silk and cotton, from Leopold Heymann, Gorlitz—44in. mixed cloth, black, entered at .94, advanced to 1.03 marks per metre; 48in. mixed cloth, black, entered at 1.01, advanced to 1.11 marks per metre. Deduct inland freight, insurance, etc.

Woollen cloths, from J. J. Wysong and Co., Glau-chau—128-130 C-M, foulé, entered at 1.70, advanced to 1.80 marks per metre. Discount, 8 per cent. Add packing.

Woollen cloths, from A. Tissandia, Paris—18, all-wool, black tanpel, 148-150, entered at 7.50, advanced to 8 francs per metre. Other similar advances. Discount, 10 per cent. Add case.

The Kerr Thread Co., of Fall River, Mass., has issued a notice of an increase of \$150,000 in the capital stock to its shareholders. Old stockholders have the privilege of taking the new stock at the rate of one new share to every three old shares held until the 1st of June at par. Shares issued in excess of this amount, will be allotted to shareholders at \$105 per share. Last year an average of 22,000 spindles were run, and the completion of the present extensions will bring the number to 60,000 spindles.

The original plans of the Lings Spinning Co.'s mills at Greenville, N.J., were made with a view to extension, and it is reported that James Chadwick and Co., Limited, who recently acquired the property, will now erect a thread mill adjoining the present structures.

THE French Government has sent three superb pieces of tapestry to Copenhagen as a Golden Wedding present to the King and Queen of Denmark. One piece, which represents Baudry's "Autumn and Winter," is Gobelins, and the others, of which the subjects are landscapes by François, were executed at Beauvais.

COLONIAL WOOL SALES.—The total fixed as the limit of gross arrivals for the forthcoming series of wool auctions, which will commence on the 14th proximo, having been reached on Saturday last, the list was closed on that day, and particulars of the estimated supply shew a total of 387,607 bales.

News in Brief.

ENGLAND.

Accrington.

The hands at Woodnook Spinning Mills resumed work on Tuesday morning after having been out on strike for over four months.

Bolton.

Messrs. Witter and Son, of Bolton, have secured the contract to fit up the Mather Lane Spinning Co.'s three mills with "Witter" sprinklers.

Mr. Buckley, of Bolton, left for Russia on Monday, as the representative there for the next three years of Messrs. Chadwick Bros., sewing cotton manufacturers, Eagley Mills, Bolton.

The dispute at Peel Mills has become more acute. The spinners at No. 3 Mill finished work on Thursday morning, and left. Nearly all the vacancies in the card-room department have been filled by non-unionists, and the firm will endeavour to fill the places of the spinners with non-unionists. No. 1 Mill is still closed.

The death occurred on Wednesday of Mr. John Hoyle, of West Lawn, Lostock, and late of Wheelton, at the age of 82. He owned the Stith Mill (cotton manufacturing) at Wheelton, near Chorley, which was burned down a few years ago, and also Park-street Mills, Heywood. The latter concern has been made into a limited company, and the deceased was chairman of the Board of Directors up to the time of his death. He was formerly part proprietor and manager of Bridgeman-place Machine Works (formerly Messrs. Threlfall and Spencer, and now Messrs. R. Threlfall and Co.) For years he carried on a very extensive business as a mill and machine valuer, but retired about five years ago, when he was succeeded by his son, Mr. Richard Hoyle. Deceased was a director of the South Pier Company, Blackpool, and was connected with other undertakings. He leaves six daughters and a son, all of whom are married.

Bradford.

The Bradford Technical College was inspected yesterday week by a deputation from the Clothworkers' Company, who subscribe to its funds. The deputation were afterwards entertained at luncheon at the Bradford Conservative Club.

Buckfastleigh.

A twenty-four weeks' lock-out in the woollen trade at Buckfastleigh, Devon, ended on Monday, the men accepting the masters' terms.

Burnley.

At a meeting of Burnley cotton manufacturers a communication from the local Trades' Council, asking for two additional days holiday, was referred to, and it was resolved not to discuss the matter at present.

The annual meeting of the Northern Counties Weavers' Association was held on Saturday at Burnley. Councillor D. Holmes was re-elected president. Half of the Central Committee who retired—Messrs. Holmes, Birtwistle, and Park—were re-elected. Mr. Buckley, of Oldham, was re-elected vice-president, and all the other officers were re-elected.—A long discussion took place on the position which had been taken up by Harwood on the uniform list, and the criticisms of the Central Committee made by a Mr. Hewitt at the recent meeting of the Harwood weavers. The correspondence which had passed between the Local and the Central Committee secretaries was read, from which it appeared that in the bill announcing the Harwood meeting the names of some of the committee had been used without their consent, and that in one letter from the Harwood secretary to Mr. Wilkinson, secretary of the Northern Counties Committee, was used the phrase, "provided you will or dare come to the meeting." This was regarded as a threat, in consequence of which the representatives of the committee absented themselves from the Harwood meeting.—After all the facts and letters had been put before the General Council, the meeting approved of the action of the committee, and decided to let Harwood take its own course in the matter.—It was decided to make a grant of £100 to the Durham miners.

Darwen.

Over 1,500 looms are standing idle in Darwen. The Cotton Hall Spinning Mill have been making extensive alterations in their card-room, the work being carried out by the firm of Mr. John Mason, of Rochdale.

Halifax.

The monthly meeting of the Council of the Halifax Chamber of Commerce was held on Wednesday, Alderman Booth (the president) in the chair. The President and Mr. L. Clayton were appointed to represent the Chamber at the Congress of the Chambers of Commerce in June next. Mr. J. F. Milner, alluding to the strike which recently took place at his place of business (Woodside Mills, Elland), said that when the men went in again, in order to find work for those who

had remained at work as well as for the strikers, he put the men on to three shifts of eight hours each. A week ago he was requested by a deputation of the men to revert to the old system of two shifts, 5½ hours to constitute a week, and overtime to be paid at single rate. The men said they were tired of the association, and offered on their part to withdraw from it if he would agree to their request. He consented, and his men were now working as before, and, so far as Elland was concerned, the connection with the association was dissolved.

Heywood.

On Saturday evening a presentation was made to Mr. James Hardman, who for over 20 years has been the manager of Messrs. Norris Bros., and who has now resigned his post through failing health. Over 400 persons sat down to tea at the Conservative Hall, among those present being Mr. Norris, the Rev. R. W. Perry Circuit, the Manchester representatives of the firm, and the representatives of several firms with whom Messrs. Norris Bros. trade. After tea Mr. Norris presided, and he, the Rector, Mr. J. M. Barlow (the salesman), and Mr. Wm. Turner (the cutlooker), gave brief addresses. Mr. Meadowcroft, the senior overlooker, who has been connected with the firm for 42 years, made the presentation on behalf of the employes. The gift consisted of a handsome silver tea and coffee service, silver cruet stand, silver-mounted walking stick, and an illuminated address. Mr. Hardman suitably acknowledged the gift, and the rest of the evening was spent in singing and dancing.

Huddersfield.

On Saturday afternoon a fire occurred at the mill of Messrs. James Shiers and Sons, manufacturers, Milnabridge, and before it could be extinguished damage to the amount of several hundred pounds was done.

Yesterday week a well-attended meeting was held at the Huddersfield Technical School with the object of forming a Textile Society. The society was formed, and a committee elected to enrol members and arrange a syllabus for the winter session. The annual meeting for electing officers, etc., is fixed for September.

Leeds.

The following have been recommended to the Senate of the Yorkshire College for election to scholarships:—Clothworkers' Textile Industries Day Scholarships, £15 15s.; Percy Reginald Gaunt, Edgar Knowles, Edgar Sawyer, and Joseph Wilson. Clothworkers' Textile Industries Evening Scholarships, £2 2s.;—Thomas Woodhouse, Charles Edward Hewitt, Harry Corke; Second Year: Arthur Spence Boyes, Darcy Grimshaw, and Frederick Priestley. Clothworkers' Entrance Dyeing Scholarship, £20; Henry Charlesworth Haldane.

The monthly meeting of the Council of the Leeds Chamber of Commerce was held on Wednesday, Mr. T. W. Harding presiding. In answer to circulars issued by the Chamber in reference to the Chicago Exhibition in 1893, it appeared that only seven replies had been received from Leeds manufacturers, each of them being of an unfavourable character. The Council agreed to make arrangements for the hearing of an address from Mr. McCormick, official representative of the United States in London, on the subject

Macclesfield.

Messrs. Birchenough and Arnold's mill, Prestbury-road, is stopped through a breakdown of the engine. The weavers employed at the Globe Cotton Co.'s Lower Heys Mills are also idle from a similar cause.

Manchester.

On Thursday Earl Spencer opened an exhibition in this city of Irish industries, consisting of knitted fabrics, etc., from the Carna districts.

Mr. Christo, Jeremias, of the firm of Messrs. Papayanni and Jeremias, of this city, has had conferred upon him the Cross of the Legion of Honour by King George of Greece.

The Unbreakable Pulley and Mill Gearing Co., Limited, West Gorton, Manchester, have just completed the new works of Messrs. Edward Moore and Co., of South Shields, which they have entirely fitted up with their special steel shafting, adjustable and swivel bearings, and wrought iron pulleys.

An extraordinary meeting of the shareholders of Hall, M'Kerrow, and Co., Limited, of Nicholas-street and Pendleton, manufacturers, has been held, and resolutions passed for the voluntary winding up of the company. Mr. John G. Litton, of 69, Princess-street, Manchester, has been appointed liquidator for the purpose of winding up.

On Tuesday, at the City Police Court, the decision was given as to the amount of costs to be paid by Messrs. W. Waller and Co., sewing cotton manufacturers, Manchester, to Messrs. R. F. and J. Alexander and Co., sewing cotton manufacturers, Glasgow, who were fined a few weeks ago for an infringement of Messrs. Alexander's registered trade mark. The amount was fixed by Mr. Headlam (the Stipendiary Magistrate) at £250. It was also decided to try the case of Messrs. Alexander against Messrs. A. and S. Henry and Co. on Thursday next.

On Wednesday last Mr. Walter Yates, of the firm of Messrs. Matthews and Yates, Limited, ventilating, heating, and lighting engineers, of Manchester and Swinton, was united in marriage to Miss Clara Richardson, daughter of Mr. Joseph Richardson, of Swinton. The ceremony took place at the Congregational Church, Pendlebury. At the breakfast, which was served at the British Schools, Pendlebury, upwards of 100 guests sat down. At the conclusion the bride and bridegroom started for their honeymoon to the Lake district. Amongst the numerous wedding presents was a handsome time-piece, presented by Mr. Millington, the firm's manager at their new works at Swinton, on behalf of the workpeople in their employ.

Oldham.

Messrs. Wilson and Ingham, cardmakers, Liver- sedge, have clothed 18 carding engines at the mill of the Melbourne Spinning Co., with their needle-pointed, hardened and tempered steel cards.

Messrs. John Hetherington and Sons, Limited, of Manchester, have recently booked a number of machinery orders in Oldham. They have filled the Elm Mill with cotton spinning machinery, and have received the order for the new mill being erected by the Radcliffe Mill Co., which is to hold 90,000 spindles; and are also to supply 80,000 mule and 20,000 ring spindles and preparation to the Clarence Mill Co. They are likewise replacing mules at the Smallbrook Spinning Co. and the Greenacres Spinning Co. has entrusted them with an order for complete prepara- tion machinery.

The new mill projected at Lees, referred to in our last week's issue, is intended to hold 200,000 spindles, and the share capital is to be of like amount, raised in shares of £50 each. It is put forth by the promoters that the cost shall not exceed 20s. per spindle, some say 17s. or 18s. per spindle, but there is a great deal of doubt as to whether a fireproof mill can be put up at such a low cost. Mills erected in recent years said to cost about a guinea a spindle have been found when completed to exceed this figure by several shillings. It is stated that two-thirds of the capital is now sub- scribed.

