Editorial Notices.

Articles, Correspondence, Reports, Items of News, on all matters of novelty and interest bearing upon the Textile Industries, home or foreign, are solicited. Correspondents should write as briefly as possible, on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication, but as a guarantee of good faith. When payment is expected, an intimation to that effect should be sent with the contribution. The Editor will do his best to return ineligible MSS., if accompanied by the requisite postage stamps, but will not guarantee their safe return.

*** Readers at home and abroad are invited to avail themselves (gratis) of our columns, for the purpose of entering into communication with machine makers or others able to supply their wants, and for obtaining any other information on textile matters which they may desire. Their names will not be published unless requested.

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.

Publishers' Notices.

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The Textile Mercury.

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OUR TRADE WITH HANKOW.

In a consular report just to hand from Mr. C. T. Gardner, British Consul at Hankow, attention is called to the fact of a decreased import into Hankow last year of nearly all classes of cotton goods except Indian yarns. The figures are as under:—

Articles.		1891.		1890.	
		Quantity.	Value.	Quantity.	Value.
Cottons—					
Drills, English	Pieces	27,155	£14,765	29,733	£22,297
Lastings	,,	55,959	37,419	55,682	54,919
Sheetings	,,	81,418	44,829	106,405	£1,671
Shirtings	,,	2,304,567	935,474	2,465,455	921,175
T-Cloths	,,	150,925	42,394	116,237	32,248
Yarn, English	Lb.	2,373,200	94,355	2,930,133	120,428
,, Indian	,,	17,475,200	534,611	16,920,667	590,297
American drills	Pieces	91,259	56,121	68,325	39,040
Italians	,,	52,722	53,935	42,060	43,291
Chintzes, etc.	,,	159,303	48,055	146,056	43,815
Turkey Reds	,,	166,096	54,797	88,489	30,028
Velvets	,,	14,687	25,838	14,530	21,795
Sundries	,,	..	36,431	..	32,187
Total cotton goods		..	1,978,934	..	2,042,031

This, remarks our Consul, is most unsatisfactory. There is in the region supplied from Hankow, a teeming population dressed from head to foot in cotton, innumerable flotillas of boats propelled by cotton sails and covered with cotton awnings, houses and huts provided with cotton portières, curtains, and bedding; yet how insignificant does our import of cotton look by what evidently, judging from the import of 635,000,000 needles, should be the case! One of the districts supplied from Hankow, the province of Ssu-ch'uan, grows no cotton: it imports raw cotton, cotton yarn, and native goods. The Consul declares that he has sent to Manchester specimens of nearly all the native cloth textiles in use in the district, with particulars of the quantity used, the price at which retailed, etc.; and he confesses to a feeling of disappointment that our manufacturers have not as yet made more serious attempts to produce commodities suitable to the native requirements. He again points out that for clothing and awnings the fabric principally in use is a strong material 14 inches wide, dyed dark blue with indigo; for sails of boats an undyed fabric, slightly stouter than English drills, also 14 inches wide, undyed and unbleached, and also unsized, as the size in such cloths renders them liable to rot when exposed to wet. With regard to the cloth used for sails, all the numerous boats sailing from Shasze to Ichang for Chungking buy new sails before starting, which they sell in Chungking to be cut into smaller sails for the boats higher up the river. On the return journey to Chungking boats drift down with the swift current and do not use their sails. Many of these boats are wrecked at the rapids, and in lieu of our system of insurance they have what they call "pang" associations for mutual aid and assistance. The existence of these "pang" would greatly expedite the demand for suitable sail cloth, as if once our manufacturers could provide such an article for one boat the whole "pang" would quickly adopt it, and the example would be followed by other "pang." It is pointed out to enterprising manufacturers who wish to push the sale of their commodities in these regions, that it would be a wise course to put themselves in communication with British firms at Hankow, as at Shanghai, who deal in piece-goods, and whose names can be found in trade directories, and arrange references. It would be still better if manufacturers acquainted with all the details of the home production would visit the East and place themselves in communication both with the British dealers and the native middlemen with a view to an extension of trade. "It is only a waste of postage," Mr. Gardner adds, "to send Her Majesty's Consul, as some persons have sent me last year, snips of cloth, with a request that the Consul will obtain orders for a bulk of such goods. The specimens of cloth thus sent to me have been unfitted for the market here; of those that have been dyed, the colours have run and they have presented a most blotched appearance. I could far more readily imagine a desire to sell than a wish to purchase such commodities, but even if the specimens had been all that was suitable, Her Majesty's Consular officers in China are for good reasons prohibited from trading, and are therefore unable to solicit orders for any home manufacturers."

INDIAN YARN IMPORTS INTO HANKOW.

The table in the preceding note shews a slight increase in the imports of Indian yarn into Hankow for 1891 as compared with 1890. In this connection Consul Gardner points out that the province of Ssu-ch'uan grows no cotton; there is no practical land route from Hankow to Ssu-ch'uan, the Yangtse with its rapids, most formidable to native craft, being the only highway to commerce; and the cost of importing so bulky a commodity as raw cotton into Ssu-ch'uan is enormous. The consumption of this staple in Ssu-ch'uan is about 300,000,000 lb. a year. Much of this is used for wadding for winter garments, but much is woven into fabrics. The replacing of this portion of the import of raw cotton by cotton yarn, which is a dead-weight cargo, must naturally effect a great saving in freight and enable the cloth vendor to sell and the consumer to buy the textile at a cheaper price. It is to be noted that Indian yarn is preferred to English yarn, as the native women find it easier with their rude looms to weave Indian yarn into cloth than English; or, in other words, the Indian spinners have been more successful than their English rivals in producing the article the customers in Ssu-ch'uan want to buy. Weaving yarn into cloth is, like the production of silk, essentially a cottage industry. It is done at home by the women of the family when the agricultural work is slack, and consequently to a great extent the difference of cost between machine and hand labour is done away with. Hence for the rural districts the increase in the import of cotton yarn is proportionately greater than that of fabrics; but still there should be an increase in the sale of our fabrics in the large riverine towns of Ssu-ch'uan. To this the opening of Chungking as a treaty port, whereby our manufactures can reach that town without paying the inland transit dues of 2½ per cent. *ad valorem*, should contribute.

THE SILK PLUSH TRADE.

"Half of the machinery at Manningham is covered with dust, and 2,000 workmen are on the street," said Lord Masham at a Society of Arts meeting recently. The trade is still in a depressed condition, but if it be true, as we are informed, that some of Messrs. Lister's velvet hands returned to work last week, it would appear

that an improvement in the outlook has taken place. High authorities in Bradford, we may add, expect that the summer demand for silk pile goods will shew a decided change for the better in comparison with that of last year.

A Society Critic on Manchester Trade.

One of the "society" journals, with which London swarms, has been edifying its readers with an account of the state of trade in Manchester. Business here is so bad, it appears, that representations have been made in influential quarters with the view of inducing the Queen to encourage local industry by a greater patronage of Manchester goods! This, it is hoped, will tend to improve the commercial outlook, which, we are gravely informed, is very forbidding. There is some more information of an equally entertaining kind to be found in the paragraph whose contents we have summarised. The matter is only mentioned here as an example of the "information" which journals of the character referred to are in the habit of publishing. The scribe quoted is evidently unaware that the patronage of the African "nigger" is of much greater concern to Manchester than any support which the Royal Family can give. If Royalty chose to adopt the suggestion embodied in the paragraph, some of our manufacturers would no doubt reserve a loom for the production of all the cloth that would be required, and present the Queen with it. Or even a couple of looms out of the 600,000 or so at work in the country might be turned on to the production of cloth for royalty. The orders derived from such a source would make no difference one way or another. The Manchester Corporation, however, evidently are of a different opinion—if we are to believe another "society" journal, which recently printed the following :—

> A Manchester subscriber says that the Corporation of that city have been urging Sir Henry Ponsonby to use his influence with Her Majesty to get her to encourage the trade there, and states that the Queen has said that she was deeply impressed by the reports of the bad state of business and the extraordinary gloom of the present season, and has urged the Prince of Wales to appear as much as possible in public, and has authorised his two daughters to go to theatres and other places of public amusement after this month. There is no doubt that the death of the Duke of Clarence and Avondale caused a serious stagnation to trade which will not be overcome this season.

We are not informed whether the Prince of Wales and his daughters will shew themselves before the Mahchester public or not. If they do we fail to see why the "society" paragraphist infers that an improvement in trade will result. If the London public is meant, the mystery becomes even more insoluble. We fear that even the best of society journals are in the habit of publishing a good deal of nonsense, which is not rendered any the more credible because interluded plentifully with French words and quotations. "*Moi-même*" himself is not guiltless in this respect, although we acquit the *World* of having had anything to do with the publication of the above paragraph. We have a suspicion, however, that even Mr. Yates is amongst the vast army of imperfectly informed Londoners who picture Manchester streets as being perpetually crowded with wagons laden with numberless bales of cotton. The *Graphic* and *London News* artists appear to consider it the correct thing to give the bale of *raw* cotton a conspicuous position in all sketches of Manchester; and Mr. Yates, with others in the south, no doubt believes that such illustrations are in every sense faithful reproductions of the scenes they are intended to represent. It would be far better if London journals confined themselves exclusively to minute descriptions of fashionable functions in the metropolis. When we are told that Lady B—— looked "*chic*" or "*pschut*," as society *argot* goes, at the Drawing Room, and that she wore a delicately shaded pale heliotrope silk, relieved by a handsome train of something else, drapery of black net, trimming of *passementerie* and black ostrich plumes, forming a *tout ensemble* quite *en évidence*, and so on, and so on—then sober-minded northerners do not care to criticise or dispute. But when the penners of these unconsidered trifles turn their attention to more practical matters, and those matters concern ourselves, a word from us appears to be in season. Mr. J. C. Fielden found it necessary to correct the *Standard* on Saturday, with regard to a most ridiculous statement made by that journal regarding Manchester affairs; and our correction of the society journal, though of less importance, will not have been in vain if it serve to shew North-countrymen the value of the information for which some of them pay their sixpences so readily.

The Ship Canal: Another Loan Probable.

A correspondent writes :—"The time appears to have come for a reference to rumours which have for some weeks past been in circulation regarding the financial position of the Manchester Ship Canal Company. It has been asserted that another loan of three millions sterling will be required merely to complete the excavation necessary to provide a waterway from the city to the sea. In other words, that sum will be wanted simply for the digging of the ditch—which by no means represents the whole of the task that will have to be accomplished before the scheme will be in a sufficiently forward condition to earn money. This statement has of course been officially denied through the medium of the Manchester and other newspapers, and the public have for the present apparently been lulled into a feeling of security. There is, however, good authority for saying that in the opinion of some members of the Manchester Corporation the funds in hand (estimated at less than a million—a figure has in fact been named which does not exceed half that sum) are utterly inadequate for the completion of the great undertaking. The three millions lent by the Corporation have been almost expended, and another loan will absolutely be required. It is even asserted by authorities whose opinions are entitled to consideration that the further loan referred to will not suffice for the erection of warehouses, without which the Canal cannot be regarded as complete. If this be true, then additional borrowing beyond the amount named will be required. All statements of this nature have hitherto been promptly denied, but, unless I am much mistaken, events will speedily shew that they are well founded. What is more startling, it may be added that in the opinion of persons *not* in the employ of the Ship Canal Company, the expenditure by the time the Canal and warehouses are completed will not fall short of eighteen millions sterling." These statements may appear somewhat sensational to many; but those who heard Councillor Telford Ganson's remarks on the subject in the Council Chamber recently will not be prepared to give them a flat denial. There appears unfortunately to be some hesitation amongst local newspapers—arising, no doubt, from a false feeling of local patriotism—to publish anything which may not be of a satisfactory character concerning the canal. The most intelligent amongst local canal critics has become apparently tired of playing the part of the black angel in King Lear; for its croakings have suddenly ceased. The case is one of in which no news is *not* good news; and while reproducing our correspondent's statements for what they are worth, we will go so far as to say that in our own opinion the balance from the last canal loan is not sufficient to complete the work. Our correspondent's figures may not be strictly accurate; but his statements in other respects are, we think, worthy of attention. The sooner the Lancashire commercial public heed them, the better.

The Silk Association and its Journalistic Ambitions.

Mr. Blair, of Glasgow, in a communication published in the last circular of the Silk Association, reverts to the subject of establishing a silk journal. The suggestion has been made before, but so far nothing has come of it. Mr. Blair points with fervent admiration to the American monthly which bears the title of the *Silk Journal*, and he is evidently desirous of seeing something of the same kind here. Mr. Blair is not perhaps aware that the Americans themselves obtain all silk news of importance from the columns of the weekly textile journals, long before the monthly has made its appearance. *The Textile Mercury* since its foundation has been generally prompt in the publication of silk news in England; and we do not think that with the facilities now at our disposal we are likely to be beaten in the race for textile news. During the six months ending with June last (the latest date to which our index is completed), *The Textile Mercury* contained seven articles on subjects connected with silk; not including the exhaustive analyses of the Factory Acts Amendment Bill, which appeared from time to time as leaders. Out of over three hundred leaderettes which appeared during that period, a very large number referred to silk matters. We published the new French tariff proposals long before the Silk Association had discovered them, and long before any other journal in the country had printed them. In our news columns proper a vast amount of information directly bearing upon silk was given; and, under the circumstances, the talk of establishing a silk journal appears to be on a par with the carrying of coals to Cardiff. There is another point, too, in connection with the establishment of a silk journal, of which Mr. Blair and his fellow members appear to be unaware. In the United States people believe in subscribing to and reading intelligently conducted trade papers. In England, *silk manufacturers* think "they know it all," as the Americans would say, and trade journals practically derive no assistance whatever worthy of the name from them. Out of the many thousands of pounds spent yearly in maintaining trade journals, not sixty pounds are contributed by the British silk trade in the shape of subscriptions. Unless there be a sudden change in the tastes of the trade, the prospects of a silk journal would therefore appear very discouraging indeed. Brokers connected with the sale of raw silk and of foreign silk yarns in this country already subscribe to existing sources of information, and they are not likely to make a change. If every manufacturer in England subscribed, the journal might have a hundred readers; but the Association could not turn out a very big sheet for the amount represented by such an income as this. Considering the insignificance of the silk trade compared with the giant industries of cotton and wool, which offer a more highly remunerative field to the textile journalist, it is surprising that so much space is devoted to silk affairs. Silk, however, is the queen of textiles; and beauty, although known only to be but skin-deep, always commands homage beyond its deserts. The trade, therefore, cannot complain of a lack of free advertisement; what its members would think if they were asked to contribute a little towards the expenses attendant upon the operation is another matter. They have not yet displayed any anxiety to do so;

although their competitors in Lyons and Crefeld think English trade journals worthy of being subscribed to. The Macclesfield and Leek manufacturers, however, consider themselves perhaps wiser in their generation.

Smuggled English Clothes.

Though protectionists in theory, many Americans, as we have repeatedly shewn, are free-traders in practice, judging from the numerous attempts made by wealthy citizens of the Republic to smuggle clothing and other European goods, bought during the course of the "grand tour," through the Custom House at New York. Not so long ago a gentleman in this city was asked by a well-known Bostonian, a friend of his, to purchase a quantity of silk lace on his account. The lace was to be rolled in a particular way, and enclosed in some other material, for the purpose, as the American frankly owned, of getting it through the Customs, if possible, without paying duty. The individual who desired all this trouble to be taken is a staunch protectionist, but, like many of his countrymen, appears disposed to favour free trade for himself and high tariffs for the rest of the world. Not long ago a large company attended the sale in the United States Marshal's Office, New York, of clothing and tobacco seized for undervaluation and smuggling. The clothing consisted of an assortment of spring overcoats, trousers, and suits, made by Poole, of London. Most of it was brought over by Mr. Henry B. Kendrick, a passenger on the *Teutonic*, for Harvard students. The bidding was brisk. A son of Marshal Kennedy bought a dress coat for 30s. He was so anxious to get the coat that he overbid his own bid twice. Trousers fetched from 19s. to 28s., light spring overcoats from 48s. to 60s., suits from 60s. to 84s., and one dress suit £5. Three women were present, but did not bid. There was so much fun and noise at the expense of some of the bidders that the auctioneer threatened to clear the room, which he didn't do. There were several 'dudes' in the company. They bid on the light overcoats, and one offered a bid of 4s. on one of the coats, which sold for 60s. It was too much for the auctioneer, and he remarked: "Say, young man, I think you want a linen duster." The sale of the clothing netted $423.50. This report of an actual sale is worthy of being preserved; for although the existence of the practice thus remarked was not unknown, the actual illustrations of it seem rare, probably because the smugglers generally get off scot free. We wonder if Mr. McKinley buys English trousers!

Oldham "Limiteds."

Our Oldham correspondent writes:—"For some time past the Oldham cotton spinning companies have not produced returns that can be regarded in any degree as inspiriting. Losses have been the rule, and in a few instances even five figures have been reached. Adverse balances have been increased, while the reserves have been diminishing. A local share list of to-day, when compared with one of 12 or 18 months ago, plainly indicates how complete has been the transformation. The concerns have suffered severely from speculation and the great shrinkage which has taken place in the values of cotton and yarn. The adverse balances of these concerns far outnumber the reserve funds. Of the former there are 46 companies, with debit balances ranging from a few hundred pounds to as high as £15,000; while the latter vary in like manner with reserves from a few hundreds to about £6,000. And these adverses are yet being announced. Only this week three companies declared losses in the neighbourhood of £2,000 on the three months' working, and of seven others only one has shewn a gain. Even to-day (Saturday) further losses are expected to be made known, the figures in one instance being placed at £9,000 or £10,000. This condition of affairs is beginning to tell its own tale. These concerns in a great measure are financed by loans obtained from the public, with a minimum of called-up share capital. Through the state of trade the wealth of the town has been decreasing, which has had its effect upon the owners of shares, who in numbers of instances look to the dividends from these companies as their income. This having failed them, they have been compelled to have recourse to withdrawals of loan money. If only this were all, all would be well, but it is not so. These continuous bad returns have created a want of confidence, and as a consequence there has been a run upon loans, which has caused a few of the concerns to make calls upon the holders of shares. Then several new companies have been formed, which again has caused loans to be withdrawn to meet the liabilities on the shares. Still, for all that, and notwithstanding the severe trial through which they are passing, they have on the whole the confidence of the public. They have previously undergone very trying ordeals, and come out with credit, and those most in touch with the state of things confidently believe they will do so again. The losses put together, however, will take some time to liquidate, and well-wishers must hope that they will be able to wipe them clean out before another depression sets in."

Some Recent Consular Notes.

The much abused Consul occasionally sends home something really valuable in the way of a report, although as a rule the information contained in these documents has become stale by the time it is published. Recent reports from our representatives abroad say little of special importance. Consul Keene, speaking of the trade of Madeira, mentions facts which go to confirm what most already know, namely, that Portugal is utterly incapable of managing her foreign possessions, the prosperity of which her influence tends to ruin and destroy. Although Madeira is a province of Portugal, a decree has lately been passed in the Cortes to domicile a certain number of notes of the Bank of Portugal for currency in Madeira only. This measure greatly inconveniences the majority of merchants, and hampers interchange of commerce, as Bank of Portugal notes not domiciled in Madeira are not accepted as currency in the island; and as there is no gold and little silver there are no means of transmitting funds from the mother country to this island, and inland bills are almost unobtainable from Lisbon to Madeira, as the exchange on London has ruled considerably higher in Lisbon than here: for example, when the exchange was $5 800 milreis per pound sterling in Lisbon, it was in Madeira $5 300 milreis. The issue of post-office orders from Madeira to England has for the time being ceased, but to other countries it continues at the exchange of 240 reis per franc. The issue of orders from England to Madeira still continues, but considerable delay is experienced in receiving their value. The stupidity of the arrangement as to the notes of the Bank of Portugal is best illustrated by supposing the English Government to have passed a law providing special Bank of England notes for circulation in Lancashire only. If, to carry the illustration further, other Bank of England notes were not accepted in the county, an idea could be formed of the abilities of the enervated beings who control the destinies of Portugal. The Post Office might as well refuse to accept postal orders issued in Lancashire at any office outside the county. In England such an ordinance would raise a hornet's nest round the ears of any Government; in Portugal and Portuguese possessions the people apparently are too listless or too ignorant to protest against and abolish such an arrangement. The suspension of Post Office orders between Madeira and England is not a very important matter, but as they are still issued to other countries it is to be hoped that they will soon again be obtainable by those desirous of remitting to the United Kingdom. Owing to the excessive duties, which render foreign competition with goods manufactured in Portugal impossible, the importation of textiles from England is almost entirely suspended. It is difficult to anticipate the result of these duties, as the factories in Portugal cannot supply the demand, and there is already a stagnation in trade with foreign countries. Madeira's total exports last year were, according to not altogether reliable official statistics, valued at £188,000, as against £171,000 in 1890. Of these England supplied goods valued at £68,000 and £78,000 respectively. The imports for 1891 were worth £196,000, as against £223,000 in the previous year. England's share fell from £145,000 in 1890 to £117,000 in the following year. German and American exports to Madeira increased during this period. Consul Keene, in conclusion, says a word on the decline in the supply of British manufactured goods to Madeira. During the past year he has been applied to on very many occasions by English firms of all kinds for the names of the principal buyers of goods, whatever they may be, and for the names of trustworthy agents to sell on commission; but in most instances the result has been *nil*, as the supply is, as a rule, already in the hands of foreigners. The foreigner (as in previous reports the Consul has mentioned) sends travellers with samples of the goods supplied by the houses they represent, and offers advantageous terms for payment. England sends few or no travellers, but applies to the Consul, with the result stated. It cannot therefore be wondered at that the small trade there is is gradually passing into the hands of the foreigner.

"Oil Halfpennies."

There is a grievance amongst the Burnley cotton trades-unionists about paying a halfpenny per loom per week for services rendered that return them five to ten-fold. In order to make apparent the great magnitude of this piece of oppression, and exhibit very clearly the grasping avaricious nature of the Burnley employers and the manner in which they oppress and rob their employés, we may as well state for the information of the outside world that a loom is a machine which may cost the employer, when completely furnished, anywhere from £10 to £25;—we mean of course looms in the cotton trade. The 'life' of a loom may and will be according to usage anywhere from 10 to 25 years: the former period in cases where it is badly used, the latter in those in which it happens to have been allotted to the charge of a competent and conscientious weaver. In a Lancashire manufacturing establishment there are often found from 500 to 2,500 looms, and sometimes more.

Let us assume that a firm possesses 1,000 looms and preparation, and that the cost is £15 per loom inclusive, or £15,000 in all. This sum the employer or somebody for him must put down in hard cash, and find another considerable sum beyond as floating capital, before business can be prudently begun. At the end of 20 years these looms will have been worked to death, and their bones be only fit for the scrap-heap of the iron-founder. The price

realised for them in this state will not exceed what has been necessarily spent upon them to keep them in going order from the time they commenced working, so that this sum may be disregarded. The £15,000 has therefore disappeared in an annual depreciation of 5 per cent. Unless, then, replacement of this sum be provided for by annually setting aside £750, the manufacturer at the end of 20 years will find that he has paid away in one form or another the money he originally invested in the necessary machinery. Should the same machinery be placed in the charge of incompetent, careless, or unconscionable operatives, it will be worked through in half that time. If provision must be made to meet this requirement £1,500 per annum will have to be withdrawn from the gross profit fund, if the employer is to have his own again. This means a depreciation of £10 per cent. per annum—a sum which in any of our mills or weaving establishments would be esteemed a very satisfactory annual profit. Even the difference between the two would be gratefully received, when we consider that it has been stated, on very high authority indeed, that the capital invested in the Oldham Mills for many years past has not returned above 1 per cent. per annum.

Now we affirm it as an incontestable truth that for the past ten or fifteen years—that is, since the operatives' unions have grown to be what they term strong—there has been a rapid depreciation in the *morale* of the workers, much as their leaders may extol the virtues of unionism and the qualities of the unionist as a worker compared with those outside the unionist fold. Their work is worse performed by a great deal than previously, and particularly so in the weaving departments; and this would be very much more in evidence were it not for the greatly improved quality of the materials supplied to them to work,—in itself the result of improvements in the machinery in the spinning department, in which now it is almost impossible to make bad yarn, however much it may be desired to do so. But the mischief to which we wish specially to direct attention is the reckless disregard of their employers' interests shewn by weavers in refusing to sweep, clean, and oil their looms as often as and in the manner they ought to do. All power-looms ought to be thoroughly swept three times and thoroughly cleaned once a week. In addition, a loom ought to be oiled throughout three times a week, and some of its parts, such as the cranks, the bearings of the shafts, the cone picks, and the picking bowls, daily, whilst the fly spindles should be oiled as often as required. Three minutes affords ample time in which to oil a loom thoroughly, and consequently 12 minutes for oiling four looms three times per week will make 36 minutes. Sweeping will require about five minutes per loom, and a thorough clean about 10 minutes per loom. The proper performance of this work increases the production of cloth, improves the quality, prevents the rapid deterioration of the machinery, diminishes the labour of the weavers, and increases their earnings in a far greater proportion than the time spent upon it. But in spite of this it is a well-known fact that the evil influence trades-unionism has exercised upon them, coupled with the vicious teachings of their leaders, has so far undermined the proper discipline which previously ruled in every weaving shed, that now in many cases weavers will neither sweep, clean, nor oil their looms.

It is because of the rapid degeneration of the *morale* of the weaver that employers in many establishments have resorted to the services of a "professional oiler" to perform the duties that time out of mind in the past have always been regarded as a portion of the weaver's work. They have also sought to recoup themselves for the cost by making a charge of ½d. per loom per week upon the weaver, and to facilitate collection they have deducted it from the weaver's earnings at the weekly pay day. Those Siamese twins of trades-unionism in the Burnley district, Mr. David Holmes and Mr. Joshua Burrows, have just discovered that such a deduction of a ½d. per loom is a contravention of the provisions of the Truck Act, and have therefore instructed their clients to demand the repayment of all such 'oil halfpence' as have been stopped in this manner. It is said that the demand has been made, and in some instances has already been complied with. The allegation of these astute fellows is that the ½d. per loom is an overcharge for the work done, as the professional oiler does other work besides oiling looms, and therefore to that extent the weavers are being defrauded. These two wonderful counsellers, however, do not appear to have ever told the weavers to perform the duty themselves, and thus save their halfpence, and at the same time obviate the loss their negligence inflicts upon their employers of £7 10s. per week by the unduly rapid deterioration of the machinery in a shed of 500 looms, and proportionately the same in larger or smaller sheds. Oh no! These perfectly wise and just men, whose voices are always upraised against oppression and injustice, cannot discover anything wrong in the proceedings of their constituents, or that they are wasting their employers' property and thus damaging themselves. But beyond this aspect of the matter, which may be regarded as the chief one, there is another—that of the alleged infraction of the Truck Act. It is very questionable indeed whether such a contention could be sustained: we doubt it very much. In our opinion it would be well to have the point decided in a court of justice before submitting to the demand. But even in the event of the decision of a bench of magistrates or of a higher tribunal affirming the view of Mr. David Holmes, there is an easy and perfectly proper way by which the employer can put himself outside the four corners of this Act: that is, by enforcing a reduction of 2½ per cent. in wages in every case where the weavers refuse to perform the service that appertains to them. It is quite time that the proper discipline of a mill was enforced throughout East Lancashire; and this may be done, provided the employers will maintain and further perfect their organizations: and it certainly will not and cannot be done without.

THE POSITION OF THE LACE AND HOSIERY TRADES.—I.

(From our Special Commissioner.)

It has been the custom during the past few years to speak of the lace trade as one which is on the verge of ruin, and from Nottingham especially most gloomy accounts have been received for some time past as to the condition of the staple industry. And yet, with all that is said against the business, it is known that the operatives are as a rule in a comfortable position, and that foreign rivals, about whose cheap labour there always has been and probably always will be much talk, pay wages which enable the workers of Calais to indulge occasionally in champagne and oysters at Boulogne. From all accounts it is not the men who are suffering in the lace trade, whatever may be the position from the masters' point of view. Neither Nottingham nor Leicester bear traces of poverty to the stranger within Stoney street or Gallowtree-gate. Both are clean, well-built towns, with plenty of street traffic, and every sign of a population which spends its money freely. The betting man is rampant in both towns, and the "punter" is to be found everywhere. Nottingham and Leicester have in fact always been notoriously profligate from the horse gambling point of view, and outsiders who think that the one town is immaculate in this respect because the local corporation wishes to black out sporting news from the papers shewn in the Free Library; or that the other is to be admired as a puritanical centre, for that the city fathers once displayed compunctions about keeping up the racecourse, are woefully mistaken. No one can say of Nottingham that its lads and lasses do not extract plenty of sweets from this life; and that fact, so patent to all who know the town and contrast the appearance of its workers with that of those in such places as Macclesfield, argues the possession of at least a fair amount of money and the means for earning it. It may be remarked, too, that in Lancashire, where employers complain of their inability to earn a fair interest on their capital, the position of the operatives is equal, if not superior, to that of the best-paid class of workers in the country.

That the hosiery trade has expanded steadily during the past decade is abundantly clear from official figures. In 1874 the number of hands employed was 11,980. In 1885 the total was 19,536, and in 1889 the employés included 24,838 souls. These figures, by the way, embrace those for Scotland, where in Roxburghshire are some of the finest hosiery factories in the world. In Hawick leather has belied its reputation by becoming subservient to hosiery and other branches of the woollen trade. The power afforded by the Teviot and Slitrig, more valuable from what we have seen of those streams than that of the Leicester Soar, was a godsend to the early manufacturers of the Scottish Lowlands; and although steam now reigns supreme, it is probable that the industries which are still the chief glory of Hawick would never have been brought into being but for the steady running streams which pass through the district. In Leicester the development of the plain and fancy hosiery trade is of comparatively recent date. The industry dates as far back as 1680, but it was during the days of existing grey-beards that the business sprang forward and entered the channels through which it now flows so strongly. The population of the town is nearly 160,000. The census of 1861 represented the number as 68,056, that for 1871 being 95,084. The population of Nottingham is nearly a quarter of a million, but in neither case are the inhabitants so densely crowded, we fancy, as in the Oldham district, although the returns for that spinning centre are less than those of the lace capital. In all such comparisons the accidental limits of borough boundaries are deceptive. The best test of the commercial importance of a town is to take the population within at least a radius of five miles from the Town Hall or some other building which may happen to be central. On this basis Oldham easily tops both Nottingham and Leicester; and for the matter of that so does Bolton. And both Oldham and Bolton, be it remembered by our foreign or remote provincial readers, are within ten miles of Manchester.