On Saturday afternoon the steam engines at the Ellenroad Spinning Co. were christened by Mr. E. Clegg, chairman of the board of directors, being named "Victoria" and "Alexandria." The engines, which are triple expansion and calculated to turn 2,000 horse power, are the work of Messrs. J. and W. M'Naught, of Rochdale. The mill will contain 100,000 spindles and preparation, the whole of which machinery is being supplied by Messrs. Platt Bros. and Co., Limited. The building, which is fireproof, has been erected from the designs of Messrs. Stott and Sons, architects, Oldham and Manchester.

On Monday evening, Bell Mill, belonging to Mr. Frank L. Ogden, was completely gutted by fire. The building, which was erected some 30 years ago, contained about 15,000 spindles and preparation. The damage is covered by insurance. On three sides of the mill there is house property, which was somewhat damaged by falling debris, etc., and in some instances the tenants removed their furniture. Early the following morning a fire was discovered in a flock manufactory, a short distance away, which is supposed to have been caused by the flying sparks, and damage to about £300 was sustained.

Radcliffe.

During the past few days a strike has been in progress amongst the finishers at the Clough Bleachworks, Whitefield, consequent on the masters declining to concede an advance of wages. Some five or six weeks ago the men in the mangling portion of the finishing department demanded an advance of from 15 to 20 per cent. in their wages, and Messrs. J. Brerley and Sons raised the wages of those whom they considered deserving. The men were dissatisfied, and placed the matter in the hands of the association, but the negotiations proved futile. The firm assert that they already pay higher wages than any other firm in the district engaged in the fancy and heavy goods trade. On Friday last week the men handed in their notices, and left work on the same day.

Shipley.

The second annual meeting of the Shipley Textile Society was held in the Shipley Technical Schools on Thursday evening. Mr. A. F. Barker, instructor to the textile classes at the schools, presided. The report, which was read by the secretary (Mr. F. Bradbury), shewed that the society had increased in membership from 85 last year to 102. The report recorded a very successful exhibition, and contained a list of interesting lectures which had been delivered during the session, and at which there had been an average attendance of over 42 members. Subscriptions had been received from Messrs. Henry Mason, Gordon L. Salt, M. Sowden, E. Pullan, C. B. Shaw, and Wm. Bottomley, in addition to the grant of £5 from the County Council. There was a balance of £5 in hand. Officers and the committee for the new session were elected as follows:—President, Mr. Miles Sowden; vice-presidents,

Messrs. W. Bottomley, E. Pullan, G. L. Salt, and C. B. Shaw; treasurer, Mr. M. S. Clough; secretary, Mr. F. Bradbury; librarian, Mr. T. Hollis; committee, Messrs. A. F. Barker, A. Barker, A. Chapman, F. Collins, F. Dracup, G. Garnett, S. Gunnell, E. Renard, and H. Steel. The new committee was authorised to endeavour to make arrangements for visiting other technical schools or any firms which may be agreeable to receive visits.

Stockport.

The foundation stone of the new Stockport King Spinning Co.'s Mills will be laid this afternoon by Mrs. Giles Atherton, wife of the chairman of the directors. The company has been established with a capital of £80,000 in 16,000 shares.

Yeaddon.

The death is announced of Mr. Thomas Bolton, in his 74th year. Mr. Bolton, who retired from business twenty years ago, was formerly one of the partners in the old firm of Baldwin, Brown, and Co., of the Union and Albert Mills, and afterwards, in conjunction with his brother, the late Mr. Edward Bolton, he built Manor Mills, where the two carried on a very prosperous business. Subsequently he left his brother, and built for himself Banksfield Mills, which are now run by his eldest son, Mr. Simeon Bolton.

The monthly meeting of the Yeaddon, Guiseley, and District Chamber of Commerce was held on Monday evening, Mr. A. Brayshaw presiding. Mr. Laycock, the secretary, read a number of extracts from the Board of Trade returns relative to the exports and imports of France, and a short discussion took place thereon. Mr. J. Peate said it seemed from these figures—although he had not verified them—that France had progressed relatively more than England during the period to which the figures referred; and if they were correct, they did not sustain the idea entertained by many people that a degree of Protection reduced the competing power of a country in neutral markets. In reference to England, he asked did we not go too far in ascribing our prosperity since Free Trade was inaugurated entirely to Free Trade principles; and did not we leave out of consideration far too much the fact that prior to the adoption of Free Trade we occupied, as regards other nations, an incomparable position? We had bequeathed to us by our predecessors colonies all over the entire globe, and also what amounted to maritime and commercial supremacy; and, taking our position at that time, it seemed to him that we had scarcely taken the full advantage of it that we might have done.—Mr. N. Hodgson said that if Protection had been advantageous to any community, then the Chinese ought to be the most perfect nation in the world.—Mr. Peate said the Chinese neither wanted to buy from nor sell to barbarians, although intercourse for pretty nearly all purposes had been forced upon them.

SCOTLAND.

Dundee.

Damage was caused last week to the extent of between £4,000 and £5,000, by a fire which broke out in the jute warehouse of Mr. D. W. Wylbrants, jute spinner and merchant. The loss is covered by insurance.

The firm of Messrs. Harry Walker and Sons, jute spinners and manufacturers, Calderum Works, has been registered under the Limited Liability Acts. The capital is £200,000, divided into £100,000 Ordinary Shares, £50,000 Preference 6 per cent. Shares, and £50,000 5 per cent. Debentures. The managing directors are Messrs. J. H. and W. N. Walker. Mr. Harry Walker, son of Mr. John H. Walker, is a director. No shares or debentures will be issued to the public. Other manufacturing firms in Dundee registered under the Limited Liability Acts are—Messrs. Baxter Bros. and Co.; Gilroy, Sons, and Co.; Thomas Bell and Sons; and Alexander Low and Co.

Ex-Provost Moncur, who has been the generous originator of various local benefactions, has added another by purchasing Bammatyne House, Newtyne, with about nine acres of ground, to be devoted to the purposes of a sanatorium for mill and factory girls and other women who might be in need of air and rest in the country. He will guarantee the working of the institution against loss for the first two years. The cost of the ground and the alterations on the building will be upwards of £3,000. It is likely that the weekly charge which a girl would have to pay would not exceed 7s. per week, and gentlemen who give a guinea subscription will secure the privilege of nominating three girls for a week's residence at the sanatorium.

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.	Australia.	Africa and Egypt.	Continents.	Totals.	Total for year to date.
£103,447	3,243	301	522	395	199	108,221	1,747,992
279	6,355	—	—	279	—	7,041	399,371

The following are the total values of the exports for the same twenty-one weeks of last year:—Cotton, £1,649,502; linen, £327,603.

IRELAND.

Bangor.

The Bangor Handkerchief and Laundry Works, erected by Mr. James M'Murray, T.C., of Bangor, have been opened. The building is a somewhat imposing structure of two storeys, in the Hamilton-road. The material of the building is red brick, manufactured at the East Bangor Brickworks, of which Mr. M'Murray is also the owner. It measures in length 103 feet, and in breadth 35 feet. The top room will be used as the machinist's department principally; whilst the lower or ground floor will be devoted to the finishing, smoothing, and laundry work generally. The sewing machines and other appliances are also all of the most modern make, having all the latest improvements, so that in the matter of equipment the best of everything has been provided. In celebration of the opening of the works, Mr. M'Murray entertained a number of his personal friends and well-wishers at his residence. Heartly good wishes were expressed by all for the future success of the Bangor Handkerchief and Laundry Works.

Belfast.

The quarterly meeting of the Belfast Chamber of Commerce was held on Thursday, the president, Mr. D. B. Lytle, J.P., in the chair. An address urging Belfast manufacturers and merchants to make a good display at the Chicago Exhibition was delivered by Mr. Baker, an agent of the Royal Commission on the Exhibition. The feeling in Belfast is favourable to exhibiting.

Miscellaneous.

FACTORY INSPECTION.

DEPUTATION TO THE HOME SECRETARY.

On Monday evening Mr. Stansfeld, M.P., introduced to Mr. Matthews, the Home Secretary, in one of the Committee-rooms of the House of Commons, a deputation from the Trades Councils of Halifax, Huddersfield, Brighouse, and Sowerby Bridge, who presented a memorial urging that an assistant factory inspector should be appointed for the district. The other members of Parliament present were Mr. Wayman, Mr. Summers, and Mr. H. J. Wilson.

Mr. STANSFELD, M.P., said he understood that there were not fewer than 4,000 factories and workshops in Mr. Prior's district, and the very utmost that the inspector could possibly do was to visit each of them once in three or four years. That could not be considered sufficient inspection. The deputation made no complaint against either the industry or ability of Mr. Prior, but they thought he should have assistance.

Mr. BEEVER (Halifax) stated that, however industrious Mr. Prior might be, it was utterly impossible for him adequately to inspect all the factories and workshops in his populous manufacturing district. The geographical area of the district was rather under than over the average, but the number and variety of industries were altogether exceptional. There were more than 800 textile factories alone.

The HOME SECRETARY: Could you mention any notable infractions of the Factory Act in the district within the last few years?

Mr. BEEVER: Yes; in regard to juvenile labour, I have known a half-timer called on to work a full day.

The HOME SECRETARY: The information which reaches me is that on the whole the factory law is well observed in the district.

Mr. BEEVER: Yes, in larger establishments; the complaints came mainly from the smaller workshops.

Mr. GEE (Huddersfield) said they believed Inspector Prior was one of the most hard working servants the Government now had or ever had, but he needed assistance. Within the past three months Mr. Prior had paid a surprise visit to Elland, when he went into six or seven workshops early in the morning, and in every one of them found young persons, half-timers, employed earlier than they ought to have been. Convictions were obtained against all these offenders. There were places where people worked and where they could hardly remember such a thing as a visit from an inspector. The trades councils were constantly receiving complaints, and some of these they forwarded to Mr. Prior, who attended to them; but if they sent him all the complaints they received, Mr. Prior would

be doing nothing but attending to the behests of these trade societies.

The HOME SECRETARY: If you expect an inspector to watch all these factories, and to be there when the work daily begins and when it ends, you would require an inspector per factory, or at least a thousand additional inspectors in your district.

Mr. GEE: We don't want over-inspection.

The HOME SECRETARY: Have your own trade societies prosecuted any cases of alleged infractions of the Factory Act?

Mr. GEE: It is not generally understood, although we learn from you it is a fact, that any person can prosecute. But one difficulty is that workpeople who swore information against a given mill would lose their employment and be boycotted.

The HOME SECRETARY: Who gave evidence in the Eland cases which you mentioned?

Mr. GEE: Mr. Prior himself.

The HOME SECRETARY: Was he the only witness?

Mr. GEE: Yes, so far as I know.

The HOME SECRETARY: If workpeople are reluctant to give evidence you cannot expect the inspector to do everything for you.

Mr. GEE: It is a different matter being summoned by Mr. Prior as a witness and being called on by a trade official like myself.

The HOME SECRETARY: But the inspector is not a prosecutor-general. It is much more the interest of the working people than of even the inspector to see that the Factory Act is carried out. If you expect the inspector to be prosecutor, and not only that, but the chief or the sole witness as well, you are putting on him an impossible task.

Mr. GEE: Are we putting on the inspectors any more than the Act puts on them?

The HOME SECRETARY: The inspectors' duties are narrower than you seem to imagine. It would be rather shirking your duties as citizens and as chosen champions of your fellow-workmen if you were not yourselves to prosecute when you have evidence of infractions of the law.

Mr. GEE: You see before you to-day two men who were dismissed for taking positions of prominence in connection with trade societies.

The HOME SECRETARY, in reply, said he was glad to have had the opportunity of exchanging views with the deputation. He would give the whole subject his careful consideration, and, indeed, he had already, on receiving their letter, instructed the Chief Inspector to prepare a careful report as to the present distribution of the work in these districts. He could not now make to them any pledge, but even if he found it possible to increase the inspectorate or give more assistance he still desired to warn them against their apparently too expansive ideas as to the scope and nature of an inspector's duties. Although anxious to give the utmost protection to workmen in giving evidence, and although he did not think it would be reasonable to expect a workman voluntarily to prosecute his own employer, there was no reason why the trade societies should not take action where they thought it necessary. He was glad to learn that there was no complaint against Mr. Prior of any neglect of proper complaints on representations communicated to him.