The lace trade has not developed so greatly during the past two decades as has that of hosiery. In 1874 it employed over 10,000 hands, and in 1889 the number was a little short of 17,000. The wages paid differ so widely that we cannot give any figures which may be applied generally. Fancy hosiery hand-frame workers can easily make 30s. to 31s. a week, and on the wide hand frames, indoor hands can earn 22s. to 23s. Power rotary frame workers can earn from 33s. to 34s.; power patent frame workers from 38s. to 39s.; and enginemen (time) make 26s. 3d. or thereabouts. These are the wages for men. Lads range from 7s. 8d. or 8s. to 11s., and women earn all the way from 11s. to 18s. In Roxburghshire the earnings are a trifle lower; but it would probably be found on enquiry that the difference was made up by the cheaper rates of living in the lowland county. We have no figures relating to Hawick derived from personal knowledge; but a trustworthy informant in Leicester, who has studied such matters closely, informs us that wide hand-frame workers on piece in Scotland can earn 25s.,

which is more than many operatives working on similar goods make in the English Midlands. Power rotaries pay slightly better. In Nottingham fancy lacemakers, during a week of 25 hours only, have been known to earn as much as 26s. to 27s., and curtain makers for work extending during a similar length of time have made over a guinea. Warpers working full time earn over 34s. The estimate is, we are assured, a low one for this class. Even the warper's assistant can make as much as 17s. a week, and a guinea for a card puncher is frequently sneered at, 22s. to 23s. being often enough given. Draughtsmen make over 47s., and their assistants (lads) can earn half a guinea. Threaders, who are usually very young men, think 15s. nothing to boast about. The women in the Nottingham factories make from 12s. to 19s. a week. Jenniers and some of the warehouse hands are paid on the lower scale, while the higher wages are given to winders, embroiderers, and various special hands. Girls who work from fifty to fifty-five hours earn between 6s. 6d. to 8s. per week—some below and others above the figures named. In the country districts of Derbyshire and Nottinghamshire the wages are much lower than those paid in Nottingham itself; and rents are also less. Advantages of this kind have enabled outside manufacturers to compete with the parent centre, and even to take a portion of its trade away. And still Nottingham outwardly seems to thrive; for, as we said earlier, its streets bear the marks of prosperity.

Of Nottingham itself, it may be stated that many intelligent manufacturers, while complaining that profits are not sufficiently large considering the amount of capital employed, admit two things—first, that the turnover is extensive; and, second, that the operatives are well paid and employed fairly constantly. The lace trade is largely dependent upon fashion, and, as we have seen during previous descriptions of the industry, a period of stagnation is frequently followed by one of excessive activity. Season orders rush in pell-mell from the home and shipping houses, and have to be executed at once. Two, three, or even more months of feverish activity ensue, and then perhaps there is another collapse. The lace trade in this respect resembles that of silk. Both are subservient to the freaks of fashion, and the recent sudden shrinkage in the demand for silk Windsor scarves is illustrative of the changes which take place in the lace industry also.

Reviews of Books.

HANDBOOK OF COMMERICAL GEOGRAPHY. By GEO. G. CHISHOLM, M.A., B.Sc., etc. Third Edition, thoroughly revised; pp. vii., 515; marbled edges. London: Longmans, Green, and Co. Price 10s. net.

That the public has shewn its high appreciation of this excellent handbook is fully demonstrated by the fact that a third edition has already been called for, the first having been issued in the latter half of 1889. Having expressed high commendation of the work on its first appearance, we need only briefly indicate the plan of the work on the present occasion for the benefit of those of our readers who had not an opportunity of perusing our previous observations.

The introductory division deals with the general facts relating to the production, distribution, and exchange of commodities, and extends over the first 50 pages. The next treats of commodities and their dependency, directly or indirectly, on climatic conditions. This is followed by a brief chapter on the products of the world's fisheries, which is succeeded by one on mineral products, and this again by one on manufactured articles in which various materials are used. This carries the author to the end of the first 200 pages. The next 200 are devoted to brief yet clear and succinct descriptions of the various countries of the world, the volume concluding with a number of statistics, tables of imports, exports, distances, areas, populations, and many other matters, useful in a high degree for reference.

We again commend the work most heartily as a handy and useful book of reference for the manufacturer, merchant, and publicist.

Foreign Correspondence.

TEXTILE MATTERS IN THE UNITED STATES.

BOSTON, MAY 23RD.

COST OF LABOUR IN VARIOUS COUNTRIES.

Mr. Carroll D. Wright has submitted the seventh annual report of the Commission on Labour, dealing with the above subject. The statistics of wages which he gives are taken from the pay rolls of 125 textile and glass establishments in this country and in Europe. In cotton manufacturing, among other examples, he gives the following: A cotton mill in the Northern District of the United States shews that it employed 380 different persons during a period of six months. Their average daily earnings were $1.17½, but the average number of days' work performed by each was 85, and the average total earnings for each, $100. Two hundred and eight employés, working the whole period continuously, instead of 380 working on an average 85 days each, would have performed the same labour, accomplished the same results, and would have been paid $184 each for the six months instead of $100. A cotton textile factory in the Southern District of the United States, running the same period, that is, six months, employed 275 different persons, the average earnings being 78½ cents a day each, the employés working 92 days on an average out of the six months, and earning $72 each. The report shews that 160 employés, working continuously, instead of 275, could have performed the same work, and would have been paid $123 each instead of $72. Carrying the comparison to Europe, the report shews a textile factory on the Continent, employing 391 individuals, earning 94 cents per day on the average, and working 123 days, the average earnings for the period being $60.50. Had 307 employés worked steadily, instead of 391, they would have earned $76 each during the six months. This comparison shews that in the European mill the individuals were employed more steadily than in the mills referred to in either the Northern or the Southern Districts of the United States.

In referring to the cost of living, the report gives the facts for 5,284 families, representing 27,577 persons. These families are distributed through the cotton and glass-producing States of the United States, Belgium, France, Germany, Great Britain and Switzerland, and constitute the most extensive collection of cost of living data that has ever been published.

The total average income of families from all sources for different countries for the number of families for which budgets were obtained in each country, was, for the cotton industry, $657.76 in the United States, $365.94 in France, $302.11 in Germany, $556.14 in Great Britain, and $358.56 in Switzerland.

In the woollen industry, the average family income from all sources was $663.13 in the United States, $424.51 in France, $275.99 in Germany, and $515.64 in Great Britain.

A lace curtain factory has been established at Galveston, and the managers are prepared to make a contract for a year's supply. Mosquito netting will also be manufactured. For such a trade the position of the factory is a good one, as it is in close proximity to the regions where the mosquito most actively improves the darkening hour.

Mr. H. Benttell, agent for John Crossley and Sons, of Halifax, has returned home after a European trip. He visited Smyrna and Constantinople, and bought a large number of Eastern rugs and carpets. Halifax, Wiltons, Brussels, and tapestries, and velvets are also shewn in great variety at the New York office of the firm.

The Lancaster Oil Cloth and Linoleum Works are represented in this country by Mr. J. C. Lyon, of Lyon Hall and Co., Baltimore. The sale of attractive designs in such goods is still possible, notwithstanding the tariff.

Yet another addition to the crowded ranks of American trade journals! This time it is the *American Knit Goods Review*, which caters for that sub-division of the textile trades indicated in the title. To Englishmen it appears a puzzle how so many journals can live and thrive in the United States; but the matter is easily explained. Americans appreciate trade journals and read them carefully. Your English readers who have felt the effects of American competition in certain branches of trade during the past few years will admit that this Republic is peopled by men of intelligence; and if Americans support trade organs, it may safely be taken for granted that class journals are worth buying. Americans cannot understand the Englishman who, professing to know everything, refuses, therefore, to read the papers. If they think anything at all about it, they regard him as a fool.

Bleaching, Dyeing, Printing, etc.

NEW COLOURING MATTERS.

ROSINDULINES BB, B, G, AND GG.

The Rosindulines are a small group of acid-dyeing colouring matters for wool and silk, sent out by the old-established house of Kalle and Co., of Biebrich-on-the-Rhine, and the production of which they have patented. In composition the rosindulines are the sulphonic acids of red basic dye-stuffs, which latter are not of themselves very satisfactory, but when converted into sulphonic acids they become excellent dyes. A similar dye-stuff, azo carmine, has been known for some time, and is largely used by dyers. The new rosindulines dye from an orange to a deep scarlet, the rosinduline GG dyeing fine bright red shades of orange, rosinduline G a good scarlet, rosinduline B a very bright red scarlet, and rosinduline BB a fine crimson. Wool and silk are dyed equally well, so that these new dye-stuffs would do for mixed wool and silk fabrics. The dye goes upon the material evenly and easily, and there is no difficulty in obtaining bright shades. They are quite fast to alkalis; while, as regards acids, the BB is fast, the B is turned a little browner tone, and the G and GG shades are turned yellow. They may be considered fast to soaping—the G being the least fast of the series, but even with this the amount of bleeding is but slight. The rosindulines possess a tolerably resistant action to the influence of light, being quite equal in this respect to the old scarlets.

AZINDONE G AND R.

The two dye-stuffs just named belong to the class of basic colours capable of dyeing cotton that has been mordanted with tannic acid and antimony, giving it various shades of blue; the azindone G dyeing a bright blue, and the azindone R a redder, but still bright shade of blue; while by varying the proportions of dye-stuff, a number of useful shades from pale to dark navy may be dyed; and of course by dyeing on a bottom of sumac and iron very dark navy blues may be obtained. The colour on the dyed fabric is turned rather redder by acids and browner by alkalis. Soaping has no action, and the blue is fast to rubbing, being in this respect superior to indigo. By passing the dyed fabric through a bath of bichromate of potash the shades are more firmly fixed on the cotton, but at the same time they are made much darker.

INDOINE B.

This new dye-stuff is sent out by the Badische Anilin und Soda Fabrik in the form of a black-violet paste. It is a basic dye-stuff, dyeing cotton on a tannin mordant, and giving dark blackish blues of a violet tone; but the shade will vary according to the quantity of dye-stuff which is used. It goes upon the cotton very evenly, and there is no trouble in exhausting the bath and obtaining level shades. This blue has the merit of being fast to acids: a strong solution of sulphuric acid, 1 in 10, does not affect it, neither does strong hydrochloric acid. It is also fast to alkalis, a solution of from 10 to 12° Tw. in strength having no action, while it is quite fast to soaping and rubbing. Indoine blue B may therefore rank among the fastest blues which are at the service of the dyer, and

for dark blues it is likely therefore to be largely used.

NILE BLUE BB.

This new dye-stuff belongs to the same class of colouring matters as the Nile blue sent out some time ago by the same makers, but it dyes greener shades of blue on tannin-mordanted cotton, while wool and silk may be dyed some fine blue shades from a neutral bath. On cotton the colour is fast to soaping, but on wool it is rather loose.

PATENT BLUE A AND A J 1.

Several brands of patent blues have been on the market for some years, and have met with a favourable reception from dyers of both silk and wool on account of their brilliance of colour. We have now two more brands to notice, viz., patent blue A and patent blue AJ 1. Both will dye wool or silk from baths containing Glauber's salt and sulphuric acid by the ordinary method of dyeing azo dye-stuffs; or on wool goods they may be dyed with a chrome mordant, the A brand in particular giving good results in this way without any change in shade. Patent blue A dyes very greenish bright shades of blue, which are not very deep; and the patent blue AJ 1 dyes a pure bright blue. The shades are quite fast to a strong soaping, there being not the slightest tendency to bleed. These two brands of patent blues may, therefore, be safely used for dyeing milled goods, especially where they have to be milled along with white goods. Caustic soda has no action upon the colour, but dilute acids turn it a salmon colour, and strong acids a green in the case of the A brand. The AJ 1 brand is equally sensitive to acids only that the colour turns yellow. These two patent blues can be used in combination with cloth red, alizarine blue, or logwood to produce Navy blues. Thus by mordanting with bichromate of potash and sulphuric acid and then dyeing in a bath of 8 % of alizarine blue DNW, 2 % of gallein, and 4½ % of patent blue A, a fine bright navy blue is obtained, which is fast to milling; while a good fast navy blue can be got by dyeing in a bath of 3 % patent blue AJ 1, ¾ % cloth red, 10 % Glauber's salt, and 7 % acetic acid.

INDAMINE BLUES.

There are several makes of indamine blues on the market. Whether the various dye-stuffs sold under this name are identical in chemical composition we cannot say, as the information has not yet been made public. The indamines under notice at the present time are placed on the market by the well-known Hoechst firm of Meister, Lucius, and Brüning, and the latest brands are Indamine blue NG, NB, NR, N, N extra, NB extra. These are basic dye-stuffs dyeing cotton which has been mordanted with tannin and tartar emetic. The NG brand dyes bright greenish-blue shades; the NB brand dyes bright blues, rather purer in tone than the NG blues; the NR shades are decidedly redder and not quite so bright; the N brand dyes rather violet and dullish shades of blue; the N extra redder and brighter shades; and the NB extra dark shades of blue. Using 4 % of any of the last three brands full deep Navy blues can be dyed. The colours so obtained have the merit of being quite fast to soaping; acids have very little action, and caustic soda has none, so that these blues may be ranked among the fastest the cotton dyer can use. By passing the dyed goods through a bath of bichromate of potash after dyeing, the shades are rendered faster to soaping and acids, while they are very little affected in brightness by such passage.

A NEW BLEACHING MATERIAL.

A German firm of chemical manufacturers is bringing out a new material, especially intended for the bleaching of silk and wool, and of mixed fabrics containing those fibres. This new material, termed sodium superoxide, is supplied in the form of powder readily soluble in water, and the solution so made is ready for use; but being strongly alkaline, it is best to add some Epsom salts (magnesium sulphate) to neutralise the alkalinity. The bleaching powder of sodium superoxide depends, like that of peroxide of hydrogen and peroxide of barium, upon its containing oxygen in a loose state, which under certain conditions is capable of exerting a bleaching action; but its superiority to these two bodies will be manifest when it is stated that while the barium peroxide contains 8% of active oxygen, and hydrogen peroxide 1½%, the sodium compound contains 20%. The process of using consists in first scouring the wool or silk fabrics in soap and water in the usual way; then for 10 lb. of silk a bath of 25 gallons of water is taken, and 9 lb. of Epsom salts and 1 lb. of the sodium compound added. In this bath the silk is immersed for from two to three hours, at the end of which time the silk will be bleached. It is best to add the bleaching agent in small quantities at a time, and not all at once. The process is exactly the same for Tussur silk, but as there is more colouring matter to be extracted from that fibre, more of the bleaching agent—from 2 lb. to 3 lb.—must be added. The process, it will be seen, is much quicker than by the hydrogen peroxide method. After being taken out of the bleaching bath, the silk should be well washed and then brightened by an acid bath. Wool can be bleached in a bath of 10% of the superoxide and 30% Epsom salts, at a temperature of 150° F. The material has the advantage over hydrogen peroxide of being cheaper and more stable.

FINISHING CLOTH.—Whiteley's patent process for finishing cloth fabrics consists in folding and placing them between hollow perforated press plates in a hydraulic press. While under pressure a current of steam is sent through alternate press plates, which passes through the cloth and out through the other alternate press plate. In the same way currents of hot air may be sent through. By these means a very fine finish can be given to the cloth.

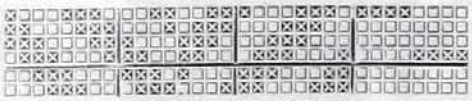
CLOTH bleached by a high-pressure system comes out somewhat narrower than by that of low-pressure, the difference in width between them amounting to about 1 inch in 50 of width, which is, of course, about the average. It is also found that there is as much difference caused by the use or non-use of caustic soda: for when it is used the shrinkage is greatly increased. Of course part, if not all, of the shrinkage caused by the bleaching can be recovered by stentering.

Designing.

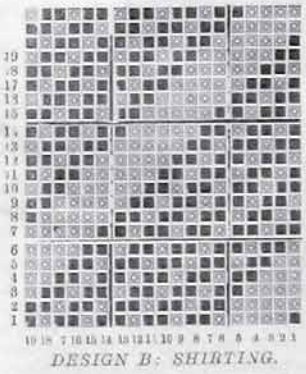
DESIGNS FROM THE VEGETABLE AND ANIMAL WORLD.

A thoughtful writer in a German technical journal has been urging textile designers to draw mainly for their designs on the vegetable world. The great realm of flowers, he maintains, is that in which the most fruitful ideas for the ornamentation of designs can be found: the plant must be regarded as the mother of textile decoration. The field thus opened up to the designer is boundless and unfathomable for those who have learned how to study it in relation to shape, growth, and purpose. There is no other which furnishes such an infinite variety of new forms, and supplies so strong a stimulus to original ideas.