Mr. BEEVER: Is it your opinion, sir, that the number of prosecutions is a measure of the efficiency of inspection?

The HOME SECRETARY: I don't say that, but the fewness of infractions of the law is an evidence of the efficiency of the inspector. In his evidence before the Royal Commission, Mr. Prior himself said that in his district there were no serious infractions of the law, and that the workpeople came to him freely when there was anything wrong. That is one gauge of success in inspection.

Mr. BEEVER: You want to make half of us trade officials inspectors as well?

The HOME SECRETARY: People must help themselves. There is some reasonable limit not only to the duties of inspectors, but also to the number of inspectors, for it must be remembered that Middlesex, for instance, which has no factories, helps to pay for the inspection required by you in the North.

The interview then concluded.

IMPERIAL COMMERCIAL FEDERATION.

The second annual general meeting of the City of London branch of the Imperial Federation League was held on Monday at the offices of the London Chamber of Commerce, Mr. F. Faithfull Begg (the vice president of the branch) in the chair, in the absence of Sir John Lubbock, M. P. (the president), who telegraphed that he was detained at the House of Commons. The report stated that a guarantee fund had been established which had considerably strengthened the position of the branch. The membership increased steadily, 47 names having been added to the list in 1891.

The CHAIRMAN moved the adoption of the report, which was seconded by SIR GUILDFORD MOLESWORTH, and carried.

Mr. W. BECKETT HILL moved a resolution instructing the executive committee to consider and submit the outlines of a scheme which would accord with the resolution adopted by the council of the branch on March 30.

Mr. NEVILLE LUBBOCK seconded the motion.

SIR CHARLES TUPPER (High Commissioner of Canada), in supporting the motion, said Mr. Beckett Hill had stated that the resolution was based upon free trade, but he himself did not hold that view, or he would not be able to support the motion. It contained a major proposition and a minor proposition. The major proposition was "that any scheme of Imperial federation should embrace a commercial union as necessary to its strength and permanence," the minor proposition being "that such union should be based as nearly as practicable upon free trade throughout the Empire." He had no objection to that. He had never discussed in the Parliament of Canada the question of free trade or protection on abstract principles. He maintained, in the words of a much greater authority—*The Times*—that free trade was made for man and not man for free trade, and that it might be quite possible that it would suit one country and be totally unsuited to another. He was quite prepared to admit that if it was the best possible policy for England it would be fatal to Canada. Canada was separated from a great Republic occupying almost half of the Continent of North America, side by side with her, separated by an invisible line, and the Republic had built up a Chinese wall of protection. Under that policy Canada found that it was not in the interest of England for the Dominion to carry out a policy of free trade, which would have meant the rapid extinction of their trade with the mother country, and its transference to the adjoining Republic. Canada had been compelled, in the face of the stern logic of facts, to adopt a policy, not of protection, but of incidental protection; but this had strengthened instead of weakened the ties binding the colony to the mother country. The time had come when, in his judgment, it behoved the friends of this great Empire, whether in the heart of the Empire or in the outlying portions, to consider whether it was not possible to add that stronger, perhaps, and most enduring of all ties—the tie of self-interest—to the great sentimental ties that bound the colonies to the mother country. (Hear, hear.) Certain objections were raised to this view, and it was said that they would thus excite the hostility of foreign countries. Upon what pretence, however, could be founded any hostility to the policy suggested by Mr. Beckett Hill of the imposition of a small tax upon products which foreign countries sent to this country? Could any one say that the United States of America, with their 60 per cent. tariff against this country, would retaliate if Great Britain put on a duty of 5 per cent. or 10 per cent., which, in this 19th century, would not, he contended, mean a protective tariff? Mr. Cobden based the whole theory of free trade upon the belief that all that England had to do was to adopt the policy of free trade, and other nations would follow it. If the very basis of his theory had proved to be unsound, he did not believe that if Mr. Cobden were alive to-day he would say that those who had adopted the theory were bound to carry it to its conclusion as if the basis had not proved unsound. When England had occasion to negotiate with France, Spain, or the United States, she was met in her attempt to protect the trade and industries of this country by being told, "You have given us everything you have to give already." It was for favours to come, not for favours received, that nations as well as individuals were the most anxious. Sir Lyon Playfair, who was acquainted both with Canada and the United States, had declared in public that Canada had the soil and the means of furnishing England with all the food products for which she now depended upon the United States of America. If that were so he put it to Englishmen whether it was not a sound and wise policy that England should adopt a course that would fill up half of the great Continent of North America with strong arms and stout hearts prepared to do and die in the maintenance of the common flag of the Empire. (Cheers.)

The motion was passed and the meeting closed with a vote of thanks to the chairman.

SILK WORKING IN MEXICO.

In a report upon the openings for the establishment of an industry for the manufacture of silk and cotton tissues in Mexico, the *Monde Economique* in its issue of the 9th April says:—

Within recent years the question of the production of silk in Mexico has been seriously discussed. The climate is most favourable to the breeding of the silkworm, and it is reasonable to assume that the proximity of the important markets of the United States, the provisions of their Customs tariff, which admits raw silks free of duty and levies prohibitive duties on foreign tissues, and finally, the want of success hitherto met with in the United States by silkworm-rearers, should

not be without influence on the rapid development of the production of this article. Sericulture has been, almost since its institution, accompanied by spinning, then milling and also weaving, and factories have been established at different places by foreigners—English, Germans, Americans, Spaniards, etc. The Mexican authorities encourage their efforts and sometimes assist them by subventions and bonuses.

One of the industries capable of the greatest development and extension in Mexico is that of the manufacture of mixed tissues of silk and cotton, the production of which has increased so rapidly within recent years, which have the advantage of being very pretty and cheaper than is generally imagined. A factory of this kind established in Mexico would be placed on an exceptionally favourable footing, for it would have excellent and cheap labour at its disposal, and would find on the spot all the raw materials required, silk as well as cotton.

In reality, the production of the latter article has gradually diminished in Mexico for the last 12 years; but this diminution is explained by the fact that textile industry is still very little developed and cannot withstand the competition of foreign tissues. But things are undoubtedly on the eve of a radical change; a new Customs tariff framed on very protectionist lines, which, says the *Moniteur Officiel de Commerce*, will certainly be the ruin of the consumer, but which will enrich a few industries, has been applied to Mexico since November, 1891.

This new Customs tariff also protects the silk-spinneries and factories. Again, to the Customs duties should be added the duties payable on entry into different States, which are on an average 5 per cent. of the Customs tax.

THE Gronau (Westphalia) Cotton Spinning Co. has made a gross profit (the appropriations to the various accounts not being deducted) for the past financial year of £1,828.

BUSINESS has for some time been brisker in the power-loom weaving sheds of Greiz, and there has also been an improvement in the business done in connection with the spinning establishments.

M. EUGEN ESCHÉ, hosiery manufacturer, of Chemnitz, on the occasion of the marriage of his daughter, has set apart 10,000 marks, the interest on which is to be employed for the benefit of female operatives on their marriages.

At the beginning of last week 200 spinners in the employ of Johann Liebig at Horatitz, struck work. The strike, however, lasted only three days, as the managers of the factory refused all conference with the men, whereupon they resumed work.

ACCORDING to advices from Plauen, recent legislation, which excludes children from the embroidery factories, is causing the embroidery machines to be more largely used. A new machine of this kind of Swiss origin is at present attracting great attention. It is constructed by the firm of J. C. and H. Dietrich, of Plauen.

It is said that in the district of Dueren, in Rhineland Prussia, which owes its prosperity mainly to textile industries, there are as many as forty-five persons who are what the Germans call "millionaires," that is, possessors of 1,000,000 marks or £50,000. So Dueseldorf, which has long been supposed to be the first of German industrial centres, has to "play second fiddle" in this respect, having only 28.

THE SPANISH TARIFF AND LINEN YARNS.—Mr. G. C. Keiller, secretary of the Dundee Chamber of Commerce, has received the following communication, signed by Mr. James W. Lowther, from the Foreign Office, relative to the Spanish tariff:—"With reference to my letter of the 12th inst., I am directed by the Marquis of Salisbury to inform you that her Majesty's Ambassador at Madrid reports by telegraph that the Spanish Government have given orders to charge the lower duty on linen yarns till June 30, and that any higher charges levied since the 1st of February will be refunded." This arrangement will have the effect of removing the uncertainty which has existed during the past five or six weeks regarding the probable action of Spain in the matter, a good deal of business having been held in reserve since the rate was raised.

CANADIAN COTTONS.—Attention having been called to the fact that, owing to the cotton manufacturing combination which has been established in Canada, consumers of cotton goods there have received no advantage from the decline in the price of the raw material, some of the members of the monopoly have issued a statement in which it is hinted that as soon as the syndicate gets into working order, consumers will reap the benefit. Since the drop in the prices of the raw material, the price of coloured cotton goods in Canada, strange as it may appear, has been advanced. It is hinted that the syndicate, in view of the decline in cotton goods that must eventually follow the great fall in the prices of raw cotton, took the precaution of first raising the price of the former, in order that they might later make a show of producing goods more cheaply without even making a concession proportionate to the decline in the prices of the raw material.

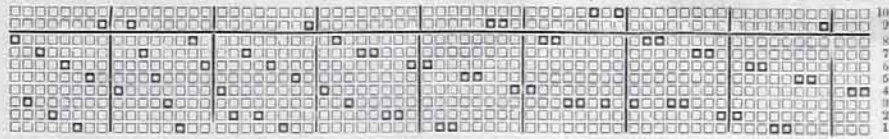
Technical Education.

CITY AND GUILDS OF LONDON
INSTITUTE EXAMINATION.

The following papers were set at the recent examinations in the subjects named. The papers on other textile subjects will appear in these columns from week to week until completed:—

CLOTH WEAVING.

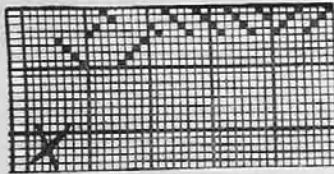
Instructions.—The candidate must confine himself to one grade only, the Ordinary, or Honours, and must select his questions from those of Division I. or II., and must state at the top of his paper of answers which grade and division he has selected. He must not answer questions in more than one grade or one division. Point paper and patterns are supplied to each candidate. Four hours allowed for this paper. Not more than ten questions to be attempted in either grade. The maximum number of marks obtainable is affixed to each question. Candidates are requested to state the town in which they have been employed.



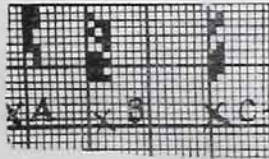
DRAFT A.

DIVISION I.—ORDINARY GRADE.

1. Give plan and particulars for accompanying white pattern, both as to counts of yarn and finish, 40 yards long and 28 inches wide when finished. (50 marks.)
2. What counts (Yorkshire skeins) is a twist composed of one thread 40 skeins at 3s. per lb., and one thread of 60's spun silk at 8s. per lb.? How much of each kind of yarn would be required to make 900s. of twist, and what would be the price per lb.? Cost of twisting, 1d. per lb. (20.)
3. Find the number of healds per inch on each shaft in the following draft, when woven in a 12-reed, 4 threads in the split. (30.)



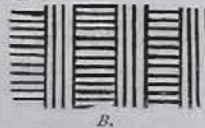
4. Complete the weaves of which sections are given in figures A, B, C. (20.)



5. Give several good designs on point paper in single cloths that would do for worsted coatings; also give plans for buckskin, doeskin, and cords. (15.)
6. Sketch the effects of the following simple colourings in the weaves given for each:—

Mayo } 2 Black, twill } 2 White. Casmere } 1 Black, twill } 1 White.
4-end } 4 Black } Checked. Matting } 4 White } Same. (10)

7. Give the order of threads and plan which will give a pattern, when woven, same as sketch B, the perpendicular lines to be one colour and the cross lines another colour. State the colours you would have it woven with. (50.)



8. Convert the following into Yorkshire skeins: 15-cut Hawick 60-2 silk; also name several methods of counting reeds, and state how many threads per

inch there would be in a 60's set in Bradford and Dewsbury systems respectively. (10.)