The suggestions made not long ago for the adoption of designs from the animal world as revealed by the microscope, are discussed and condemned. "A short time since," he writes, "the technical papers stated that a Strasburg professor was about to issue representations of a large number of microscopic forms of life, with a view to their use in the designing of dress patterns; and that thus a new kind of decoration would be created, which would supplant the styles of ornament in vogue, as well as the natural ornamentation taken from the vegetable world. It may indeed be assumed that these microscopic forms, being quite strange to the purchaser, may perhaps so confuse him for a short time that he will welcome the patterns decorated with them, however destitute they may be of real taste; but it is certain that before long the public will turn away from them. The rapid intoxication will be succeeded by as rapid a return to sobriety, and designers will come back with all the greater love to vegetable forms and the styles developed out of them. Microscopic figures are so distant alike from the common people and the designer, are so little understood by both, and have so little interest for both, that they will be popular only for a short time, and that solely on account of their novelty; and will therefore not be able to compete successfully with the plant. Civilised man is inseparably connected with the latter; he loves it and enjoys it, and therefore seeks to decorate the objects round about him and his person with its formations."



DESIGN C: SHIRTING.

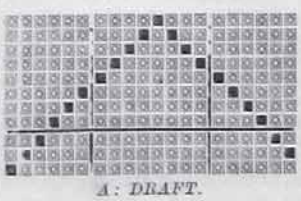


DESIGN B: SHIRTING.

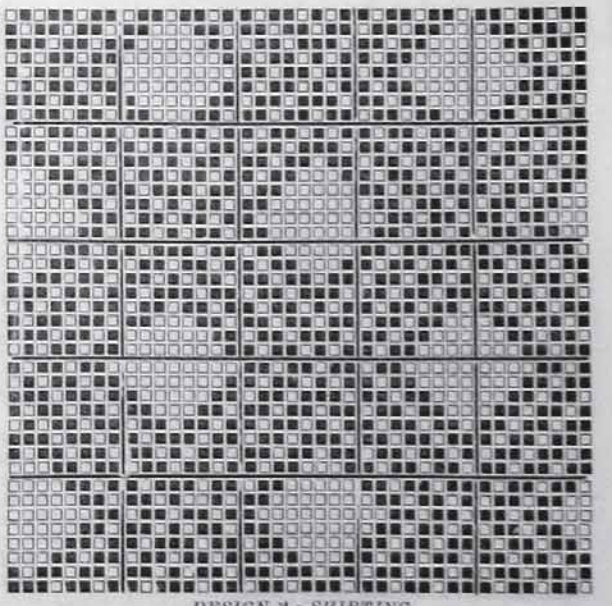
C: PEGGING PLAN.

C: DRAFT.

A: PEGGING PLAN.



A: DRAFT.



DESIGN A: SHIRTING.

NEW DESIGNS.

NEW SHIRTING DESIGNS.

Design A is on 11 shafts, 20-end draft, 20 to the round. The white spots are a weft effect; the ground or warp being all blue, the white spots white, straw, or cream. The warp may be all white, grey, or cream, or any light tints; the wefts in dark shades. In every colour arrangement dark shades to be used either for weft or warp, with any light colour in opposition, or the weave all in grey; piece-dyed or bleached. Warp 20's cotton, in 30 dents per inch, 2 in a dent; 16's weft, 60 picks per inch; calender finish.

Design B, same counts of warp and weft, 19 shafts, straight-over draft, 19 to the round. This is a shirting fabric similar to *Design A*, the weft forming the undotted diagonal. Dark shades for ground or warp, with wefts all light. The pegging plan is as the design, the tread and shafts being numbered.

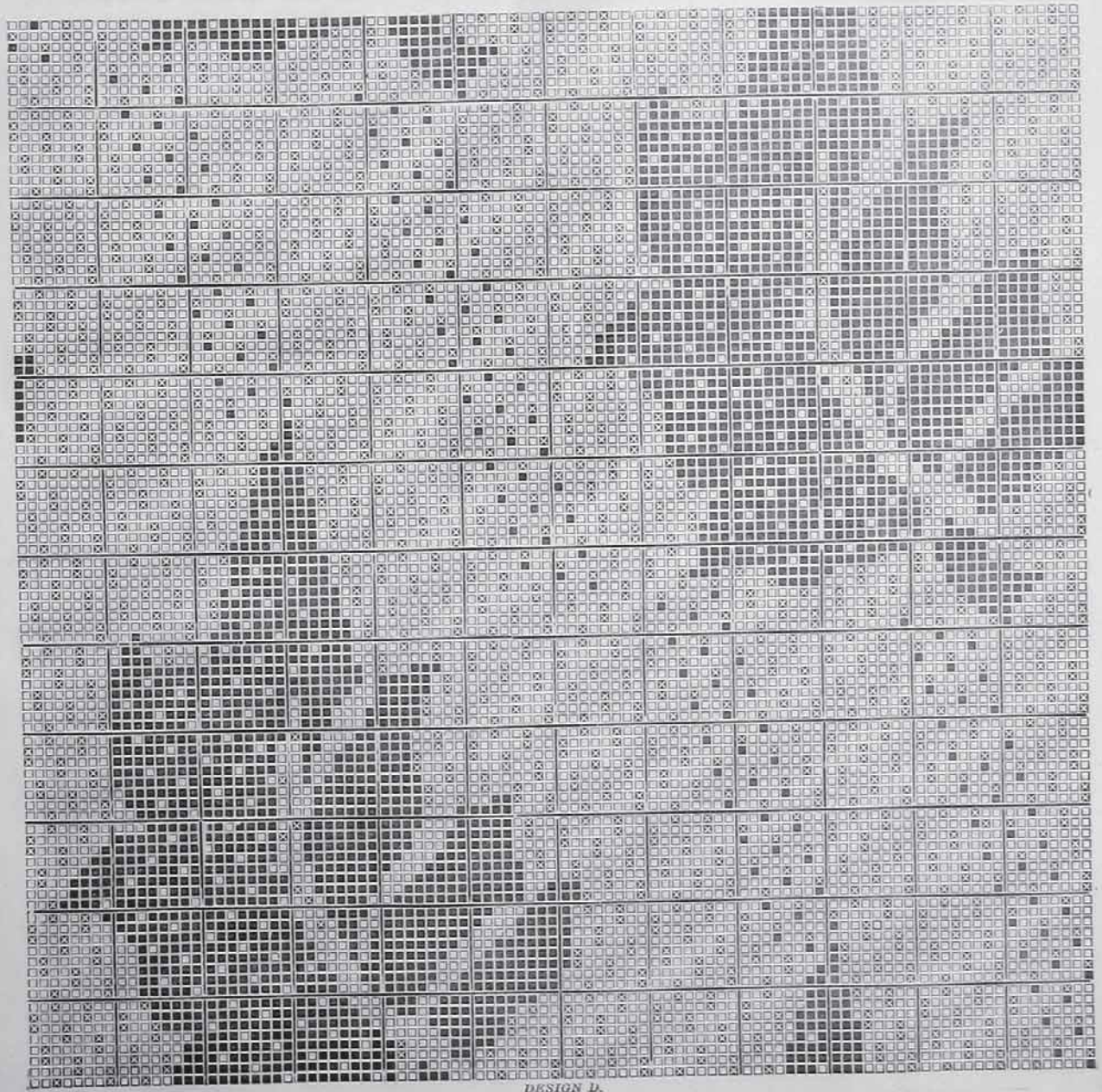
Design C is also for a shirting-cloth, and will form a very handsome angled stripe. It is on 6 shafts, 32-end draft, though this may be extended by repeated draws of any particular section. Warp 20's cotton, 4 in a dent, in an 18-dent per inch reed, 56 picks of 20's weft. We give one pattern as a guide: 10 dark blue, 2 light blue, 10 dark blue, 4 white, all if possible in one heald and dent on the 6th shaft; 4 white in one heald and one dent on the 3rd shaft; 4 red in one heald on the 6th shaft; 4 white, one heald, on 3rd shaft; and 4 white on 6th shaft complete pattern. Weft all dark blue. This pattern may be varied in colours, or the draft varied. Any number of changes can be effected without any inconvenience, and the weave is extremely simple.

EXTRA WEFT SPOT FIGURE.

A very useful figure for demonstrating clearly the correct method of employing extra weft, should swivels not be at hand, is that given in *Design D*. It will be observed that the extra weft is necessary throughout the piece, although in two places very few threads will be depressed. This of course is a defect, since the best shed is always formed with equal quantities of warp up and down, so that it is evident a more perfect introduction of the extra weft will be obtained by inclining the leaves more; although the pattern as given here is quite weavable, since the extra weft ties in star type help to keep down the bottom of the shed. Of course if the cloth be woven wrong side up, as is frequently the case, the above objection will not hold. The star type illustrates very effectively the tying of the extra weft into the cloth. If this extra material is to be cut off these bindings should of course be omitted, and firm binding round the edge of the leaves be inserted.

Warp.
All 2-48's worsted; 14's and 6's.

Weft.
1 pick 24's botany.
1 pick 30's mohair.
84 ground picks per inch.



DESIGN D.

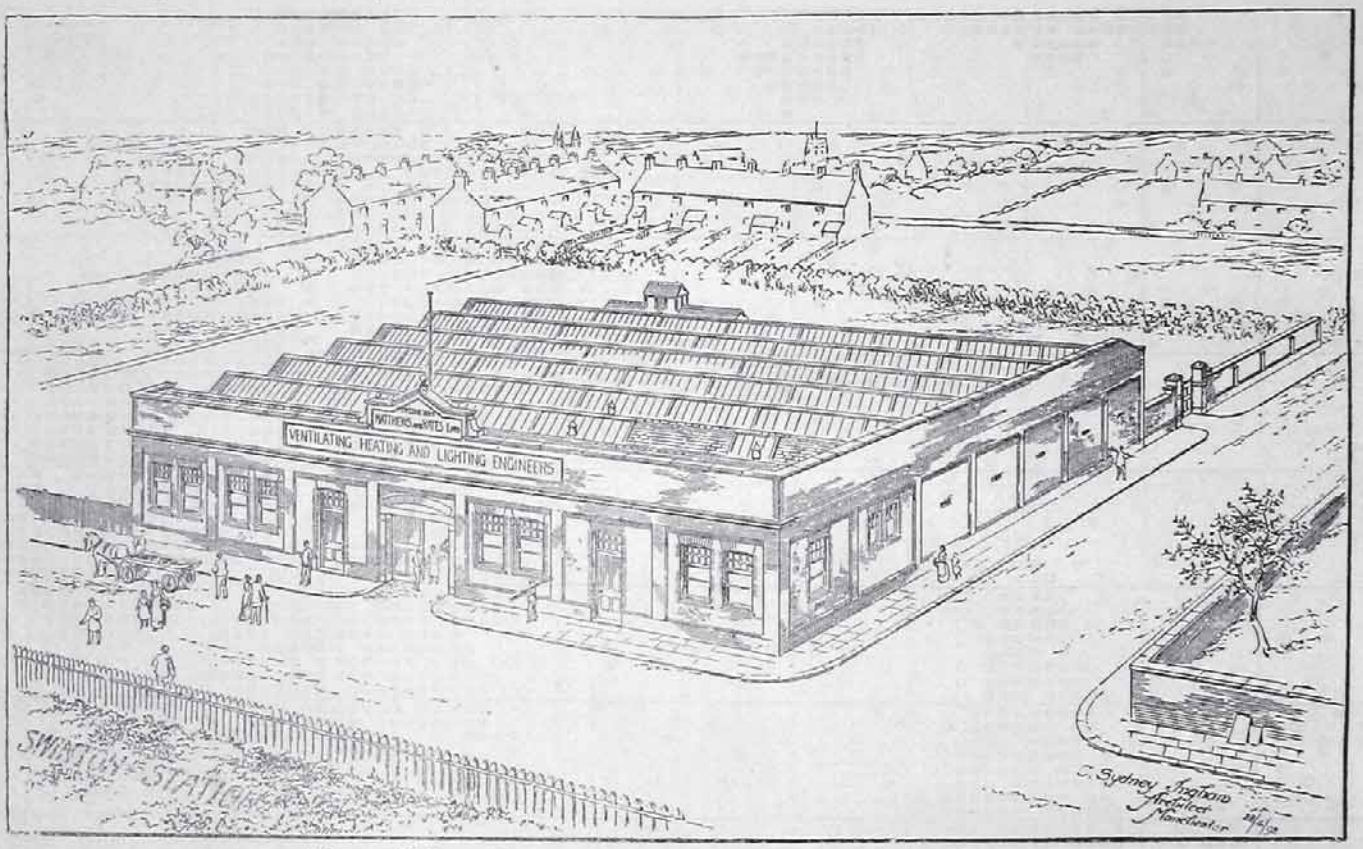
Machinery and Appliances.

VENTILATING AND HUMIDIFYING APPLIANCES FOR MILLS AND WEAVING-SHEDS.

MAKERS: MESSRS. MATTHEWS AND YATES LIMITED, VENTILATING, LIGHTING, AND HEATING ENGINEERS, SWINTON.

Recent legislation has forced upon the textile trades and several others, the importance of attention to the better ventilation of mills, weaving sheds, and workshops than has hitherto prevailed. Though it is quite open to question whether such legislation has not to a great extent been a mistake from many points of view, it need not be disputed that there was in many places ample room and need for improvement in this respect. But unfortunately it too often happens that where there is most need there is the least disposition, so that when compulsion is applied it must be brought to bear against all alike, as it is impossible to so draft laws that they shall discriminate between one case and another. This duty is left to the administrators of the law, and unfortunately there is far too often only total incapacity brought to the task. Hence arises so much of what is little better than a mockery of justice in the administration of our laws. These incongruities pervade the whole system; and not least conspicuously, the recent legislation upon steaming and ventilation in our mills and weaving sheds. But, for good or for evil, this has been placed upon the statute book, and perhaps it will be easier to conform to it than to procure its repeal. The necessity of doing this has called into requisition on an extensive scale the services of a class of engineers whom the demand for improved ventilating appliances has induced to make a particular study of the requirements of legislation, and the necessities of the various trades to which it applies. It has been their endeavour to invent and construct appliances that will comply with the requirements of the Act of Parliament, while they at the same time meet the necessities of the trade.

Amongst the few firms who have taken up this matter and dealt with it most successfully is that of Messrs. Matthews and Yates, Limited, Cyclone Works, Swinton, and Todd-street, Manchester. Their firm was amongst the earliest to take means for emptying mills and weaving sheds of foul or exhausted air by propulsion or exhaustion, as they quickly discerned that it was impossible to rely upon natural means, such as differences of temperature between the external atmosphere and that confined within mill walls, for the attainment of the desired results. Then, again, the introduction and expulsion had to be so governed that neither the work in process, nor the attendants, should suffer inconvenience, much less injury, by changing the atmospheres of the places in which the work was carried on. Also, when the external air was low in temperature, cold, dry, and harsh, it needed to be warmed and softened, and the reverse when the opposite conditions prevailed. It will be obvious from the mention of these points that the introduction of each complicates the problems to be solved, and that no "'prentice hand" can be expected to satisfactorily solve them. That Messrs. Matthews and Yates since they first gave their attention to these subjects about seven years ago have been very successful in their treatment of them is amply demonstrated by the number of installations of ventilating systems they have placed in textile mills and weaving sheds, churches, chapels, schools, public rooms, and buildings of various kinds. In the two former, which will chiefly concern our readers, the firm have fitted a large number with both ventilating and humidifying arrangements. During the past seven years they have supplied a total of several thousands of fans to the leading spinning and manufacturing firms in Lancashire and Yorkshire, and places more distant. From a list of these, containing the names of more than 200 firms, and which would fill more than a page of this journal, we select the names of the following well-known and representative firms:—The Accrington Spinning Co. Limited, Accrington; Messrs. G. and J. Shepherd, Bacup, and almost every mill in the Rossendale Valley; Messrs. Eli Heyworth and Son, Blackburn; Mr. George Haworth, Rawtenstall; New Bacup and Wardle Company, Stacksteads; Messrs. W. & J. Hutchinson, Bury; Messrs. J. and W. Hamer, Ashton; Messrs. Hibbert and Aspland, Hyde; Messrs. R. Haworth and Co., Manchester; The Millgate and Facit Spinning Co., Facit; Messrs. W. Brown and Nephews, Wigan; Messrs. Boden and Co., lace manufacturers, Derby; and Messrs. Finlayson, Bousfield, and Co., Johnstone, N.B., and the Great Western Cotton Company, Bristol. These will be sufficient for the purpose of indicating the wide ramifications of their business connections.