9. Explain the different systems of shedding in the hand loom, especially referring to the treadle and single and double-lift dobble machines. (10.)



C.

10. Make a check pattern from the above sketch C; warp the threads 2 and 2, weave it 2 pick and 2. Give the plan, also sketch the effect that the pattern

Back the design B same make as face, one end of face to one back, both warp and weft. Cut the two weaves by changing the back on to the face; face on to the back. Shew how you would colour it to make a neat checked stripe design. (40.)

8. Make a plan for a small checked corkscrew pattern, corkscrew to be for ground, and the other make for check. Shew how you would colour it. Give a sketch of the woven result. (25.)

9. A cloth is made with 2-48's warp and weft, 102 threads per inch, and 96 picks per inch. It is required to make a similar cloth with 2-36's. How many ends and picks would it require? (15.)



C.

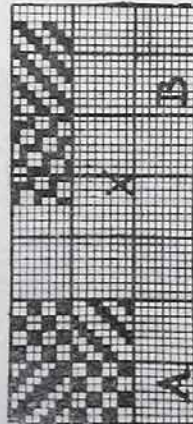
10. Give the order of threads, reed, picks, counts, and plan which will give a pattern when woven same

as sketch C. Each warp colour must be intersected with the same colour for weft. Give the two colours that you would weave it with. (35.)

11. What do you mean by compound and graduated checks? Give sketches and examples. (10.)
12. Give the sateen weaves on 8, 10, 13 shafts, and construct three weaves on each base. (10.)
13. What is the cause of shady or streaky effects, and how would you obviate them? (10.)
14. Give warping for a check in a 3 and 3 twill; also give colours you would warp it with. (10.)

DIVISION II.—HONOURS GRADE.

1. Give plan for accompanying back pattern, both as to counts of yarn and describe the process of finishing, also the reed and picks, 40 yards long when finished, and 28 inches wide. (60 marks.)
2. Give plan and the order of the threads for a hair-line composed of three colours—a line of black, white, black and lavender. (30.)
3. What faults would develop in the finished worsted coating if you warped your warp without breaking off at the foot end? (10.)
4. Calculate the weight and cost per yard of a piece of woollen cloth made as follows:—17 reed 4-ends in a split, 44 picks, 36 inches wide in a loom, 28 inches finished, 50 yards of warp, 40 yards finished piece; counts of yarn, 24 skeins warp and weft, at 2s. 6d. per lb.; scouring and milling, 10s.; mending and knotting, burling and finishing, 12s.; weaver's wages, 11s., to be doubled for other weaving expenses; 5 per cent. waste. (25.)
5. What is the best system of stitching double cloths, and how may the face of the fabric be damaged by the stitches? Give examples of designs stitched in weft and warp respectively. (20.)
6. How would you proceed to make a new style? Give details, accompanied by an illustration. (10.)



7. Back the accompanying design A with plain back, two face to one back, both warp and weft; also cut the squares, in place of stitching it under the twill

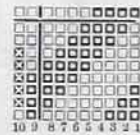
as sketch C. Each warp colour must be intersected with the same colour for weft. Give the two colours that you would weave it with. (35.)

11. Find the capacity of the Jacquard machine containing 4,608 harness cords, set 36 inches wide in the comb-board, and giving a pattern 3 inches wide. (10.)
12. What would be the average girth of yarn in a cloth made with two threads (15 skeins, Yorkshire) and one of 2-28's worsted? Give the result in Yorkshire skeins—counts. (10.)
13. Point out the difference between regular and irregular compound schemes of colouring. (10.)

DIVISION II.—ORDINARY GRADE.

Only ten questions to be attempted, including the calculations.

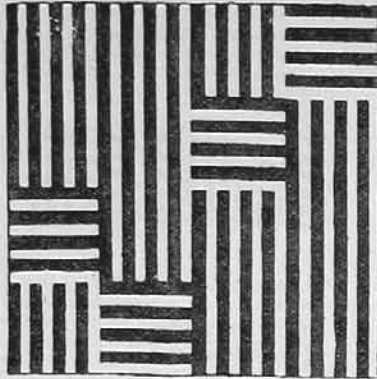
1. Define and illustrate three methods by which pattern or design is commonly acquired in the loom. (15 marks.)
2. Briefly explain the structure of textiles, and indicate the special characteristics of (a) fabrics in which all the warp threads are parallel to each other; (b) gauze fabrics; and (c) plush fabrics. Supply a sketch of the scheme of interlacing for each of these textures. (25.)
3. On 48 threads form a stripe pattern composed of three weaves derived from the 6-end twill (3 up and 3 down on each pick) by re-arranging the threads of this make. (20.)
4. Ascertain the number of healds per inch on each shaft in draft A, (see above) and construct the complete design from the reduced plan C, and the heading draft. The set of the fabric is 80 ends per inch. (35.)



PLAN C.

5. Shew, by sketches, two systems of automatically setting up the piece in power loom weaving. (15.)
6. Compare the action of single and double-lift dobble machines. (20.)
7. Work out the following calculations:—
(A)—A 2-16's twist (worsted counts) is composed of 2-60's black worsted, 30's 2 silk, and of a third thread in skeins; find the size of the woollen yarn.
(B)—What is the average counts of yarn in a fabric made thus: 2 threads of 2-50's worsted, and 1 thread of 2-80's cotton.
(C)—Required the length of cloth which may be woven from 140 hanks of worsted, when the fabric contains 60 picks on the inch and is 32 inches wide. (35.)
8. Make a diagonal pattern on 42 ends and picks, employing 6 weaves acquired from the seven-shaft sateen. (30.)
9. Sketch the patterns which would result from colouring the tabby weave and cassimere or shalloon twill 1 black and 1 white, in both warp and weft; and also from warping and wefting the 4-end mat or celic 4 black and 2 white. (20.)

10. Pattern *D* is an enlarged sketch of a fine worsted dress style; furnish the design you would employ in producing it, and indicate the scheme of colouring it would be necessary to adopt. If it is feasible to obtain this form of pattern in more than one variety of weaves, give others which might be used. (30.)



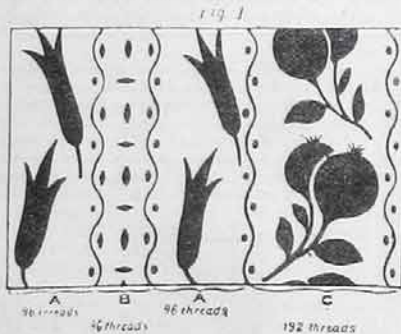
D.

11. Describe and draw the parts in the tappet loom which operate the shafts. (20.)
12. Give a drawing of a set of stocks and bowls for working seven shafts. (15.)
13. Construct on 36 ends and picks a design containing 6 spots or minute figures. These must be planned on the basis of the six-shaft sateen. Ground weave of the design to be prunelle twill (2 up and 1 down on each pick). (25.)

DIVISION II.—HONOURS GRADE.

Only ten questions to be attempted, including the analysis and calculations.

1. Compare the action of the double-lift Jacquard with that of the double-lift Dobbie, giving sketches of the parts which control the formation of the shed in both machines. (25.)
2. For what purposes are shafts combined with harness mounting? Indicate the several methods of accomplishing this. Let your answer be illustrated. (25.)
3. Sketch the scheme of harness mounting (*i.e.*, plan of the comberboard and system of tying-up the harness) for Fig. 1. Shew two repeats. The Jacquard has a weaving capacity of 384 wires. (35.)



4. Work out the following problem on the Jacquard:—
 - (a.)—Required the number of harness cords to be attached to each neckband in a machine mounted as per Fig. 1, assuming the harness to be 32 inches wide in the comberboard, and the fabric to have 84 ends per inch.
 - (b.)—If it were required to weave a design occupying 160 threads in a 192 machine and a fabric 30 inches wide, how would it be necessary to cast out? Also give the number of ends per inch of the reduced harness, assuming that of the original Jacquard to be a 60's set.
 - (c.)—Ascertain the number of harness cords tied to each neckband in a Jacquard mounted for weaving bordered fabrics thus: 192 wires for the centre and edges, and 192 wires for the borders. 60 harness cords per inch. Width of harness 80 inches, distributed as follows:—
 - 4 inches for each edge.
 - 12 " " border.
 - 48 " centre. (40.)
5. Describe any open-shed power-loom Dobbie used in weaving fine worsted or woollen fabrics. (20.)

6. Explain the system of actuating the shuttle boxes in the loom you refer to in answer to question 5, and map out the box chain for a pattern of weft arranged:—

- 4 picks of a dark shade.
- 2 " light shade.
- 4 " mid shade.
- 2 " fancy shade. (25.)

7. Make a small design for a gauze fabric. Let the ground weave be tabby and introduce 5 gauze spots into the pattern, arranged on the base of the 5-shaft sateen. Supply draft plan for the same. (25.)

8. Point out the difference in the structure and method of weaving velvet and velveteen. Give weaving plans and sketches of the scheme of interlacing for each texture. (20.)

9. Fig. 2 is a striped style woven with one shade of weft; work out the design, and give order of warping for producing it. (30.)

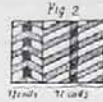


Fig 2

10. If the irregular compound colouring appended were woven in the 6-end twill (3 up and 3 down) what effect would it have on the fabric? Sketch the style which would actually result. (25.)

- For 12 threads { 2 Black, and picks. { 1 White.
- For 18 threads { 4 Black, and picks. { 2 White.

11. Illustrate backed and double make cloths. Also say which scheme of "stutching" double fabrics you prefer—warp or weft. (25.)

12. Complete Fig. 3, and use it as the scheme of arrangement for a small spotted design on 32 threads and picks. Develop the two series of spots in warp and weft respectively. (25.)

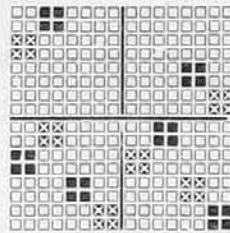


FIG. 3.

14. Analyze one of the textures attached hereto, giving weave, counts of yarns, set and picks per inch. (35.)

15. Answer the following calculations:—

- (a.)—A fine worsted coating is made of 2-48's worsted warp and 30 skeins weft, and has 120 ends and 60 picks on the inch, and it is required to make a similar cloth $\frac{1}{4}$ th heavier. What counts of yarn and number of ends and picks must be used?
- (b.)—Find the cost per yard of a piece of cloth made as follows:—

WARP.
2 threads of 2-48's Worsted.
1 thread of 2-28's "

WEFT.
2 picks of 24's Worsted.
1 pick of 14's "

Length of warp 60 yards, of piece out of loom 56 yards, and of finished fabric, 54 yards. Width in reed 72 inches. 108 threads and picks per inch. The price of the 2-48's is 3s. 6d. per lb.; of the 2-28's, 2s. 6d.; of the 24's, 3s.; and of the 14's, 2s. 2d. Allow 5 per cent. for waste of weft, and reckon cost of dyeing and finishing as 20s., and of weaving 30s. (40.)

JUTE SPINNING.

Instructions as above. Also, no candidate will be considered as having passed in either grade who does not satisfy the examiner by his answers to the questions in Section II.

ORDINARY GRADE.

Not more than *twelve* questions to be answered.

I.

1. Describe shortly the cultivation of the jute plant, and the mode of its preparation for shipment.
2. Name the four kinds of jute in common use, and state the character of each.
3. State the advantages of machine batching over the old mode of hand batching, and the quantity of (a) oil used, (b) water used on a 400 lb. bale.

II.

4. Name the machines in a system of jute preparing for 7 lb., beginning with one breaker, and state how many machines of each sort are required.

5. State the usual number of workers, strippers and doffers in a jute breaker, and shew by a sketch the movement of each.

6. What are the main points of difference between a half circular card and a full circular?

7. In altering the draft of a card, name the roller, the speed of which you change, and the effect of driving it quicker or slower.

8. Calculate the draft of a spiral drawing frame geared as follows:—

Diameter drawing roller	....	2½ inches.
Change wheel	.....	55 teeth.
Back shaft wheel	.....	36 "
" " other end	.....	26 "
Stud wheel	.....	67 "
Socket	.....	26 "
Retaining roller wheel	.....	67 "
Diameter of retaining roller	....	1¾ inches.

9. What is the effect on the speed of the fallers of a roving frame, (a) of hardening the twist, (b) of shortening the draft? and shew why the speed of the fallers is altered.

10. Supposing the roving frame to be building the rove too hard on the bobbin, state the injurious effect of this upon the yarn, and how the machine should be altered to remedy this.

11. Give the speed of the spindles of a spinning frame, the main shaft running 270—

Diameter drum	.....	28 inches.
" pulleys	.....	15 "
" cylinder	.....	9 "
Wharve	.....	1½ "

12. Calculate the twist per inch on a spinning frame geared as follows:—

Cylinder pinion	.....	30 teeth.
Stud wheel	.....	83 "
Change wheel	.....	33 "
Drawing roller wheel	.....	110 "
Diameter of drawing roller	....	3½ inches.
Diameter of cylinder	.....	9 "
Diameter of wharve	.....	2½ "

III.

13. What is the grist of 12 lea yarn and of 8 lea yarn per spynde?

14. In spinning 7lb. warp, the yarn when weighed off the reel is under weight. State what causes might account for this; and, if the yarn is really under the proper grist, what are the evils resulting from this?

15. Explain in a few words the results to spinner and manufacturer of the yarn being short in the tell.

HONOURS GRADE.

I.

1. Describe shortly the cultivation of jute, the kinds used in manufactures, the date of the introduction of the fibre, and the growth of the trade.

2. Give a batch (a) for 1 lea yarn, (b) for 8 lb. warp, good, and (c) for 8 lb. weft, common.

3. State the best modes of batching, the best kinds of oil, the quantity of oil and of water used on a 400 lb. bale.

II.

4. State the best kind of combined batching and softening machine, and the quantity such a machine will do in a day, and the horse power required to drive it.

5. (a) Explain why a long draft is not so injurious to the material on a circular finisher card as it is on a breaker; (b) what serious fault is present in the yarn when too long a draft has been used on the breaker? (c) state the proper drafts for (a) a breaker, (e) for a finisher.

6. What is about the relative surface speed of cylinder, workers, and strippers, of a circular shell finisher? What is the effect of decreasing the speed of the workers?

7. Work out the drafts for rove weighing 70 lb. per spynde, starting with a set of laps weighing 180 lb. per 100 yards.

8. If the weight of a rove is changed from 56 lb. per spynde to 84 lb. per spynde, what change will it be necessary to make upon the differential motion?

III.

9. In a mill spinning 10,000 spindles 8 lb. warp per week, with 4 turns twist, the twist is changed to 5 turns; how does this change affect the cost of production, and to what extent is it affected?

10. In what respects is a 4 in. supposed to be preferable to a 3½ by 3¼ spinning frame for 8 lb. yarn?

11. State the heaviest sizes of sacking yarn you consider it profitable to spin on a spinning frame, and shew why sizes above that limit are more profitably spun on a spinning roving.

12. What are the items of expense in a jute mill to be taken into consideration in calculating cost of production? In a mill spinning 8 lb. and 9 lb., what proportion does wages bear to other expenses com-

bined, and what would be loss per week on a mill which spins 100 tons a week by running half time?

13. Explain how short tell affects the seller and buyer of yarn, and which has the advantage, if the yarn is 5 per cent. short, and 5 per cent. is allowed on the price in consequence.

14. When yarn goes off the weight and comes light $\frac{1}{2}$ lb. per spynole, what is the most serious result of this fault?

SILK THROWING AND SPINNING.

Instructions. The candidate must confine himself to one grade only, the Ordinary or Honours. The maximum number of marks obtainable is affixed to each question. Not more than eight questions to be answered. *Three hours allowed for this paper.*

ORDINARY GRADE.

Instructions as above.

1. How many kinds of insects produce silken fibres?
2. Which is the principal and most important one?
3. Describe its life-history.
4. Describe what you know of its anatomy, particularly those parts in which silk is produced.
5. In what state is silk in the body of the silk-worm, and in what state is it when sericised?
6. What is the meaning of the terms bave and brin?
7. What are about the length, strength, and elasticity and thickness of silk in a cocoon of Bombyx Mori, and in a cocoon of Tussur silk?
8. Describe the operation and result of cocoon reeling.
9. How many deniers does silk titre whose raw-silk thread consists of six cocoons?
10. How many fibres are there in the threads of six cocoons?
11. Mention the principal raw-silks of commerce, and their values per lb.
12. Describe the operations necessary to make raw-silk into organzine and tram.

HONOURS GRADE.

SECTION I.

Not more than ten questions to be answered. They may be selected from either section, but not from both sections.

1. How much raw-silk is obtained from 1 lb. of dried cocoons?
2. What is the thickness or diameter of a brin of Italian, Chinese, and Bengal silk, and how much weight will each support before breaking?
3. What is knubbiness, and how is it caused? What other terms are used to denote this irregularity in England? What in France?
4. What precautions are principally necessary to insure an even thread of organzine out of a second or third-class raw-silk?
5. What is Foulard, and how composed?
6. What is Bengaline, and how composed?
7. Describe the different kinds of umbrella-cloth yarns used at the present time.
8. What is the effect upon the fibre of weighting silk, and why is silk weighted?
9. How would you detect weighting matter on a silk dyed black; first, as a boiled-off weighted black; second, as a weighted black souple?
10. How would you detect the weighting matter of coloured or white boiled-off silks, weighted beyond 16 oz. per lb.?
11. Give the cost of each operation or stage of throwing organzine and tram from a good China raw.
12. What is the chemical composition of a fibre of silk as sericised by the silk-worm?

SECTION II.—Spun silk.

1. Of what silk fibre is seal-cloth made, and what are the most suitable sizes or counts of the yarn for seal-cloth, and how many folds?
2. How many descriptions of silk waste are there in the market?
3. What is chassum, and its average price?
4. What is the difference between the terms schappe and spun silk?
5. Which system prevails in England, and where does the other system prevail?
6. What is the main difference between a spun and a net silk yarn?
7. Name all the operations or stages in the manufacture of a two-fold 60's yarn.
8. Give the cost per lb. of each operation in producing this yarn.
9. State the average length of time required to convert 500 lb. of waste into 2-60's yarn, the machinery being in each operation sufficient to treat this quantity and the conditions being favourable. State the time required in each operation.
10. What are the breaking strengths of 2-60's yarns respectively of one, two, three four, and fifth drafts? Any other size can be taken if preferred by the student, the point being to show if attention has been given to the respective strengths of yarns made from each of these drafts.
11. What is the best average draft from drawing frame to the spinning frame for producing the strongest and most even yarn?

WOOL AND WORSTED SPINNING.

Instructions.—As above. Also each candidate should state the name of the town in which he is employed. Not more than ten questions to be answered in either grade.

ORDINARY GRADE.

1. Sketch the shape of a fleece of wool as it is laid out on a sorting board, and mark where the different qualities of wool are found, making eight sorts. (25 marks.)
2. What are the essential points of good washing, and what effect has insufficient scouring on the spinning properties, or the overheating of the suds on the wool? (25.)
3. Design a carding machine for fine wools, with general dimensions of cylinders, rollers, etc.; also the clothing in fillets. (40.)
4. What is a "backwash," and what wools are benefited by its use? In what way does it affect the tare of a top? (25.)
5. Describe the process of "preparing" long wools previous to combing. (15.)
6. How is the weight of wool regulated on the feed apron of a card? Describe a "Hopper" automatic feed. (40.)
7. What are burning rollers? How are they placed and driven? (25.)
8. How is wool prepared for woollen spinning? Give details of a set of machinery. (40.)
9. In worsted drawing, what is the use of a "weigh box," and how are the alterations made? Give examples. (40.)
10. Explain the principles of "cone drawing." (25.)
11. Describe the lifter motion for traversing bobbins, spools, tubes, and cops. (40.)
12. How is twist put into yarns on the mule, also on cap, fly and ring frames? (25.)
13. How many warps of 2,000 ends, 498 yards long, can be made from 6,000 lbs. of 2/62's? (25.)
14. Give the weight in drams, also in grains, of 80 yards of 3-fold 26 worsted and 18's woollen respectively. (25.)
15. How many yards are there in a bundle of 11 lb. of 2/71's? (25.)

HONOURS GRADE.

1. A blend of wool costing 9d. per lb. gives, in sorting—

10	per cent.	of 56's quality.
10	"	48's "
25	"	40's "
35	"	36's "
15	"	32's "
5	"	sink or waste.

Make out the costs of each quality *pro rata* to their value, basing the 36's at 9d. per lb. (40 marks)

2. In wool washing, how is the proper proportion of soap determined, and what is the most approved plan of washing lime skin wools? (25.)
3. In carding engines, the tendency of late years is to increase the diameter of the doffers; what is the object of this, and why should a 40 in. doffer do more or better work than one of 30 in.? (25.)
4. What is the "Apperley feed?" and explain the principles of "ring doffers;" also double and single rubber condensers; also the Belgian condenser? (50.)
5. What is meant by gauge points? Work out an example in a gill box and a spinning frame. (25.)
6. Why is it advisable to draw for carded yarns in open drawing without gills? How many, and what operations would you give to get a 16-dram toving, 40 yards? (40.)
7. How would you make a drawing of a mixture composed of—

10	per cent.	black top.
10	"	white top.
5	"	scarlet top.
5	"	yellow top?

How many ends up, and the weight of each, at first gill box? (50.)

8. Describe the lifter motion for frames, Scaife's and Hodgson's, and in how many ways can the traverse, pitch, and shape of bobbin be altered? (25.)
9. In a 10 lb. bundle of yarn there are 200 so-called hanks, but which only reel 545 yards each; what is the exact count of this yarn? (25.)
10. You have in stock 1,200 warping bobbins of 2/32's, each containing 8,960 yards, how many warps of 2,000 ends, 360 yards, will this make, and how many lbs. will be left over? (25.)
11. A merchant orders 20,000 lb. of yarn, and gives particulars for 1,000 grosses of single 40's, 500 grosses of single 30's, 150 grosses of 2/24's, and 30 warps 1,200 ends, 280 yards. What is the balance of his order still unexecuted? (25.)
12. How are crevel, loop, corkscrew, knicker and spot yarns made? (25.)
13. Sketch a design of the tension pulleys and tape driving arrangement as applied to cap frames, stating the objects and advantages of the system. (40.)
14. If the main shaft runs at 180, the drum being 50 inches, the cylinder 11 inches, the wharfe $\frac{1}{2}$ inch, what size of pulleys must be put on to give a bobbin speed of 7,000 per minute? (25.)

Textile Markets.

COTTON.

MANCHESTER, FRIDAY.

On its industrial side the cotton trade is now in a calmer and quieter condition than for a considerable time past. The combative propensities of the leaders of the operatives and mischief-making subordinates have been considerably repressed by the lesson which has just been taught them. The lock-out in the spinning trade, and the general and firm adherence of the bulk of the trade to the resolution, was a great surprise to these men, and demonstrated that they had carried their policy of irritating interference in the conduct of their employers' businesses to an extreme that would not any longer be tolerated. The result has been a general climbing down from their pretensions. The strike at Stalybridge was settled, as intimated in our last report, by the acceptance by the operatives of the anti-belligerent state of matters. The lock-out, therefore, ended, and save for the expression of irritability and opposition on the part of the local strikers and their friends, who had been taught practically to believe that their union was invincible, the conditions were everywhere accepted. The dissatisfaction having been got over, the Accrington strike, to which we have occasionally referred, and which was of an exactly similar type, was taken in hand and settled in a similar manner. The advantage of unionism amongst the employers having been thus strongly demonstrated, it is rapidly bringing within the local unions and the federations, members of the trade who have hitherto held aloof. The work of organisation is being rapidly perfected, and as the outcome, it may be anticipated that there will be fewer manifestations of the silly and ignorant turbulence which has characterised the workers for two or three years past.