"CYCLONE" WORKS, SWINTON, MANCHESTER.—MESSRS. MATTHEWS AND YATES, LTD.

The extension of the firm's business in this leading department has been so remarkable that they have been compelled to erect new large works for the production of their fans, humidifiers, and sizing-room ventilating appliances. The new premises, of which we present a view herewith, are situated close to the Lancashire and Yorkshire Station at Swinton, and cover an area of about 1,400 square yards, whilst the firm have secured a large amount of land beyond this to meet the very probable contingency of further early extensions. The works have a handsome entrance fronting the Lancashire and Yorkshire Railway Company's new route to Liverpool and Southport. A suite of convenient offices, general, private, drawing, and managers', and waiting room, forms the front, and a spacious passage between these leads

into the light and airy shed behind, in which their specialities are manufactured. The workmen's and the goods entrances are to the left of these. The building is constructed on the principle of a weaving shed, lighted from the roof, and is rapidly being completely equipped with the best and most perfect tools obtainable for the quick and economical production of the appliances to which we have referred and the numerous others made by the firm. The formal inauguration of the works was celebrated by a social gathering a few weeks ago, at which the members of the firm, numerous friends, and the workpeople assembled, when the event was dealt with in what has come to be regarded as the orthodox manner. Mr. John Smale, C.C., of the firm of J. Smale and Sons, silk manufacturers, Macclesfield, the chairman of the company, presided over the assembly, and stated that he was brought into connection with it owing to the excellent manner in which Messrs. Matthews and Yates had executed some work for his firm. The best wishes of the assembly were freely expressed for the abundant success of the firm in its enlarged capacity, and after an evening's enjoyment of a very high order the company separated.

In the course of their considerable experience gathered since their entry into business 25 years ago, Messrs. Matthews and Yates have naturally developed some valuable specialities. Amongst these we may mention the Cyclone air propeller, to which we have referred above; the ventilo-humidifier; the caloric radiator for steam or hot water; various feed-water heaters for boilers, laundries, dyeworks, etc.; water heaters for serving workpeople in mills, etc.; steam traps; the Simplex gas governor; the cyclone blower for strong blasts; wrought iron pulleys, etc., etc. Many of these appliances are kept in stock for the purpose of the rapid execution of orders. In connection with any of these appliances, and for ventilating and humidifying mills, weaving-sheds, bleach and dye-works and other industrial establishments, also churches, chapels, schools, public assembly rooms, etc., the firm will be glad to afford any information that may be desired respecting their own appliances and any other means of obtaining satisfactory results.

THE HANKOW (CHINA) COTTON MILL.

Reporting to the Foreign Office under date March 14th last, Mr. C. T. Gardner, British Consul at Hankow, writes in reference to the above:—

Very considerable progress has been made since the date of my last report. The buildings, dssigns for which were furnished by Potts, Sons, and Pickup, of Manchester, are now practically completed, and the greater part of the machinery is ready to be set up. Some of it, indeed, has been already placed in position, chiefly in the mill-house, and the work is being rapidly proceeded with under the direction of engineers sent out by the manufacturers of the machinery, Platt, Brothers, and Co., of Oldham, and Hick, Hargreaves, and Co., of Bolton. The manager, Mr. R. Morris, informs me that he expects to turn out cloth by the month of October next. The machinery is of the very best, and in Mr. Morris the Viceroy has found a manager who has had more than 30 years' experience in the United States, India, Burmah, and Brazil; nevertheless, there are drawbacks to the production here of the best grades of cotton cloth. Chinese cotton is only good for low counts, say up to 16, and if finer cloth is desired it will be necessary to mix it with cotton from Egypt or America. As the object of the Viceroy's cotton mills is to compete, not with the native fabric—which is coarse in texture—but with the foreign, he designs, I understand, to import from time to time a quantity of American cotton.

Precisely how far the projected competition will affect Manchester manufacturers it is not easy to say, but I do not think that, until the Viceroy modifies what are said to be his present views, they have much to fear. The Viceroy holds that, as foreign cottons pay a certain import duty, if these were ousted by his own manufactures there would be a loss of revenue to the Government. Accordingly, he proposes when his mill is in full working order to levy on the out-turn a tax which shall be the equivalent of this lost duty. This proposal, if the Viceroy really entertains it, illustrates the primitive ideas of the Chinese on economical subjects. Even if no such duty is levied on the finished article, and it thus gets the advantage over the Manchester product of freedom from impost and sea freight, still the cost of production may for other reasons turn out to be considerably greater in Hupei than in Lancashire, especially when foreign assistance is dispensed with. For the present there will be an efficient foreign staff, consisting, besides the manager, of an engineer, a carder, a spinning master, two weaving masters, a dyer, and a bleacher. These will have under them a large number of operatives, taken, as far as possible, from this province. The manager desires to employ in the spinning-room some 500 or 600 females, but he expects that he will have to draw from the neighbouring province of Kiangsi, though in my opinion it would be possible to obtain equally suitable hands from Hupei.

NEW MILLS IN OLDHAM.

Since 1889 the following mills have been erected and fitted up, several of which are now in course of equipment:—

		Spindles.	Makers.
Oldham	Lion	107,472	Platt's.
,,	Ruby	80,000	Asa Lees.
,,	Beal	96,000	Platt's.
,,	Earl	81,000	Asa Lees and Ashworth's.
,,	Elm	73,052	Hetherington's
,,	*Summervale	20,000	Platt's.
,,	*Neville	20,000	Do.
,,	Stamford	70,000	Asa Lees.
,,	Pine	100,000	Platt's.
,,	Royal	75,000	Asa Lees and Ashworth's.
,,	*Melbourne	20,000	Platt's.
,,	Werneth	40,000	Not given.
,,	Pearl	116,000	Platt's.
,,	Parkside No. 2	90,000	Do.
,,	Holly	73,000	Do.
,,	Richmond Mill	66,300	——
,,	Radcliffe (projected)	90,000	Hetherington's
,,	Clarence (projected)	100,000	Do.
Milnrow	Ellenroad	100,000	Platt's.
Rochdale	*Eagle	20,000	Do.
,,	Moss	90,000	Mixed.
,,	Standard	101,508	Hetherington's
Heywood	Mutual No. 2	77,000	Dobson and Barlow and Lord's.
,,	Yew	110,000	Hetherington's
,,	Burns Ring	40,000	Brooks and Doxey
Bury	Peel No. 2	80,000	——
Stockport	Stockport Ring	53,000	Brooks and Doxey
Ashton district.	Milton	90,000	Hetherington's
,,	Minerva	86,868	Hetherington's
,,	Rock	75,000	Asa Lees
,,	Park Road	90,000	Do.
,,	Castle	75,000	——

* Additions.

These give a total of 2,400,000 spindles. Of the above, three companies were registered in 1889, nine in 1890, and 13 in 1891.

THE firm of Lederer and Wolf, at Dörfel, near Reichenberg, intend to enlarge considerably their power-loom weaving shed.

THE firms of May and Hohlfeld, and Linke and Co. (the latter already settled in Rumburg), intend to erect two power-loom weaving sheds at Georgswalde, in Bohemia.

THE firm of Adolf Schwab, cotton spinners and power-loom weavers, propose to erect a new spinning factory with 12,000 spindles at Hammerstein, near Reichenberg, in Bohemia.

A GREAT fire occurred on Monday at the manufacturing town of Enschede, Holland. An important steam cotton mill, comprising 12,000 spindles, was totally destroyed.

MUTUAL MILL NO. 2, HEYWOOD.

CHRISTENING THE ENGINES.

Engine christening was again the order of the day at Heywood last Saturday, the Mutual Spinning Co.'s No. 2 mill being the scene of the ceremony, which was observed by a large gathering of shareholders and friends.

The engines and shafting have been made by Messrs. John and Edward Wood, of Bolton, who also made those for the Mutual Spinning Co.'s No. 1 mill. The new engines are similar to the old ones in very many respects: the power, 1,200 indicated horse power; the speed, 50 revolutions per minute; the stroke, six feet; and the size of the fly pulley, 28 feet diameter, grooved for thirty-five ropes, being the same in both cases, the great difference between the two being in the boiler pressure; the old engines work with 80 lb. boiler pressure on the compound principle; the new engines at 160 lb. on the triple expansion principle. The old engines have worked economically, but it is anticipated that the new engines will work with a very considerably smaller consumption of steam. Instead of two cylinders the new engines have four: one high-pressure cylinder 22 inches diameter, one intermediate cylinder 31 inches diameter, and two low-pressure cylinders 35 inches diameter. These are arranged like the cylinders of a pair of tandem engines, the high-pressure cylinder being placed behind one low-pressure cylinder, and the intermediate cylinder behind the other. The adoption of four cylinders for a triple expansion engine has great advantages, as the engine not only has a symmetrical appearance, but the powers and the strains on the two cranks are maintained very nearly equal. By dividing the low-pressure cylinder into two, the disadvantage of having one very large piston is got rid of. The low-pressure piston in the No. 1 mill engine is 58 inches diameter, as against two pistons only 35 inches diameter each in the No. 2 mill. The valve gear of this engine is of the Corliss type of Messrs. John and Edward Wood's well-known design. The piston rods, the cross pins, and the crank pins are of Siemens-Martin mild steel, as also are all pins throughout the engine subject to wear; the cross-heads, connecting rods, cranks, and the crank shaft are of scrap iron, the last being 15 inches diameter in the journals, and 20½ inches diameter in the swell for the fly wheel. The condensing apparatus consists of a condenser placed between the engines into which both the low-pressure cylinders exhaust, and of two air pumps, one driven off each engine cross-head. The engines are provided with all the latest improvements in the way of automatic lubricating apparatus; the cylinders are cased with sheet steel, the fly pulley is provided with a wood casing. One of Messrs. Wood's automatic barring engines is provided for turning the fly wheel round, and the piston rods are fitted throughout with Macbeth's patent universal self-adjusting stuffing boxes and metallic packing. The engines are finished in Messrs. Wood's usual high-class style, and are a fine example of modern triple expansion engine practice

The mill itself is a substantially constructed six storeyed building, and is fireproof throughout. The architects are Messrs. Potts, Son, and Pickup, of Manchester.

The ventilating, humidifying, and heating apparatus has been put in by Mr. P. Parsons, of Blackburn. The Mutual is the first spinning mill to adopt his system of heating by hot air, as distinguished from the steam-pipe system, though over two dozen weaving sheds have adopted it. The engine being started, a large fan draws the fresh air from the outside through the heater, by which it is warmed to the desired temperature. The air then passes through the humidifier, where it gathers up its moisture from pure fresh water or steam according to the season of the year, and it then travels up an oval pipe into the main pipe of each room, and thence through the branch pipes into the rooms. Valves are placed at each main and at each branch, so that a room, a branch, or any portion can be shut off or on as required.

The mill is not being lighted by gas as is No. 1 Mill, but by electricity. There are the equivalent of over 700 lights, of 16 c.p. each. In the engine-room and boiler shed, wall connections and hand lamps are provided, which can be carried to any part of the engine or inside the boilers.

After a severe competition the directors entrusted the machinery order with Messrs. Dobson and Barlow, of Bolton, with the exception of the scutchers, which are being supplied by the well-known firm of Messrs. Lord Brothers, of Todmorden. When filled, the mill will contain 78,000 mule and ring spindles, the counts to be spun being 40's to 60's twist, and 60's to 80's weft.

Amongst those present at the opening ceremony were Messrs. Dawson (chairman), John Tattersall, James Belshaw, Walter Chadwick, John Kershaw, and Adam Wild (directors); Mr. James Howarth (manager); Mr. Robert Livesey (secretary); Messrs. Mason, Higginson, Hamer, and Forrest (representatives Messrs. Dobson and Barlow, of Bolton); and Messrs. R. Steel and C.

E. Ashworth (from the firm of Messrs. E. Jardine and Co., cotton brokers, of Liverpool), and Mr. Wood, of Bolton. Mr Dawson officiated as chairman, and in opening the proceedings said that the new engines had been erected by the same firm as those in the No. 1 mill. The engines in the No 1 mill had given them every satisfaction, and during the time they had been in use the mill had not been stopped once on account of a derangement of the engines. The engines in the new mill were almost the first of the kind that had been erected in Lancashire It was a triple-expansion engine, and could be worked at very high pressure. Those engines would be worked at something like double the pressure of steam required for the engines in the old mill. (Applause.)—Mr. Wood, of Bolton, then gave a technical description of the working of the engines, after which Miss Chadwick, daughter of one of the directors, named the first engine "Amy," and Miss Needham gave the name of "Edith" to the second. Both young ladies, prior to performing their pleasant duties, made a few appropriate remarks, and wished the promoters of the mill every success.—Mr. Mason (Messrs. Dobson and Barlow) proposed a vote of thanks to Miss Chadwick and Miss Needham, and the motion having been seconded by Mr. Steel, of Liverpool, it was carried with acclamation. The ladies then turned the steam valve for the purpose of starting the engine, and as the large fly-wheel commenced to revolve a hearty cheer was raised by the company present. A demonstration of the electric light was then given, and after some refreshments had been served to the company, an adjournment was made to the large room on the fourth storey, where tea was provided. Subsequently a few short speeches were given, and the rest of the evening was spent in dancing.

News in Brief.

ENGLAND.

Accrington.

At a meeting of the committee of the creditors of Messrs. J. and E. Whittaker, Accrington, it was reported that the debtors had offered 7s. 6d. in the pound.

Blackburn.

One hundred and eighty of the employés at the Audley Mills were on Saturday treated by the management to an excursion to Brungerley Bridge, Clitheroe.

Mr. John Abbott, recently representing Messrs. William Dickinson and Sons, machinists, is now well on his way to Brisbane, Queensland, to assume charge of the new cotton spinning and manufacturing concern recently formed at Brisbane, to which we called attention a few months ago. Mr. Abbott, who has gone out under the auspices of Messrs. Asa Lees and Co., Ltd., Oldham, who are supplying the machinery, is a thoroughly practical man, in both the spinning and weaving departments.

Bolton.

Mr. Joseph Foy, a Bolton magistrate, cotton spinner, and draper, died at his Southport residence on Sunday morning after a short but painful illness. Deceased, who was 65 years of age, formerly represented the Liberal interest in the Town Council, and was treasurer of the Bolton Liberal Association.

A fire broke out early on Wednesday morning at Messrs. J. Marsden and Co.'s No. 2 mill, Fletcher-street. The outbreak occurred in the top storey, where there are a couple of pairs of twist mules. The Corporation Brigade found the automatic sprinklers at work, which had checked the fire below them, but by some means the flames had got to the ceiling and communicated with the roof. Before a mastery could be gained over the burning ceiling considerable damage had been done by the water, which ran into both mule and card-rooms below. The machinery was not much damaged. The damage is estimated at about £1,000, fully covered by insurance.

Bury.

The newly formed Vulcan Spinning and Manufacturing Co., Limited, are about to invite tenders for ring-spinning machinery. The tenders for construction of the mill are under consideration.

The number of members on the funds of the Bury Spinners' Association during the month has been 160, or a weekly average of 40. The amount expended was £127 14s. 1d.; and the gain in funds was £60 19s.