In its commercial aspects there is little change to report. Taken all round the market remains in the same unsatisfactory condition that it has been in for a long time past. The spurt in the Liverpool market, which has recently carried prices $\frac{1}{2}$ d. per lb. upwards, is due to causes other than those of a genuinely healthy kind, and it will not be very surprising if there is not a recession in the opposite direction to, at all events, half the extent towards the point from which the movement started. A general review of the conditions of the principal distributing markets affords no prospect of any immediate revival of importance, and certainly no justification of the trade paying any advanced prices for cotton in face of the great fact that practically no advance can be obtained for yarns and goods. Certainly what little producers have yet succeeded in getting is a long distance away from being an equivalent. Another inconsistent feature in the market may be noticed, which is this: that if the prospect of the current crop turning out to be 9,000,000 bales, had power to send values down to $\frac{3}{4}$ d. per lb., it is inconsistent with the plainest dictates of common sense that the realisation of this should send up values $\frac{1}{2}$ d. per lb. when no other factor has undergone any material change. The advance that has taken place appears to us to be based purely upon an unreasoning sentiment, a frightfully insecure basis for a trader to operate upon, as the slightest adverse change will sweep it all away, as the breeze or the sun dissipates the mists of the morning. The prudent and safest course for the trade appears to us to be to keep all their contracts covered; not to hang off in the firm prejudice that cotton must come down again, and on the other hand not to buy enormously in advance, in the belief that it must go still further upward.

COTTON.—The considerable business exhibited by the estimates of sales of cotton in Liverpool last week proved at the close to have been much exaggerated. The week's estimated figures were 6,000 bales over the actual sales, and it was on the basis of this fictitious activity that the last addition was made to the quotations of American. Since then the price has been with some little difficulty maintained. On Saturday there was a fright amongst the "bulls" owing to Transatlantic reports that the floods were either subsiding or had probably attained their maximum point. Great and rapid fluctuations occurred, but prices ultimately closed with only a loss of $\frac{1}{2}$ a point. There was a moderate demand for spots at unchanged rates. On Monday there was an improved demand from spinners, which steadied the market and slightly hardened prices all round. Futures opened quietly with a loss of $\frac{1}{2}$ a point, then rapidly improved, making a gain of 2 to 2 $\frac{1}{2}$ points; this was again nearly all lost, but another rush before the close brought the register to from 1 to 1 $\frac{1}{2}$ points above the close of the previous day. Spots were in good demand, and made fractional gains. Brazilian was quiet, but for

Egyptian demand was strong. East Indian was quiet, but appreciably harder in sympathy with other growths. The market lost tone on Tuesday, sellers easing off a little. Brazilian and Egyptian were in better demand, and advanced each $\frac{1}{8}$ d. Surats were quiet and unchanged. Futures on the day lost 1 to 1½ points. On Wednesday there was again a fair trade demand, which maintained prices against some other adverse influences—mainly good reports of new crop prospects. Futures, after several fluctuations, lost 2½ to 3 points on the day. Brazilian was steady, Egyptian in good demand and harder in price, whilst Indian, with a fair general enquiry, advanced the quotations of Broach $\frac{1}{8}$ d. Yesterday there was again a good demand for spot cotton, and prices were harder, though not sufficiently so to affect official quotations. Futures fluctuated and finally closed at an advance of 1 to 2 points on the day. For Egyptian there was again a good demand, and official rates of brown were again advanced $\frac{1}{8}$ d. Other growths were steady.

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

	Import.	Forward.	Sales.	Stock.	Actual Export
American..	41,948	49,769	55,670	1,464,010	4,880
Brazilian ..	166	1,190	1,790	46,880	—
Egyptian ..	5,945	5,608	6,680	101,500	2,696
West Indian	2,077	567	840	35,750	20
East Indian	7,941	3,685	1,920	49,630	2,061

Total .. 58,077 .. 60,819 66,900 1,688,770 .. 9,657

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

	G.O.	L.M.	Md.	G.M.	M.F.
American.....	3½	3½	4½	4½	4½
Pernam.....	3½	4½	4½	4½	4½
Ceara.....	3½	4½	4½	4½	4½
Paraiba.....	3½	4½	4½	4½	4½
Maranhã.....	4½	4½	4½	4½	4½
Egyptian.....	4½	4½	4½	4½	4½
Ditto white.....	4½	4½	4½	4½	4½
M.G. Broach..	—	—	—	3½	3½
Dholerah....	2½	3	3½	3½	3½
Oomra.....	2½	3	3½	3½	3½
Bengal.....	—	2½	2½	3½	3½
Tinnivelly....	3½	3½	3½	4	—

* Nominal.

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.
May.....	4-1 2	4-3	4-2 b	3-63 4-0	4-1 2	4-2 3
May-June..	4-1 9	4-3 8	4-2 b	3-63 4-0	4-1 2	4-2 3
June-July..	4-3 8	4-4 8	4-3 4	4-1 8	4-2 3	4-3 4
July-Aug..	4-5 v	4-5 b	4-6 s	4-3 4	4-5 b	4-5 s
Aug.-Sept..	—	4-8 b	4-8 s	4-5 0	4-7 8	4-8 b
September.	4-7 8	4-10 11	4-10 b	4-7 8	4-9 10	4-10 11
Sept.-Oct..	4-10 s	4-10 11	4-10 b	4-7 8	4-9 10	4-10 11
Oct.-Nov..	4-10 s	4-13 s	4-14 15	4-10 8	4-11 12	4-12 13
Nov.-Dec..	4-12 b	4-15 v	4-16 17	4-12 v	4-14 s	4-14 15
Dec.-Jan..	4-14 15	4-17 b	—	4-14 b	4-16 b	4-17 s
Jan.-Feb..	4-16 17	4-20	—	—	—	—

Price of Mid American.	4-1-16	4-1-16	4-1-16	4-1-16	4-1-16	4-1-16
Estimated Sales including Spec. and Export.	7,000	12,000	8,000	12,000	12,000	10,000
	500	2,000	1,000	1,000	1,000	1,000

YARNS.—The slight increase of enquiry reported in our last, arising from the stimulus given by the activity of Liverpool, has not made further progress. It continues near about the same volume, and has enabled some slight increase of transactions to be recorded, manufacturers willing to take very low figures having been enabled to place a few orders. This has reacted on the yarn market, and led to an increased number of transactions therein at a slight improvement, though very slight upon the low prices recently current. The aggregate, however, is not very great, and leaves the manufacturing branch in a position in which a great number of looms still remain idle. Spinners for the home trade have kept a steady front towards buyers; backed by the firmness of cotton this has been easy. But no further progress was made until Wednesday towards enhancing values, when a little more strength was developed owing to the continued activity of cotton. Egyptian yarns were in best request yesterday, and some fair amount of business was put through. Americans for the home trade were not bought with any

freedom. Spinners were firm in their prices owing to the aspect of Liverpool, but they had few temptations placed before them by either home or export buyers.

CLOTH.—The demand for cloth has been maintained at about the level of that of last week, or perhaps it shows a very slight falling-off. The great want of the market is a good Indian demand for plain fabrics, which is not forthcoming. The business done for the chief Eastern markets and especially for India has been in the various kinds termed fancies, which have been placed moderately well under engagement. Prices of these are now generally advanced. Jaconets and mulls too have met with some enquiry, but there is a great lack of enquiry for plain goods of a grade a trifle below the best and downwards, for what are sometimes termed the cheese-bread stuffs of the market. On the whole the aspects of the market up to yesterday are a little more promising than has been the case of late. Yesterday the report of the cloth market was not so uniformly dull as so often of late, but though more enquiry came to the surface it did not lead to any material increase of transactions.

To-day there is no perceptible change in the condition of the market. The bulk of the cloth enquiries remain hopelessly out of reach. Yarn is firm and the turn dealer, and cotton is very steady.

WOOLLENS AND WORSTEDS.

BRADFORD.—The demand for local productions is not quite so brisk as was the case a few weeks ago. There are not many new contracts placed for yarns, and machinery is not fully employed. Mohairs are steady. The piece trade does not alter much.

LEEDS.—Some large orders have been placed on recent market days, chiefly for account of provincial centres. Manchester and London houses have stocks to carry them over Whitsuntide. Prices tend upwards. Fine makes sell well to the United States, and Colonial orders are coming in.

Huddersfield.—Recent improvement is still maintained, but, speaking generally, business is not so brisk as it was expected to be, and as it is now getting between the seasons, matters will remain pretty much as they are for a few weeks. Some of our leading manufacturers are keeping their mills well occupied with good orders which have latterly come to hand, and which will keep them going for some time—particularly in the better class worsted cloths, novelties intended for shipment to America and the Continent.

ROCHDALE.—Season orders are rather scarce, as distributors have not yet arrived at an estimate of drapers' probable wants during the season. Athletic flannels have not been bought so largely as manufacturers hoped, the demand having been injured by the unfavourable weather. All the mills are not yet working full time.

GLASGOW.—Messrs. Ramsey and Company, wool brokers, in their report dated 24th May, say:—Wool: There is no change to note in the Scotch wool market. There is little doing in the home trade, but shipments of black-faced wools continue, and stocks are now much smaller than was at one time anticipated. Values are unaltered. Sheepskins: The supply has been only moderate, but mostly of good qualities. Demand somewhat irregular, without change in quotations.

FLAX AND JUTE.

DUNDEE, WEDNESDAY.—Since the last report, the jute market in Dundee has been in a state of panic. Jute is unsaleable except at a further decline. New jute is offering about £1 per bale (not per ton) under recent quotations here for old, and even at £15 buyers are shy. Jute yarns have for common 8 lb. cop fallen from the top price two months ago of 1s. 10d. to 1s. 4d. For the higher qualities by the best spinners the price is still quoted much higher relatively, but even the best qualities are forced down by the tremendous fall in the lower kinds. The same remark applies to jute Hessians. The lower qualities are quoted at 1½d. to 1½d. for 10½ oz. 40, while cloth with the same name of the best makers' goods cannot be bought upon anything approaching to that basis. Flax is without change in value, but spinners being well bought it is not possible to make sales without some concession. Fine tows suitable for the best warps remain very scarce and relatively dear. For all other kinds the price is in favour of buyers. Linen yarn is quiet and without change. Tow yarns, especially the heavier sizes, droop. Linens are in fair demand. Fifehire is busy in fancy linen goods, and Forfarshire linen looms are fairly engaged. The home trade is still lifeless, however, and leaves much to be desired. Arbroath heavy Canvas does not move, and there the looms are running short time. The Dundee Fancy jute trade is stagnant, and manufacturers are stopping looms. Twines, cords and ropes, and jute harvest twine are all wanted, and indeed in active demand.

SILK.

LYONS.—The Lyons Silk Conditioning-house figures for last week give a total of 143,468 kilos., against 123,946 kilos. in the preceding week, and 94,402 kilos. in the corresponding week last year. It will be observed that last week's total is quite extraordinarily large and seems to indicate continued great activity in the Lyons silk market. The total includes, however, it is explained, a large proportion of deliveries against old purchases, though, at the same time, it shows that recent business was on a much more extensive scale than was supposed at the time. A noteworthy feature is that there does not appear to be any purely speculative business included; the figures represent transactions for consumption exclusively, so that the silk in question must be regarded as finally taken off the market. It may be inferred, therefore, that stocks are rapidly diminishing. During last week there were symptoms of slackening in the market, but these are, of course, not surprising, after the recent activity, and cannot be regarded as indicating an adverse change in the position and tone of the market. On the whole the market continues steady. Lyons and St. Etienne manufacturers are busy, the demand for consumption is very good, and it is even a question whether supplies will be adequate to meet requirements pending the arrival of the new silk. Moreover, a further slight improvement of prices is recorded. The reports concerning the new crops are becoming interesting. From Syria considerable losses are announced, and it is said that in Spain the progress is somewhat disappointing. From Italy also it is reported that the quantity of eggs put for hatching is inferior to last year's. It is, however, too early to form anything like a reliable opinion as to the new silk crops as a whole. In Lyons, Japanese raws have continued as the description most favoured by demand. At Marseilles there has been a good demand for both cocoons and prepared silk, though the higher demands of sellers have restricted business. The Milan market has continued firm, especially for raws.—Manchester Guardian.

DRY GOODS.

MANCHESTER.—The carpet trade does not come up to the expectations of merchants. The variety of patterns shewn is all that could be desired, but retailers do not seem to operate. Cheap jute goods, imitating Brussels and Kidderminster effects, are now produced in excellent taste, and the sale is large. The ribbon trade holds its own. Flannelette meets with a good deal of support. The article has been cheapened wonderfully, and now sells well under 2½d. a yard. The appearance has also been improved by the use of fancy designs, which imitate various classes of woollen goods as well as flannels. The Pottery strike being over, travellers' orders from that district have again commenced to flow in. Velvetens are slow in the home trade, but there is rather more doing on shipping account. Silk velvets are used as trimmings, but the trade generally is dull.

HOSIERY AND LACE.

LEICESTER.—Yarns are steady, and spinners assume an independent attitude. Lambs' wool and natural wool yarns sell largely, and cashmeres are in good demand. For hosiery there is a steady enquiry, and rates are low. Cords, braids, and dress handings are active, but elastic wools generally are quiet.

NOTTINGHAM.—The lace trade is not buoyant, as is shewn by the fluctuating character of the demand for curtain and other yarns consumed in the district. The hosiery trade is also quiet, and silk lace does not meet with much enquiry. Cotton nets are in moderate request at previous quotations. Silk Mechlin and Cambray tulle are in good request, but heavy foundation nets are slow of sale. There is a large amount of fancy millinery lace selling, and manufacturers are hastening delivery before Whitsuntide.

Joint Stock and Financial News.

NEW COMPANIES.

JOYMOUNT BLEACHING, DYEING AND PRINTING COMPANY, LIMITED.

Registered by Jordan and Sons, 120, Chancery-lane, W.C. Object, to carry on the business of dyers and bleachers, finishers, etc., in all its branches, and to carry into effect two agreements expressed to be made

(1) between A. H. Ryeroff of the first part, Swindells, Peel and Co., Limited, of the second part, and this company of the third part; (2) made between A. H. Ryeroff of the first part and this company of the second part. For the purposes of registration, the company is declared to consist of 18 members, with an individual liability, in the event of the winding up of the company, of £1.

LORD AND CO., LIMITED, ROCHDALE. Capital, £15,000, in £10 shares. To take over as a going concern the business of manufacturing flannel now carried on at Rochdale and elsewhere under the style of Lord and Co. Subscribers:—

- Shares. W. Lord, 166, Portland-street, Southport, flannel manufacturer 1 S. Lord, Holland-street, Rochdale, flannel manufacturer 1 Mrs. H. L. Holland, Ashton-under-Lyne 1 Mrs. L. Lord, 166, Portland-street, Southport 1 Miss A. Lord, Holland-street, Rochdale 1 J. Lord, 5, Beswick-street, Rochdale 1 N. Pickup, 73, Ramsey-street, Rochdale 1 Qualification of directors, £100; remuneration to be fixed. Mr. S. Lord is the governing director.

Patents.

NOTICE OF REMOVAL AND CHANGE OF FIRM.

E. K. DUTTON & CO.

CHARTERED PATENT AGENTS,

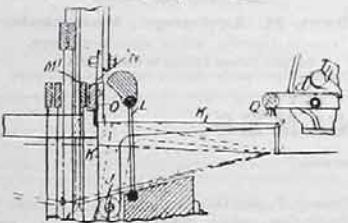
(Late DUTTON & FULTON).

Removed from 1, ST. JAMES'S SQUARE, to QUEEN'S CHAMBERS, 5, John Dalton St., MANCHESTER.

ABSTRACTS OF SPECIFICATIONS.

19,536. December 1, 1899. Looms. J. STAMKIE, Shade Mill, Teulmarde. Reeds.—The reeds are made of steel wire which has been subjected to the ordinary flattening and polishing processes and then to a hardening and tempering process, whereby it has acquired a protective film or coating.

19,540. December 1, 1899. Looms. W. TERRY and F. RAWNSLEY, both of Dudley Hill, near Bradford.



Pile warp forming.—In looms for looped fabrics, such as heart rugs, deer mats, imitation skins, etc., a series of blades K, mounted on a shaft J, pass between the dents of the reed L. A horizontal bar N carries a grate or comb O, between the prongs of which pass the pile warp threads, the pile warp head M being lifted by its cam above the other heads at certain times to bring the shed in its position above the blades. The shed is moved laterally by lever and cam action, each pile warp thread crossing a blade to form a loop, which is then bound in by a weft pick. The shaft J may be rocked by levers and cam mechanism in order to raise the blades and increase the size of the loops as required. The pile warp is let off from bobbins and passes over a drum and around a rod on a cam-worked lever arranged to draw off the required amount of warp. The loops are beaten up by the lay and are stripped from the blades by a reciprocating brush Q travelling upon a bigged cam B and a fixed cam A. The blades may sometimes be formed with knife edges to cut the loops.

19,541. December 1, 1899. Ropes and Cords. G. B. C. URSORRETT, Green Lane Mill, Derby. Cords of silk, cotton, etc.—The finished cord is given a greater twist on the reeling bobbin than it can retain when free. It is left on the bobbin for some hours and then rewound on to another bobbin, the superfluous twist being at the same time taken off. A machine for making is described. Drawings.

19,566. December 1, 1899. Finishing Fabrics. D. STEWART and R. WALKER, both of London-road Iron Works, Glasgow, N.B.

Stretching or untwisting.—Relates to chain clips. The fabric F is gripped by the bar A pivoted at B. To prevent more than the advance being gripped the lever G is provided pivoted at H. When so much of the fabric is within the clip that a slot in the plate J is covered, the prong G is supported and the hook G3 catching under the tail A2 of the bar A holds the latter up. As soon as the prong G2 is free to fall into the slot the bar A is released and the fabric is gripped. The clip is released at the proper moment by a cam guide actuating the upper arm G4.

19,622. December 1, 1899. Laco-making. F. ELSLEY, Russell-street Works, and S. T. KIRK, Gamble-street, both in Nottingham.

Lace is threaded with tape, spotted, gimped, or thick threaded (separately, or in combination) by means of thread guides, which pass through longitudinal slots in the ordinary guide-bars. These slots are open at the middle of the top edge to allow the tapes or threads in the guides to be passed from one side of the fabric to the other. Drawings.

19,638. December 2, 1899. Spinning. J. JORDAN, Mold Green, Huddersfield. Casting yarn.—The yarn is wound on to spindles, being guided thereon by traversing guides, the rail carrying which is balanced by a weighted chain passing over a pulley driven through suitable gearing from the tin roller which drives the spindles. If desired, more than one spiral layer of yarn may be wound on the spindles, the traverse rail being for this purpose reversed, when it arrives at the upper end of the traverser, by operating a hand lever carrying change gearing. The curl in the yarn is fixed or set by boiling and drying, and the yarn is unwound from the spindles by any suitable means. Drawings.

19,642. December 2, 1899. Ropes. W. J. CROWE, H. T. PHILLIPS, W. J. BETTS, all of Ebbw-street, London. Strands.—The strands are formed with a core of twisted asbestos fibres, round which wires are spun spirally, and over these are twisted strands of manilla hemp or other fibre which may be dipped in a fire-proof solution. Where imflammability is not an object, a core of india-rubber may replace the asbestos. Drawings.

19,643. December 2, 1899. Pile fabrics. G. MARCOTTI, Dean Clough Mills, Halifax. In weaving looped fabrics for carpets, rugs, etc., worsted warp threads for the figure portion of the design, alpaca or mohair threads for the ground portion, or vice versa, are employed. Or the ground and figure portions may be composed partly of wool and partly of alpaca or mohair threads.

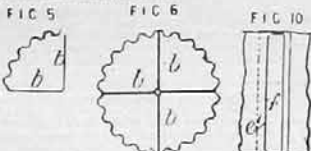
19,683. December 3, 1899. Bobbins. F. FOWLER, Troutbeck Bridge, Windermere. Wool bobbins are provided with a metal or other suitable lining, in order to prevent oil from passing through them, and discoloring the cotton. Drawings.

19,689. December 3, 1899. Spinning. H. HICKTON, Chestnate, Stockport.

Skips for yarn.—The bottom of the skip is provided with a protecting ledge or support B of T, X, or Y sections which takes on to the rail of the spinning or doubling frame and is slid along the same during the doffing operation. The vertical member of the support takes against the side of the skip, and one of the horizontal members is secured by passing through it the vertical ribs of the skip or by clamping it to a plate C on the inside of the skip.

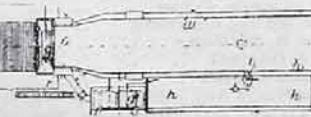
19,782. December 4, 1899. Cop Tubes. J. B. G. and J. B. SWALES, all of Moorhey, Oldham. Cop tubes are made from blanks severed without waste from a continuous strip of paper, etc. Drawings.

19,849. December 5, 1899. Spinning. J. H. STOTT, Wardleworth Iron Works, Rochdale.



Swifts or reels.—The axle is formed of one or more sheets of metal so bent or shaped that the axle is provided with one or more longitudinal strengthening plates or ribs. Fig. 5 is a section of an axle formed by joining together four segments, each formed by bending a sheet of metal in the manner shown in Fig. 6, the parts b forming longitudinal strengthening plates. The tube forming the axle may also be cyrurgated longitudinally and each segment may have other strengthening plates secured within it. If desired, two of these tubular axles may be joined together endwise, so as to form a longer axle, the end e1 (Fig. 10) of that tube which takes within the other being strengthened by a flanged disc F. The ends of the axle are provided with short solid axles which take into the usual bearings. The Provisional Specification states that axles formed of sheet metal may be strengthened by so arranging the metal sheets that the joints shall be spirally arranged with regard to the axle of the swift.

19,878. December 5, 1899. Washing Wool. J. and W. McNAUGHT, both of St. George's Foundry, Rochdale.



Relates to machines for washing and scouring wool and other fibrous materials. Consists in providing at the side of the washing tank a, a settling tank b into which the water which has passed with the wool down the shoot c to the squeezing rollers d is raised by a scoop wheel e from a trough g connected with the trough f by a pipe h. At h1 is an opening by which the water passes back to the tank a, and at j is a valve at a lower level for connecting the tanks when desired.

19,929. December 6, 1899. Gig mills. H. GROSSELDI, Sedan, Ardennes, France.

Relates to machines comprising a drum with working rollers arranged or grouped to act simultaneously with an agitating nap while turning in the same direction. The rollers which act with the nap communicate motion to the others by means of intermediate parts connecting the two sets together, such as internally or externally toothed wheels, friction gearing, belts, or other connecting devices. The difference between the speeds of two sets, constituting the useful effect or degree of working energy which is equally divided between them, can be varied in different ways. The rollers may have pinions of different axes, all of which engage with an internally toothed wheel and the variation of energy is obtained by changing the pinions for others having different numbers of teeth. When belt gearing is used, the variation of energy is obtained by altering the tension of the belts. Drawings.

20,209. December 14, 1899. Knitting. J. WILSON, Drake-street, and R. HUTCHINSON, 15, Fleet-street, both in Nottingham.

Straight-bar machines; finishing.—In producing double or parallel rows of narrowings as in the French foot, each point carrying leg is operated by a slide from the ordinary narrowing

screen, but has also a cam, so placed as to allow the bar to return a part of the distance it has been traversed, in order to produce the parallel rows. At the same time a part of each set of narrowing points is drawn out of action by levers from a cam, operated as the fashioning machine accords by a ratchet wheel and a fixed clawker. Drawings.

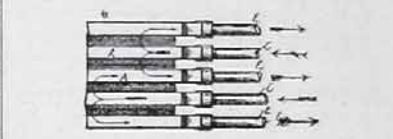
20,139. December 19, 1899. Looms. I. W. FIELDING, Bentinck-street Mill, Moses Gate, near Bolton.

Change-bar motions.—The pattern cards or plates A of check looms are prevented from becoming detached from their carrying chains B, by means of clips D composed of a spring plate or plates and extending over the ends of the cards, as shown. Drawings.

20,202. December 11, 1899. Looms. J. KENTON, Greenfield Place, Clayton, near Bradford.