Mr. John Battersby Crompton, chemist and druggist, of Bury, committed suicide on Tuesday by taking poison. He had been a director of one or more of the limited companies in the town.

The work at the Peel Mill No. 2 is progressing very rapidly. The machinery is being quickly delivered by Messrs. Platt Bros., and it is hoped that before very long the firm will be able to hold the ceremony of christening the engines.

The newly formed firm of W. and J. Hutchinson, Limited, Daisyfield Mill, Bury, held its first half-yearly general meeting on Thursday week. Despite the loss incurred during the recent strike at the mill, the balance-sheet shewed an available balance of £606 on the four months' working.

Bradford.

At the Bradford Borough Court on Thursday a summons was heard which had been taken out by Mr. J. I Loewy against Mr W. H. Drew, for using provoking language at Laycock's Hotel on Sunday night last. The Bench convicted, and fined the defendant 5s. and 14s. costs, with the alternative of seven days' imprisonment. Defendant said he should not pay the money.

The death is announced, from inflammation of the lungs, of Mr. Joseph Hey, wool buyer, of Elizabeth-street. Probably no one in the trade was better known or more highly respected. Mr. Hey, who was sixty-two years of age, acquired a knowledge of the business with Messrs. William Rouse and Co., of Canal Road. For some years past he had been wool buyer for Messrs. I. and G. Lancaster, wool merchants, Cheapside, Bradford, and was well known in many of the wool-growing districts, more especially on the other side of the Border. He was a leading Oddfellow, being at the time of his death a Past Provincial Grand Master.

Cleckheaton.

As compensation on behalf of seven of the killed in the Marsh Mills chimney disaster of February last, the sum of £460 has been paid to the deceased's relatives in sums varying from £20 to £100. As compensation to the nine injured, a total of £522 10s. has been paid, varying in sums from £20 to £200. Claims are still to be settled in respect of eight dead and two injured.

Great Harwood.

The quarterly meeting of the Great Harwood Power-Loom Weavers' Association was held on Tuesday, Mr. R. Duxbury presiding. There was a large attendance. After the election of officers, the question of withdrawing from the North-East Lancashire or the Northern Counties' Amalgamated Associations of Weavers was considered.—The Chairman said that the Committee of the N.C.A. was invited to attend a meeting of the Harwood Association some time ago for the purpose of considering the uniform list, but the Committee did not attend, and it was decided to invite them again to the next quarterly meeting. They had not, however, put in an appearance that night, the Central Committee having sent a communication saying they had finished their labours with regard to the list.—Mr. J. Hewitt said that in 1891 the Great Harwood Association paid to the Northern Counties' Amalgamated Association of Weavers no less than £277 in respect of levies. What was the use, however, of paying all this money to them, for when they wanted their assistance the Amalgamated Association always gave them the cold shoulder? The Association repudiated their responsibility when the Harwood weavers agitated in respect of the suppression of steaming, and all the money which was paid to weavers during their three days' stoppage was paid out of the Harwood Association, and not the amalgamated body. There was also a dispute at Billington. The Amalgamated Association on that occasion also refused to pay any part of the cost. With regard to the North-East Lancashire Association, the Harwood Association always got the information from that organisation which they required when the committee had a "knotty" problem to deal with, and he did not think it would be wise to withdraw from the North-East Lancashire Association.—Mr. R. Clayton said the officials of the Northern Counties' Association thought more about going to London and spending the money of the Association than they did of the interests of the weavers. They forgot they had been weavers once, and he thought the only way of checking their conduct was by stopping their pay so far as Great Harwood was concerned.—It was then unanimously resolved to withdraw from the Northern Counties' Association.

Heywood.

The report and balance-sheet of the Roach Mill Co., Limited, Heywood, shew that a five per cent. dividend has been declared, leaving the reserve fund at £224 12s. 7d.

The shareholders in the recently burned down Wham Bar Mill have decided to go into voluntary liquidation, Mr. Alfred Smith being appointed liquidator. It is rumoured that a meeting will be held shortly to consider the possibility of restarting the concern as a ring spinning mill.

Manchester.

Mr. John Anderson, the newly elected general secretary of the Amalgamated Society of Engineers, was present at a meeting of the members of the Society held at Belle Vue on Saturday. In the course of his address Mr. Anderson said that Mr. Tom Mann, his principal opponent in the voting for the secretaryship, represented what might be called the revolutionary party in the Society. He believed that if the revolutionary principles had prevailed the ruin of the strongest trade-union in the kingdom would have been wrought. The fighting policy would have crippled them by greatly reducing their strength, and all the labours of the past in the direction of drawing closer the bonds between employers and employed would have been rendered useless.

Middleton.

The Rhodes Manufacturing Co., Limited, are engaged upon extensions consisting of the addition of looms and preparation. The order for the sizing plant has been placed with Messrs. Howard and Bullough, Limited, Accrington.

Oldham.

The Croft Bank Spinning Co. has sold its machinery, and is now winding up its affairs.

After six weeks' stoppage for alterations to steam engines, which have been tripled, and the putting in of new steel boilers, the mill of the Prince of Wales Spinning Co commenced work on Monday.

Mr. Thomas Heaton, of Messrs. Radcliffe's Moss Hall Mill, Rochdale, has been appointed manager of the Equitable Spinning Co., out of over 30 applicants for the vacancy, caused by the resignation of Mr. John Cheetham.

Mr. E. Longbottom, who for several years has been the salesman and secretary to the Park and Sandy Lane Spinning Co., has been chosen to fill a similar position with the Holly Mill Co., of which he is the chairman.

Mr. James Cocker, chairman of the Ridgefield Spinning Co. and secretary of the Albion Spinning Co., and Mr. Edward R. Noall, chairman of the Borough Spinning Co., are promoters of "Scotts," engineers, Limited, Newton Heath.

The Middleton and Tonge Mill Co. have had a new steel segment ring placed on the spur wheel and also a steel pinion wheel put in by Messrs. P. R. Jackson and Co., Limited, Salford, and the Oldham Boiler Works Co. are supplying them with three steel boilers.

In the recent article in *The Textile Mercury* on the engines of the Lion Spinning Co., Royton, they were described as made by Messrs. Timothy Bates and Co, late Pollit and Wigzell, instead of by Messrs. Pollit and Wigzell, Ltd. (the present name of the firm), late Timothy Bates and Co.

The directors of the Parkside Spinning Co. have, after a severe competition, placed the order for the whole of the machinery required in their No. 2 mill with Messrs. Platt Bros. and Co., Limited. The No. 1 mill was also fitted up by the same firm. The company has now 49,000 spindles working, and the second structure will hold about 90,000.

The Pearl Mill, which as yet is the largest in the district, is approaching completion. It is fireproof throughout, and presents a very fine appearance. The triple expansion engines are being supplied by Messrs. Buckley and Taylor, Oldham; the boilers by the Oldham Boiler Works Company; and machinery by Messrs. Platt Bros. and Co. The mill will contain about 115,000 spindles.

The engines at the Prince of Wales Spinning Co.'s mill have been converted to triple compound by Pollit and Wigzell, Limited, Sowerby Bridge. The engines started with full load on Monday morning and so far have given every satisfaction. The two old high-pressure cylinders have been removed, leaving the two low-pressure cylinders, and using one new high-pressure and one new intermediate cylinder.

Preston.

The Moor Park Manufacturing Co. were fined 20s. and costs on Monday for not limewashing the mill as required.

Messrs. Hopkins, Martin, and Co., proprietors of the Astley Field Mill, St. Paul's-road, Preston, were summoned on Monday for a breach of the Factory Act. Captain Maitland, the new inspector for the Preston district, visited the mill on June 9th, and found that the horizontal and beam engines were stationed in a small room in such a position that, unfenced round as they were, they endangered the life of the engine-driver. The manager was spoken to, and subsequently served with notice to remedy the defect; but upon calling again on the 4th inst., the inspector discovered that no steps had been taken.—Mr. Parker, who represented the firm, admitted they were technically in the wrong, but the engines had been run in precisely the same manner for at least thirty years without interference from the inspector.—The Bench imposed a fine of 20s. and costs for the horizontal engine, and ordered payment of costs for the beam.

Ramsbottom.

The strike at the Square bleachworks against the proposed reduction of 10 per cent. continues, with little prospect of settlement.

Radcliffe.

The mill of Messrs. Pendlebury, Radcliffe, has resumed work after a lengthened stoppage for the putting in of a new boiler and repairs. Over £80 has been paid by the Weavers' Association to its members during the stoppage.

Rochdale.

The name of Mr. W. James Cryer, president of the Rochdale Power-loom Weavers' Association, 11, Roach-place, Rochdale, has been inserted on the Commission of the Peace for the borough.

Sabden.

At a meeting of the creditors of the Pendle Vale Manufacturing Co., Limited, Sabden, held on Tuesday, the liabilities were stated to be £3,011, with assets (at breaking-up price) £2,641. The question of the lease (about six years to run) will be a matter of arrangement with the landlord.

Stalybridge.

Mr. Samuel Sidebottom, the Operative Spinners' secretary, has a long letter in yesterday's *Cotton Factory Times* repelling the insinuations of mismanagement emanating from a writer in that journal, whom he identifies apparently with the secretary of the Amalgamated Spinners' Association. He also severely criticises the action of the Executive Council in the matter.

Stockport.

It is stated that an attempt has been made to form a board of promoters of a new cotton mill, to be erected in the neighbourhood of Portwood. No tangible result has yet been arrived at. It is believed that the promoters are waiting developments in connection with the Stockport Ring Spinning Mill before they proceed with their scheme.

In addition to trimming and wool forming, it has been the practice latterly to employ women as fur-hardeners in most of the felt-hat manufacturing districts. The Amalgamated Society of Journeymen Felt Hatters objected to the presence of women in the fur-hardening department, and nearly a year ago gave notice to the employers that no more females must be employed upon such work; consequently when Mr. Giles Atherton, of the Virginia Mills, Stockport, increased the number of his women fur-hardeners a fortnight ago, the members of the society in his employ came out on strike. In the course he had taken Mr. Atherton was strongly supported by the other hat manufacturers in the Stockport district, where some 80 per cent. of the fur-hardening is done by women, who, the employers contend, are better adapted for the work, by reason of the suppleness of their fingers, than men. Among employers there was strong disinclination to concede the demand made, and it was understood that many of them were in favour rather of a general lock-out as a means of testing the question. Happily it has been found unnecessary to have recourse to so extreme a measure, inasmuch as the men's executive has decided to rescind their resolution on the subject of women fur-hardeners. As a result of this decision, the dispute at Mr. Atherton's works came to an end on Monday afternoon, the men returning to their places on the old terms as far as the leading features of the matter were concerned.

On Saturday afternoon, Mrs. Giles Atherton, wife of the chairman of the Stockport Ring Spinning Co., Limited, laid the corner stone of the Company's mill at Brinksway. This is the mill which was fully described, and illustrated by a 2 pp. coloured supplement, in *The Textile Mercury* of January 2nd last. It will contain 106,000 spindles and employ 6,000 workpeople. The architects are Messrs. Stott and Sons, of Manchester and Oldham. There will be four Lancashire boilers, each 30 feet long by 8 feet diameter, constructed of selected mild steel to carry 160lb. per square inch working pressure, and made by Messrs. John Fernihough and Sons, of Dukinfield. The feed water heater, or fuel economiser, will contain 480 pipes, and will be supplied by Messrs. E. Green and Sons, of Manchester and Wakefield. The steam engines will be of the triple expansion horizontal tandem type, and are being made by Messrs. John and Edward Wood, of Bolton. The blowing-room machinery will be supplied by Messrs. Lord Brothers, of Todmorden. All the remaining preparing machinery and the spinning machinery will be supplied by Messrs. Brooks and Doxey, of West Gorton and Junction Ironworks, Manchester, and will include patent revolving flat carding engines, drawing, slubbing, intermediate, and roving frames, and 140 ring spinning frames containing about 53,000 spindles. The card clothing will be supplied by Messrs. Wm. Walton and Sons, of Haughton Dale, near Stockport; and the beaming frames by Messrs. Howard and Bullough, of Accrington.

SCOTLAND.

Dundee.

A serious fire broke out on Monday in the Dunhope Works, occupied by Messrs. Fergusson. The greater portion of the works soon became involved, and when the brigades got the fire under, the damage to the machinery, cloth, jute, etc., was estimated at £20,000. Four hundred workers are thrown idle.

Mr. A. J. Buist, of the firms of Messrs. Don Brothers, Buist, and Co., flax and jute spinners and manufacturers, Dundee, and Messrs. William and John Don and Co., jute manufacturers, Forfar, has retired from these firms in terms of the deed of partnership.

The death is announced of Mr. William Henry, which occurred at Berlin on the 25th ult. Mr. Henry, who was 71 years of age, was formerly a partner in the firm of Messrs. Henry and Corrie, flax merchants, Dundee. He was well known in the Dundee flax trade, and had many friends in this neighbourhood. For some years he has resided in Berlin.

A disastrous fire occurred at Dundee on Thursday afternoon, resulting in the destruction of a large range of sheds at Camperdown Dock, stored with flax and other goods. A jetty about 900 ft. long was also seriously damaged. The total damage is estimated at between £20,000 and £30,000. This is the third large fire in Dundee this week.

Glasgow.

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

	India and China.	U.S. and Canada.	W. Indies & S. America.	Australasia.	Africa and Egypt.	Continent.	Totals.	Totals for year to date.
	£33,380	10,764	1,337	1,183	—	175	46,839	1,791,832
	168	22,534	197	22	—	220	23,141	392,504

The following are the total values of the exports for the same twenty-two weeks of last year:—Cotton, £1,695,734; linen, £330,856.

Jedburgh.

Messrs. James Boyd and Son, New Bongate Woollen Mills, have just completed an extensive addition to their already large wool store.

Messrs. Laidlaw Brothers, woollen manufacturers, Allars Mill, have just made an addition to their weaving shed sufficient to hold between 20 and 30 new power looms, and they have in the course of erection a warehouse 100 feet long.

IRELAND.

Co. Tyrone.

The flax crop in this locality, which was sown in most favourable circumstances during the dry weather in April, has benefited immensely from the recent rains. Should the season turn out favourably a good crop may be confidently looked for. Very much the same area was sown this year as last.

Miscellaneous.

CHICAGO CRIES "SOUR GRAPES."

The *Chicago Dry Goods Reporter* of May 21st, says:—"The cable brings a report that Mr. R. S. McCormick, the resident commissioner of the World's Fair in London, says that there is no sign that the manufacturers of Leeds, Manchester, Birmingham and Bradford would abandon their obstinate attitude towards exhibiting at the World's Fair.

"This being the case, we do not see why Mr. McCormick should give himself any further concern about those manufacturers. We do not see that an exhibit made by the English manufacturers of cotton goods is especially to be desired. We pointed out many months ago that these same English manufacturers are our strongest rivals in the world's markets, and it will only be a question of a few more years when our manufacturers will be knocking them out in their own territory. Such being the case, we think the World's Fair authorities are very foolish in soliciting the exhibits of these English cotton goods manufacturers. The proper policy rather would be to discourage their exhibits, and throw such restrictions around their offerings as would practically keep them out.

"Mr. McCormick is entirely too energetic. We advise him to let John Bull rest in his own contentment. If he persists in his well-intentioned but manifestly misdirected energy, we would advise our American manufacturers to bring such a pressure to bear that he will have to desist. The absence of Manchester, or of all English cotton manufacturers, can have no more effect on the Fair than it would on Lake Michigan to take away a barrel of its water. And their presence might have a very serious effect in diverting attention from the products of our own manufacturers, who ought soon to occupy a position where they could command the markets of the world.

"The *Dry Goods Reporter* has intimated its opinion on this subject several times before. We think it now time to openly insist that Mr. McCormick receive better instructions."

MESSRS. CHADWICK'S NEW MILL AT EAGLEY.

Messrs. James Chadwick and Brother, Limited, Eagley, Bolton, the well-known makers of sewing cottons, are still further extending their works by the erection of a large cotton spinning mill. The firm commenced in a small way about 70 years ago, since which time their factories have grown until now the "Eagley Mills" have become a large and very complete thread-making establishment, equipped with the most improved machinery which the production of high-class manufactures invariably demands. The firm have also a large bobbin works at Staveley, Windermere, and branch manufactories near Riga, at Montreal, and at Greenville, Jersey City, U.S.A. Up to the present time every process of thread manufacture and finishing has been carried on at Eagley, with the exception of cotton spinning.

The company have, however, recently decided to erect a spinning mill of the most modern type for the production of the highest class of combed yarns. Messrs. Bradshaw and Gass were appointed architects. The new mill adjoins the No. 2 doubling mill, and is located by the side of the river Eagley. As the buildings are four storeys high, and of sufficient length for 13 pairs of mules in each storey, the ground floor gives an area sufficient to allow all the preparation machinery to be placed within the mill walls, with the addition of a shed only 42ft. wide. The card-room is of extra height, so as to ensure ample room and good light being obtained. On the long side of the mill are windows 16ft. wide, and as only a small portion of the bottom is of rough plate, an excellent light is obtained. Particular attention has been given to the ventilation of the card-room, and air propellers are arranged so as to remove the foul air. The scutching-room is placed at the west end of the mill, a dust chamber being provided below, and a dust flue placed at the angle. Being carried up at one corner of the mill it forms a feature in the external design, the top being taken up above the roof level and surmounted by a cover specially designed by the architects, and which is found to materially assist the draught and to prevent back currents. Over the scutching-room end of the mill are placed the cotton-mixing and bale-rooms, the loading doors having cast-iron jambs and a Barker's hoist placed over them. Three lofty spinning-rooms occupy the remainder of the upper storeys. These will be of great length and of the extreme width for satisfactory working. The double width bays are used with advantage, keeping the wheel-gate clear of pillars, and allowing the ceiling over each pair of mules to form a perfectly flat reflecting surface. At the end of each pair of mules a large window gives the best possible light along the length of each mule without any shadows from brick piers or other objects. The windows extend right up to the ceiling. Ventilation is provided by means of light iron casements, one to each large window. The basement extends under a portion of the card-room, and is utilised for warehousing, yarn testing, etc. It is fitted with an outside door and single-storey hoist for loading the yarn on to the mill-yard tramway for conveyance to the doubling mills, etc. Entrance to the mill is obtained from the yard at the south-west angle of the building. A glazed screen round the roller-coverers' office and a check door give control of all passage of the hands. A spacious fireproof staircase affords easy access to all the rooms, and on the first floor landing is the manager's office. In the newel of the staircase is placed a double hoist, running from the basement to the upper storey, and with good landing space to each. The staircase is carried up, forming the water tower for the sprinkler system. The whole of the buildings are to be fitted up with automatic sprinklers, giving extra protection against fire. In construction the whole will be of the most solid description, fire-resisting, and the floors designed to give the steadiest working of the machinery. Steel girders and steel joists, bedded in concrete, form the floors, the upper part being boarded on joists, all made thoroughly firm. At the north-west angle is placed the fire-engine house, the rope race dividing the scutching-room from the card-room, and allowing the fireproof passage to be formed under the ropes. Overhead a travelling crane is fixed, and the line of the traveller beam is utilised as a decorative feature, the windows at the side terminating under the same, while the upper part has a range of circular windows with arches in rings.

The engines are to be supplied by Messrs. Hick, Hargreaves, and Co., Limited, of Bolton, and will be a fine pair of side-by-side compound Corliss engines of 1,200 I.H.P., having cylinders 30in. and 56in. in

diameter by 5ft. stroke, running at 60 revolutions per minute with steam of 120lb. pressure. One of Messrs. Hick, Hargreaves' patent barring engines will be provided for starting or moving the engines. Adjoining the engine house is the dynamo house, etc., with a small engine for special use. Electric lighting is to be used throughout the whole of the new mill. The boiler-house is placed outside the line of the mill, but in close proximity to the engine house. Messrs. Hick, Hargreaves, and Co, Limited, are providing four steel boilers of the Lancashire type, each 8ft. diameter by 30ft. long, suitable for 120lb. working All the gearing throughout is being executed by Messrs. Hick, Hargreaves, and Co., and the contract for cast ironwork is also placed in their hands.

Messrs Dobson and Barlow, Limited, of Kay-street works, Bolton, are supplying the whole of the machinery required throughout the mill. The work of building is being rapidly pushed forward, and all the contracts are placed. Almost the whole of the work throughout is being executed by Bolton firms.

THE Barmen firm of Molinaeus and Co. is about to erect a factory for the manufacture of several different kinds of ribbons.

IN order to facilitate the introduction of made-up hosiery into Roumania in spite of the high tariffs recently imposed by the Roumanian authorities, it is said that some dealers in Bucharest are intending to make the attempt to import such goods in an unfinished condition.

Technical Education.

CITY AND GUILDS OF LONDON INSTITUTE EXAMINATION.

The following papers were set at the recent examination in the subjects named. The papers on the other textile subjects have already appeared in these columns.

FLAX SPINNING.

Instructions, as above. *Three hours allowed for this paper.* Candidates are not expected to answer more than *ten* questions; but they are required to select at least *five* from the last *six* questions in either grade.

ORDINARY GRADE.

1. In the common flax plant, may seed be expected from every flower, under ordinary conditions; and, if so, why? (60 marks)

2. Give as many of the characteristic qualities of good flax seed as you can; and state in what points home-grown seed would be likely to differ from properly matured Riga or Dutch. (80)

3 In preparing the soil for flax, what three points require special attention from the farmer to ensure a successful crop? (80)

4. (*a*) What part of the flax plant contains the fibre; (*b*) in retting, why are fresh spring and thoroughly stagnant waters both objectionable; and (*c*) why do some authorities prefer retting the flax with the *root* ends down? (100.)

5. Describe the three distinct operations comprised in the scutching process (whether by hand or machine) —shewing how they vary in different countries, and for different classes of fibre. (80.)

6. Why, in low-class flaxes (like Baltic) do the *age* and *condition* of the fibre become, proportionately, of more importance to the spinner than in better-class grades. (80)

7. Describe Erkine's patent "ending machine"—noting the impurities usually present in flax after being machined; and how this appliance is designed to remove them. (100)

8. Describe the theory of tow carding—shewing why the different organs are required; and how they assist in producing the desired result. (100.)

9. Why should diameters of drawing-rollers especially be kept as small as possible, consistent with the character and weight of the material; and why are narrow-faced pressing-rollers generally more effective, relatively, than broad? (80.)

10. Explain why spinning bobbins require to be "dragged" as they fill. (60.)

11. Describe the principle and operation of any yarn-testing machine with which you are acquainted —noting the two main characteristics a yarn must possess to give a successful test. (60.)

12. To whom are we most indebted for re-establishing and improving Ireland's ancient flax industry and linen trade? And, to increase the demand for linen, when, and by whom, was it ordained that "hat-bands and scarfs of linen should be worn at funerals"—a custom prevailing to the present time? (80.)

HONOURS GRADE.

1. Under the Linnæan system, to what class, and to what order, does the common flax plant belong; why has it been so placed; and what is the botanical theory as to the growth and reproductiveness of the seed? (100 marks.)

2. Discuss the question of home-grown *versus* imported seed—taking account of (*a*) desirability of regular change of district; (*b*) climatic influences and systems of culture; (*c*) probable results as to yield and fineness of fibre in each case; and (*d*) relative costs of producing the two seeds. (100.)

3. (*a*) What is the main object to be attained in preparing the soil for flax; (*b*) why should the ground be made as even and flat as possible; (*c*) when sowing is finished, about what depth should the seed be below the surface of the ground; and (*d*) for fibre, about what quantity should be sown per statute acre? (100.)

4 Contrast dew with water-setting—(*a*) as to time occupied by the operations; (*b*) yield, fineness and strength of fibres; (*c*) bleaching properties of the two flaxes; and (*d*) commercial results. (100.)

5. What is the *principle* of the Henderson scutching machine; and describe how the process is carried out under this system? (100)

6. About what amount does the United Kingdom spend annually in importing flax, and what proportion of the same could, with advantage, be produced at home? (80.)

7. In an ordinary hackling machine give, roughly, the percentage of time occupied by the fall, rest (top and bottom respectively) and rise of the "head" or "channel"; and, in such rise and fall, does the "head" usually pass through equal spaces in equal times? (100.)

8. On a tow finisher card, what results would follow in each case—(*a*) from reducing the speed of the cylinder; (*b*) increasing speed of strippers; and (*c*) decreasing speed of workers? (80.)

9. In an ordinary roving frame both spindle and bobbin receive their rotary motions through different sets of gearing—eliminating this bobbin gearing altogether (*a*) can a satisfactory rove be produced; (*b*) if so, how is this end attained; and (*c*) what would be the advantages and disadvantages of the arrangement? (100)

10. Can wet-spun yarns be effectually bleached, or tinted, by being spun through a bleaching or colouring material dissolved in the hot water of the trough; and what are the points for and against the adoption of such a system? (80.)

11. The new French tariff raises the duty on No. 50 from, say f. 40·25 to f. 50·00 per 100 kilogrammes—taking the kilo. at 2·2046 lb., f. 25 00 equal to £1 stg., and the French paquet at six bundles, what are the old and new duties, *in pence per bundle*? (100)

12. When, and by whom, was roller spinning invented; and what improvement in the spinning wheel was accomplished by the application of Arkwright's principle? (80.)

FRAMEWORK KNITTING, AND HOSIERY.

Instructions, as above. Each candidate in the Honours Grade is supplied with a piece of point paper. *Three hours allowed for this paper.* The candidate should state the name of the town in which he is employed. Not more than twelve questions to be answered.

ORDINARY GRADE.

1. Describe the principal parts and manner of working the hand stocking frame, stating what are the various supplementary apparatus used in connection with it. (30 marks.)

2. Say how plated work is made, and three other kinds of fancy stitches, of which only one shall be ribbed work. (30.)

3. Describe slurgalled work and sinker lines. State their causes and how they are to be avoided. (25)

4. How many yards per pound are there in 20/1 cashmere or worsted, and in 6/1 and 36/2 cotton or merino? (25.)

5. Describe one latch needle, and one circular frame, with bearded needles. (25.)

6 How is the gauge of a hand or rotary frame calculated, and how is it reckoned on the circular frame? (20.)

7. What are the principal kinds of rotary frames in use, and in what do they differ from the hand frame? (25.)

8. What are the principal articles now made on the hand frame, and why is the hand frame used for them in preference to the rotary frame? (20.)

9. What are the principal materials used for softening or lubricating yarns, and how are they applied? (20.)

10 Explain the various modes of narrowing and widening. (20.)

11. Describe the different modes of making the heels of stockings and socks, and say under what circumstances you would make use of them (25.)

12. Describe the making of a cut and a wrought pant. Say whether you would make a narrowed or a widened leg by preference, and why. (30)

13. Shew the various modes of making hose and half-hose on the circular frame. (30.)

14. Give instructions for making two of the following articles:—Women's full-fashioned hose, with spliced foot and high spliced heel. Men's 18-gauge wrought worsted half-hose. Wrought or cut shirt. Wrought or cut Cardigan jacket. (25.)

HONOURS GRADE.

Not more than twelve questions to be answered.

1. Give a short outline of the processes in spinning cotton, worsted and woollen yarns. Say what is the principal difference between the French and English mode of spinning worsted and cashmere. (30 marks.)

2. State the methods of numbering cotton, worsted, woollen, thrown silk and spun silk yarns; also what is the difference between the ordinary numbering of spun silk for the lace or weaving trades and that used for hosiery. (30.)

3. To what count in single yarn would the following numbers used together be equal:—18/1, 40/1, 26/1; also 32/2, 20/1, 50/1? (30.)

4. Describe the mode of working of an ordinary single bar warp loom; also the double rib warp loom. (25.)

5. Shew how one openwork and one close fabric are produced on a warp loom with a single guide bar. (25.)

6. Describe the making of one openwork and one close fabric on a warp loom with two guide bars. (25.)

7. Give a full description of a Cotton's patent frame. (30.)

8. Describe any improved rotary on Cotton's principle for making other than plain fabrics. (30.)

9. Describe any knitting machines you know, whether straight or circular, and shew what are the advantages or disadvantages of articles produced on them. (30.)

10. Design on the accompanying point paper a pattern to be produced with a circular frame, having two plain and two tuck pressers, and 1862 bearded needles Shew how to cut the tuck pressers. (30.)

11. Explain the bleaching and dressing of white cotton hose and socks, either ordinary finished or ironed; or describe the trimming and dressing of merino half-hose. (25)

12. Give the details of dressing lamb's-wool pants, or ladies' black cashmere hose. (25)

13. Two pairs of black cashmere hose, made at the same time, on the same machine, and from the same yarn, but dyed at two different times, appear two perfectly different qualities. What has caused it, and what is the difference in colour of each? (30)

14. Shew the costing of a full-fashioned cashmere hose, giving all the details, and calculated to pay a profit of 7½% and a discount of 2½%. (30.)

15. Cost a merino or lamb's-wool pant to shew 7½% profit and 2½% discount. Give full details of expenses, size of yarn and splicing used, etc. (30.)

CALICO AND LINEN PRINTING.

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

ORDINARY GRADE.

1. Give the chemical name and formula of the pure cotton fibre, and describe the action of mineral acids and of alkalis upon it. (30 *marks.*)

2. State the purpose of the following processes in calico bleaching:—(1) the steep after singeing; (2) the wash after the lime-boil; (3) the sour after chemicking. (40.)

3. Give an account of the thickeners most commonly used in making up printing colours, pointing out the particular purpose served by each. (30.)

4. Describe the method of fixation in calico printing of Persian berry extract, ultramarine blue, auramine, alizarine blue S, and brilliant green. (40.)

5. Describe the preparation of a steam black from logwood liquor. (30.)

6. Certain styles of calico prints are passed through a bath of tartar-emetic before soaping. To what class of colours is this treatment applied, and what purpose does it serve? (35.)

7. Describe the process by which a two-colour pattern in red and black can be produced in the dyed way. (45.)

8. You are required to produce a resist print in white, under a cover of (*a*) alizarine pink; (*b*) ultramarine blue. How would you proceed in each case? (40.)

9. Describe and sketch any form of open-soaping machine with which you are acquainted. (30.)

10. What tests would you apply in order to distinguish between prints of (1) indigo blue and indigo substitute (logwood); (2) berry yellow and chrome yellow; (3) aniline black and logwood black? (35.)

11. State what impurities commonly occur in river water, and point out such as render it unsuitable for use in a printworks. (35.)

12. For what purposes are starch, china clay, and soluble oil used in the finishing of cotton prints? (30.)

HONOURS GRADE.

1. Give a careful account of the chemical nature of cellulose, and describe the action of chemical reagents (mineral and organic acids, alkalis, metallic salts, etc.) upon it. (30 *marks.*)

2. Give an account of the stains that may occur in

bleached calico, distinguishing between such as may be due to the cloth itself, and such as arise from faults in the process. How would you examine a stained piece in order to determine the nature of the damage? (35.)

3. Give a careful account of the causes from which the "streaking" of printing colours may arise, and state what colours most frequently shew this fault. (30.)

4. It is required to print the blotch of a chintz pattern in ungreenable aniline black. Give the composition of the black printing colour, and describe the processes through which the cloth goes after printing, up to the point at which it is ready for finishing. (35.)

5. You are required to produce an effect with white and red in the sprig under a purple cover. How would you do this? (35.)

6. Describe the process by which insoluble azo-colours (from *beta*-naphthol) are produced directly on the fibre in calico printing. Illustrate your answer by one specific example, and give the necessary equations. (45.)