Pattern lay and pegs for dobbers, with engines, etc. The pegs are held in the holes in the lay by means of a plate formed with holes, the pegs passing through such holes and being locked by sliding the plate endwise until it passes over shoulders or other grooves formed on or in the pegs. The plate is secured in position by screws. Drawings.

20,210. December 11, 1899. Finishing Fab. W. WALKLEY, West Croft, Wyke, and T. W. STRAD, 11 Halifax.



The fabrics are placed in a folded condition between hollow pressing plates A, perforated on their opposing faces, and provided with suitable inlet or outlet pipes C, E, and with internal baffles. After the pressure is applied, steam is passed in at each end of alternate plates by the inlets C, and, after passing through the fabric, is allowed to escape from the intermediate plates by the outlets E, as shown by the arrows. Afterwards, hot air, or a mixture of steam and air, is passed through in a similar manner.

20,241. December 11, 1899. Lace-making. W. BENSON, 85, Robin Hood-street, Nottingham.

Lobbing, winding.—To prevent expansion of the sides, the lobbing is held between recessed discs on spindles. Other details are given. Drawings.

20,257. December 12, 1899. Treating Yarns, etc. A. H. BRIDGE, Buggella Mills, Bradford.

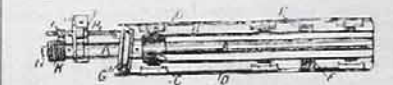
Relates to a continuous process and apparatus for scouring, drying and stretching mohair, alpaca, and wools and similar yarns. Consists in passing the threads in a separated condition first through a series of vessels containing soapuds and provided with squeezing rollers, then around a series of steam-heated drying cylinders and guide rollers, and finally through drawing-off rollers provided with screws to adjust the pressure. Drawings.

20,259. December 12, 1899. Treating warps. W. W. BOTTOMLEY, Hamer Vale Mills, Hamer, Rochdale. Consists in a machine for successively scouring, sizing, drying, and winding on the loom beam woollen warps without the use of an intermediate winding frame. Drawings.

20,257. December 12, 1899. Washing wool. A. S. and F. AWSON, all of Prospect and Well House Mills, Wilden, near Bingley.

Relates to improvements on the apparatus described in Specification No. 13,697, A.D. 1889. Consists in a convoluted channel of broad shallow cross-section, to which the wool or other fibre is fed by an apron and water by a pipe and reservoir. A portion of the bottom is perforated, so that said, etc. may fall below. The wool is delivered by a grating to the squeezing rollers, and the expressed water is conveyed by a tray to a reservoir. The rollers are driven together by weights and levers. A pivoted plate checks the flow of fibre and keeps it compact for delivery to the rollers. Drawings.

20,280. December 12, 1899. Stretching fabrics. C. L. JACKSON, Wharf Foundry, and J. EDGE, 35, Wynn-street, both of Bolton.



In an expanding roller, the toothed stretching plates D slide in stays or supports C on a barrel B, mounted on the shaft A. The swivelling ends G1, for operating the stretching plates, are actuated by shafts H, which pass through bushes F in the bearings or fixings M, and are operated by nuts I from worms K at the ends of the shafts A. The shaft is fitted with nuts N to enable it to be operated by a box-key or its equivalent.

20,403. December 13, 1899. Looms. M. A. FICKER, and C. G. HERTSCHMIDT, both of Chemnitz, Germany.

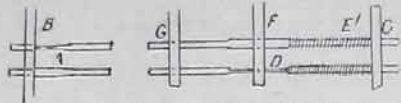
Needles having two parallel rows of wires or leashes B are formed with such wires bent round the shaft of an upright at e by twisting, etc. The wires may be united at the top in the same way as at e, and they may, in some cases, be formed with loops at the bottom taking on to two parallel shafts.

20,563. December 17, 1899. Dyes. B. WILCOCK, 47, Lincoln's Inn Fields, Middlesex. (Färbefabrikanten vormals F. Bayer & Co., Elberfeld.) Indigo azoic.—Relates to the manufacture of indigo carmine directly from phenylglycoyl, or its salts, or others. Consists in adding phenylglycoyl, which may be mixed with sand, to fuming sulphuric acid containing 20% of free anhydride, keeping the temperature down to 20° C. The yellow liquid produced is treated with sufficient sulphuric acid of 60° Be. to convert the excess of anhydride into sulphuric acid. Or other suitable means, such as a current of moist air, may be employed for this purpose. The resulting blue liquid is poured upon ice, and the colouring matter is salted out in the usual manner. (Grant of Patent applied.)

20,595. December 17, 1899. Jacquards. M. TUGOT and M. BONDARD, Halifax Place, and C. H. CRAWLEY, 14, Thompson's Terrace, Brixton-street, both in Nottingham.

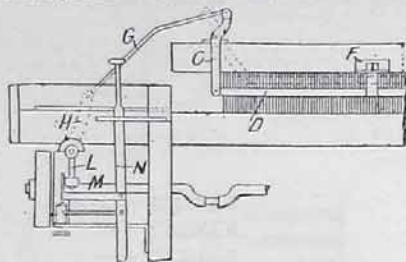
The needles are flattened to form shoulders A near the front

as which pass through the needle plate B. They are cranked to engage with the lifting wires, and their back ends pass through plate C and are flattened to form shoulders D between which and the plate C are provided springs E. The flat parts slide



between supporting wires F, and in a vertically slotted plate G. The arrangements may be applied to double-action machines.

20,646. December 18, 1890. **Looms.** G. and A. T. JENNINGS, Central Works, Thornton-road, Bradford.



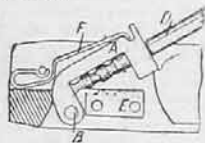
Shuttle-guard.—The guard-bar D is carried by levers C pivoted to brackets on the hand rail, and operated through a rod G, and levers H and L from a bar M on the starting rod N. The guard is in the position shown in full lines when the loom is at work, but is raised out of the way when the loom is stopped. A projection on the bar enters a slotted bracket F for steadying purposes.

20,683. December 18, 1890. **Driving belts.** R. DICK, Greenhead, Glasgow.

Waxed belts are treated, while heated, with one or more coatings of gutta-percha, or gutta-percha compounds on one or both sides. Edgings and a facing of gutta-percha may then be applied by heat and rolling. Strips of fabric treated with gutta-percha may be applied along the edges, also transverse gripping strips of canvas, leather, or cork.

20,772. December 20, 1890. **Looms.** J. WADDINGTON, Holme Top Mills, Little Horton, Bradford.

Shuttle.—The tongue D is inserted into the tongue head A which is pivoted at B and comes down on to the rest block E. The tongue rests in a half-round groove in the block E, and has annular grooves in which projections on the block E engage to prevent longitudinal motion. The spring F which normally holds the tongue head A down, is arranged to engage in a notch to hold it up while the spool, etc. is being changed. The block E is fixed by two rivets passing through the shuttle.



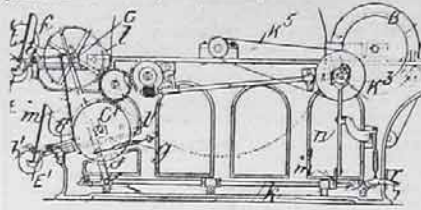
20,806. December 20, 1890. **Spinning.** I. F. LAWRY and R. WILLIAMSON, both of 34, Leadenhall-street, London.

Combing rhea, etc.—In machines in which the fibres are drawn through the teeth of the comb by nipping mechanism, the fibres are fed into the machine in the form of a lap in order that they may be nipped uniformly by the nipping mechanism. The lap is formed by passing the slivers through a roll box and winding the resulting film on to a drum until the lap has acquired the desired thickness, when it is torn across and wound on to a suitable roller.

20,808. December 20, 1890. **Spinning.** I. F. LAWRY and R. WILLIAMSON, both of 34, Leadenhall-street, London.

Rolling boxes.—Details are described whereby the ball with its core is left resting on the drums and can be readily removed by passing a bar through the core. The invention is specially applicable to lap balling. *Drawings.*

20,811. December 20, 1890. **Spinning.** I. F. LAWRY and J. T. MEATS, Taunton, Massachusetts, U.S.A.



Carding engine.—The carding engine is provided with two or more sets of feeding apparatus, so that two or more laps are fed to the machine simultaneously, and a stop motion is provided by which the feed mechanism and doffer are stopped when one of the laps runs out. The doffer B and the feed rolls C, C1, which supply the cylinders in I, I1 respectively, are driven from the shaft of the main flyer through a belt K5 and pulley, which is connected by a clutch arrangement and suitable gearing to the doffer and feed rolls. Each lap is formed on a rod L, L1, and rests upon a grooved roller E, E1, so that when a whole lap has been fed into the machine, the rod is carried forward by the corresponding grooved roller until it rests upon pivoted levers h, h1, which are connected together by a rod m, and one of which is provided with a catch for engaging with a projection on the shipper rod f, and holding the same in the working position. When one of the rods L, L1 falls on to the levers h, h1, this catch is released, and the shipper rod f, operated by a spring g, turns a rocking shaft k, which, by means of an arm m3 and lever n, disengages the clutch on the shaft K5. The parts may be again put into gear from the doffer end of the machine by moving the catch r1 and releasing a spring lever r, by which the rod k is turned and the rod f moved to its starting position. The two taker-in rollers and the doffer comb are driven by belt gearing from the shaft of the main cylinder.

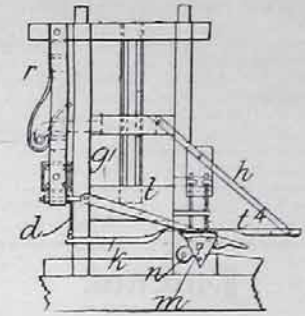
20,845. December 20, 1890. **Dyes.** H. H. LAKE, 45, Southampton Buildings, Middlesex. (Messrs. Wirth & Co., Agents for Kalle & Co., Bielefeld-on-the-Rhine.)

Indulines.—Relates to the manufacture of sulphonic acids of rosindulines. Consists in first preparing the bases C22H25N3, C22H14N3C7H7, and C22H14N3C10H7, by heating with aniline and aniline under pressure a salt of benzol-azo-a-naphthylamine, or of benzol-azo-ortho-1-a-naphthylamine, or by melting these compounds with aniline in the usual manner. The base C22H15N3 is converted into its sulpho acid by treating it with fuming sulphuric acid containing 25% of free anhydride, and heating on a water bath until soluble in ammonia. The sulphonic acids of the bases C22H25N3 and C22H14N3 are obtained by heating them with fuming sulphuric acid of 24% free anhydride at 70–80° C. for 4–5 hours.

20,889. December 22, 1890. **Dyes.** O. IMRAY, 26, Southampton Buildings, Chancery-lane, London. (Farbwerke vormals Meister, Lucius and Brünig, Höchst-am-Main.)

Blue Dyes.—Relates to the production of blue to blue-violet colouring matters by the combination of diazodiphenylamine and its homologues with certain oxynaphthalene sulphonic acids. Consists in agitating for 24 hours a solution of diazodiphenylamine, phenyltolylamine, or ditolylamine with an alkaline or acetate of sodium solution of one of certain naphthol mono-, di-, and tri-sulphonic acids, certain dioxynaphthalene mono- and disulphonic acids and certain amidonaphthol disulphonic acids. The colours dyed in wool in an acid bath are suitable for discharging.

20,901. December 22, 1890. **Looms.** W. HOLTBAUS, Elberfeld, Germany.



Jacquards.—For reducing the number of cards the pattern cards are used also as ground weft cards. A plate d is pushed in front of the needle row, whereby all the needles, except those forming the ground weft, are pushed away from the knives and rendered inoperative, as if ground weft cards were used. The plate d is raised by levers k hinged to levers h on the loom framework and operated by lifters a on the shaft m. The latter carries a pin disc z, which is turned by a catch t worked by the battens r, and is locked in position by spring pins t4. The plate d works on vertical guide rods, and is formed with openings through which pass the needles working the ground weft books, the pattern card being perforated accordingly. The cylinder catches are put in and out of action by a lifter on a shaft, which is operated from the battens as in the case of the shaft m. A secondary cylinder, with a small card chain for the selvages, is mounted on the shaft g1 of the main cylinder, and is turned independently of the latter.

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