Describe two methods by which a print in white may be obtained on a dyed indigo blue ground. (40.)

8. Discuss the method of fixation, properties, and value to the calico printer, of *three only* of the following five colour-stuffs:—(1) alizarine orange (nitro-alizarine), (2) alizarine cyanine (F. Bayer), (3) fast purple or prune (Kern and Sandoz), (4) rhodamine, (5) thioflavine T (Cassella). (40.)

9. Give description and sketch of *one only* of the following continuous steamers:—(1) Mather's (Smith's patent), (2) Duncan Stewart's. (35.)

10. Describe a method applicable on the industrial scale for the recovery of the fatty acids from the spent-soap liquors of a printworks. (35.)

11. Give a description and sketch of a beetling machine. For what styles of finish is this machine used? (30.)

JUTE WEAVING.

Instructions as above. *Four hours allowed for this paper.*

Ordinary Grade.

1. Give a short description (with sketches) of (*a*) the pirn shuttle; (*b*) the cop shuttle; and (*c*) state the main reasons for the almost universal adoption of the cop in jute weaving. (20 *marks.*)

2. State the reason why the warp is harder twisted than the weft. (10.)

3. Given two pieces of cloth, one made from starched warp, and one made from undressed warp; state the features which would lead you to distinguish the one from the other. (25.)

4. In a case of breakage of warp threads, state why it is easier for the weaver to take up the broken threads of a beam made on a dressing machine, than those of a beam made from a chain. (20.)

5. What is the difference between the end of the chain at the top of the warping mill, and that at the bottom? At which end does the beamer start? (15.)

6. Describe briefly the picking wiper, and shew, by sketches, how it is attached to the wiper shaft. (30.)

7. How would you alter the pick of a loom if the pick were too soft? (25.)

8. The crank of a hessian loom revolves backwards. Give the reason, and state the position of the crank at the moment the shuttle starts. (20.)

9. Give some of the causes of irregular selvages. (15.)

10. State why, in minimising the strain on the warp, there is a risk in doing so of injuring the quality of the cloth. (35.)

11. What change pinion will be required to give 10½ shots per inch, with ratchet wheel 80 teeth, intermediate wheel 60 teeth, intermediate pinion 30 teeth, roller wheel 84 teeth, roller 4½ inches diameter, ratchet moving 2 teeth? (30.)

12. For a web 8½ oz., 10 porter, 40 inches wide, 100 yards long, warp 8 lb. Give the following particulars:—(*a*) Number of splits; (*b*) spyndles of warp; (*c*) shots per inch; (*d*) size of weft; (*e*) spyndles of weft; (*f*) time required to weave 200 cuts, each 100 yards long, with 5 looms; (*g*) percentage of waste you would allow. (35.)

13. Describe briefly the processes through which the cloth goes after leaving the loom, explaining the function of each machine. (20.)

Honours Grade.

The candidate is supplied with one sample of cloth and a piece of point paper.

1. Make out instructions for warping a chain of 452 splits 8 lb. single warp, 666 yards 37 inch measure, 144 pins, cotton selvages included; circumference of mill 40 feet with 30 spokes, and arrange to enable 56 rounds to be put on. (15 *marks.*)

2. Shew your knowledge of warping by describing the process of warping the above chain. (15.)

3. Discuss the relative merits of the two systems of weaving hessians, *i.e.*—starching the warp, and working it dry—taking up such points as the difference of twist, and the consequent difference of price of yarn; expense of dressing, as compared with chain beaming; facility of weaving; and any other point that occurs to you, with a view to shew which is the more profitable system. (30.)

4. Give an estimate for weaving 4,000 yards of cloth, same as sample, 24 inches wide, 16 oz. for 27 inches, warp costing 2½d. per lb. and weft 1⅝d., and give details as follows:—(1) size of warp, (2) size of weft, (3) porter, (4) shots per inch, (5) quantity of warp required, (6) quantity of weft required, (7) number of leaves of heddles required, (8) time to weave with 10 looms, (9) length of cut most suitable, (10) number of cuts on the beam (35.)

5. Shew by sketches the drafts of three different twills which may be made with a 4-leaf wiper, and state the advantage of working with the largest number of leaves up. (25.)

6. Describe the mechanism which works the shuttle-box of a 3-shuttle loom. (20.)

7. Describe how the design for a Brussels carpet is put on point paper, and shew how the design is read by the card-cutter. (25.)

8. Describe the dobbie machine with which you are most familiar. (25.)

9. Describe the arrangement of heddles for making the centre selvage. (20.)

10. Describe the process of looming a hessian web. (25.)

11. In weaving twills, a pair of clasp rods are used in addition to lease rods. Describe these, and explain their uses. (10.)

12. What change pinion will be required to give 13⅓ shots per inch, with ratchet 80 teeth, intermediate wheel 75 teeth, intermediate pinion 36 teeth, roller wheel 84 teeth, roller 4¼ inches diameter, ratchet moving 2 teeth? (25.)

13. Give the best speed for looms 45 inch, 60 inch, 72 inch, and 96 inch reed-space. (10.)

14. Describe the mangle for jute cloth, and state the preparatory processes through which the cloth goes before mangling. (20.)

SILK WEAVING.

Instructions, as above. *Four hours allowed for this paper.*

Ordinary Grade.

1. Describe the taking-up motion you think best adapted to produce even cloth in the hand loom. (20 marks.)

2. Presuming that rich fabrics can be produced more nearly perfect in the hand loom than in the power loom, give the reasons. (20.)

3. State the advantages, in lighter fabrics, obtained in the power loom. (20.)

4. Describe the different motions of a plain power loom, including both positive and negative, or reed case taking-up motions. Can the same loom be adapted to weave plain, satin, and figured cloths? If so, say how. (40.)

5. Describe the single lift and double lift Jacquard machines, and also the best form of index machine you are acquainted with. (30.)

6. In a 2,700 Lancashire count, what width of pattern can be produced with a 400 Jacquard machine? How will you adapt the same harness to a pattern one-eighth less in width? What harness will you require to produce with the same machine, a 5,400 count, satin ground weft figure, same width of pattern as No. 1? (30.)

7. What is the quality desired in a shedding motion? Describe the best you are acquainted with. (25.)

8. State the manner in which you regulate the "pick" in the power loom, and give a sketch of the position in relation to the lathe most desirable for the picking stick. (25.)

9. State the advantages and disadvantages of the "Grant" system of reeling organzine and tram. Describe the processes necessary to prepare a dyed warp for the power loom after it leaves the warper. (40.)

10. How do you define the count of a reed? What qualities do you look for in a reed? (20.)

Honours Grade.

1. What do you consider the best picking motions for silk power looms (25 marks.)

2. What fabrics would you use the positive, and for what negative, taking up motions in the power loom? and give reasons. (25.)

3. In using several folds of weft it is often desirable to lay them in the cloth without twist; how would you accomplish this in the power loom? In what manner would you obtain the necessary tension on the weft as it leaves the shuttle? (35.)

4. What is the cause of the fault known as "silvering" in weaving? State the frequent cause of "crapy" or "cockled" cloth. (30.)

5. In weaving satin or other cloth in which more than four shafts are required, would you put face or back up? and give reasons for your preference. (25.)

6. Give sketches of the heald eyes you are acquainted with. In using healds of cotton yarn, say what counts and how spun you would choose for warps of dyed Italian organzine of 20/24 denier. (30.)

7. What are the characteristics of China (Tsatlee and Canton), Japan, Tussur, Italian, and French silks? For the production of which of the following fabrics is each alone or in combination suitable?—Figured handkerchief, Surah, glacé, satin, pongee, gros grain, upholstery damask, umbrella cloth. (40.)

8. What principles will guide you in determining the best spin and throw of tram and organzine and singles to be used in the fabrics named in question 7? (30.)

9. Give the method of calculating the counts of yarn in cotton and spun silk, and of ascertaining the size of silk in deniers and drams, and explain what these weights are. (30.)

10. In designing any cloth, what is it necessary to bear in mind to produce the firmness of feel so desirable in most silk fabrics? (25.)

11. What do you understand by "harmony of colour"? State the simple principles of "harmony" and "contrast." (30.)

WOOL DYEING.

Instructions as above. Not more than *eight* questions to be answered in either grade. *Three hours allowed for this paper.*

Ordinary Grade.

1. Mention several tests which would enable you to distinguish wool from cotton. (12 marks.)

2. State the actions (under various conditions of concentration, temperature, etc.) on wool of each of the following bodies:—Sulphuric acid, nitric acid, sodium hydrate, chlorine. (12.)

3. What substances are commonly present in "hard" water? Give the chemical tests for them, and state how they may be removed. (12.)

4. What is wool-yolk? (12.)

5. Write down a list of the alkaline compounds which may be employed for scouring wool, and state which of them are preferred in practice, and on what grounds. (12.)

6. How is wool mordanted with chrome, alumina, and tin respectively? Give the chemical formulæ of the metallic salts and assistants employed for this purpose. (12.)

7. Describe the preparation of the hyposulphite indigo-vat, and the process of dyeing woollen cloth in the same. (12.)

8. State the modes of application on wool of six of the following dye-stuffs:—Logwood, madder, camwood, cochineal, fustic, flavin, rhodamine, alkali blue, tartrazin S, acid magenta. (14.)

9. What colours are obtainable on the (*a*) chrome, (*b*) alumina, (*c*) iron, and (*d*) tin mordants, with each of the following:—Logwood, fustic, alizarine-orange, resorcin-green (dinitroso-resorcinol)? (14.)

10. Give the chief reactions on the dyed fibre of logwood, indigo, and orchil. (12.)

11. State briefly what you know about orchil: its origin, preparation, composition, employment in dyeing, etc. (12.)

12. Describe a method of dyeing black a mixed fabric of cotton and wool. (12.)

Honours Grade.

1. Give a method of estimating as accurately as possible the percentage of wool in a mixture of wool and silk. (12 marks.)

2. The water supply of a dyeworks contains 5 degrees (Clark's scale) of permanent and 10 degrees of temporary hardness, chiefly due to the presence of magnesium salts. How would you soften such water? (12.)

3. Describe, with sketches of the mechanism employed, the process of scouring and bleaching woollen cloth. (12.)

4. State how you would test a sample of picric acid or of naphthol yellow S. (12.)

5. Discuss the theories of chrome-mordanting propounded respectively by Nietzki, Manzoni, and Knecht. (14.)

6. A sample of commercial alzarin is given you to test as to (*a*) strength, (*b*) purity, (*c*) shade. How would you proceed? (12.)

7. State what you know regarding the composition, fastness, etc., of the various black azo-dyes in the market. (14.)

8. Give an account of the researches which have recently been made on the employment in dyeing of "unaged" logwood. (12.)

9. Describe, with the aid of a sketch, a form of hank-dyeing machine. (12.)

10. Enumerate the chief colouring matters available for dyeing wool bright blue; give their chemical formulæ, and state what you know regarding their fastness. (12.)

11. Arrange the following colours in groups according to their fastness to (*a*) light and (*b*) milling:—Indigo-carmine blue, indigo blue, crocein scarlet, cochineal scarlet, soluble blue, induline blue, night blue, gambin olive, picric acid yellow, rosin pink, alizarin red. (12.)

12. Give an account of any recent invention, or improvements, in mechanism for scouring, dyeing, or drying woollen materials, which you consider of importance. (12.)

LACE MANUFACTURE.

Instructions, as above.

A piece of point paper is supplied to each Candidate.

Ordinary Grade.

1. Describe what is meant by the term "lace," as applied to articles made by hand or machinery. (30 marks.)

2. What are the materials used in making real lace, and the methods generally followed? (30.)

3. Why is point lace so called, and what is the difference between the stitch in pillow and point lace? (30.)

4. What part of Europe can lay claim to having mostly produced point lace? (30.)

5. Give a general description of the double tier traverse bobbin net machine. State also when this machine was invented and the name of the inventor; and give the reasons which induced him to place one tier of carriages behind the other. (30.)

6. Describe the advantages possessed by the spring dropper Jacquard over the Manchester top once so generally used. (30.)

7. Upon what method are the workmen remunerated in the various machines upon which lace is made? Shew how this method compares with older methods of computing the remuneration of workmen. (30.)

8. Give the technical terms as applied to some of the different parts of the lace machines. Give also rough sketches of the parts to which such terms are applied. (30.)

9. What is cotton? Give the principal descriptions mostly used in the lace machine, and state how they are computed as regards thickness and length. (30.)

10 In what respect is real lace superior to machine-made; and which of the various kinds produced on the machine most nearly resembles real lace? (30)

Honours Grade.

1. State what is meant by the term gauge, as used in the lace trade, and give the number of carriages there are to the inch in 9¾ point Lever's lace machine. (30.)

2. What is the fundamental principle underlying lace draughting, as applied to the lace machine? (30)

3. Give a plan of marking out the sley to make Ensor net 2½ inches wide, 10 point machine, independent bars; also give the number of bars required to make the same. (30.)

4. What are the advantages to be derived by making your breadth crossways on the Lever's machine? (30.)

5. Mention the different kinds of lace or nets with which you are acquainted. State also for what purposes they are severally best adapted. (30.)

6. What is the difference between the *purl* produced on the warp machine and that produced on the Lever's machine, and what are the uses to which the warp machine purls are applied. (30.)

7. What is meant by double gimping? Give an illustration, and shew what are the requisites to give a good woven effect. (30.)

8. State briefly the difference between warp and bobbin fining, and give illustrations of both. (30.)

9. Illustrate your method of laying out the sley for a bobbin fining lace 5 inches wide, 9¾ point machine, right twist, independent bars, reverse twist, 4 quarter bars, and 40 thick threads. (30.)

10. Work out the system of computing the various sizes of cotton yarn, and give the weight in lb. of 160/2 cotton necessary to make a warp 1,000 yards long with 5,840 threads. (30.)

COTTON DYEING.

Instructions—As above. The Candidate in this grade must not answer more than twelve questions.

Ordinary Grade.

1. Give a brief account of the chief varieties of cotton. 12 *marks.*

2. By what chemical treatment, other than mordanting, may the dyeing properties of cotton be considerably modified? What objections are there to such treatment? 14.

3. What impurities are contained in unbleached (*a*) cotton yarn; (*b*) calico; (*c*) cotton velvet? Describe a process of bleaching one of these materials. 12.

4 Sketch the appearances under the microscope of cotton, linen, hemp, jute, and China-grass. Name the fibre substances of these products. 12.

5. Describe two methods of mordanting cotton with a mixture of chromic and ferric hydrates. 12.

6. Give the chemical formulæ of stannous and stannic chlorides; state how these salts are prepared and for what purposes they are employed in dyeing. 12.

7. State briefly what you know regarding the origin of logwood, its colouring principle, etc., and its employment in dyeing. 12.

8. What colours are obtainable on the (*a*) alumina; (*b*) iron; and (*c*) tin mordants, respectively, with each of the following dye-stuffs:—Logwood, fustic, quercitron bark, peachwood, catechu, alizarin, gallocyanin, alizarin-orange, rescorcin-green (dinitroso resorcinol)? 12.

9. Describe a method of dyeing manganese bronze, and explain the chemistry of the process. 12.

10. What mordants and colouring matters (or colouring matters alone) would you employ to dye cotton (*a*) bright yellow-green; (*b*) heliotrope; (*c*) chocolate; (*d*) scarlet; and (*e*) bright blue. 14.

11. Give examples of the employment of tannic acid as (*a*) mordant; (*b*) fixing agent; and (*c*) colouring matter. 12.

12. Describe a method of bleaching jute. Why is it difficult to bleach this fibre? 12.

Honours Grade.

1. What considerations determine the extent of the scour or bleach to which cotton cloth is subjected prior to dyeing? What preliminary treatment would you recommend for cloth which is to be dyed (*a*) logwood black; (*b*) erika pink; (*c*) pale indigo blue; (*d*) Turkey red? 12 *marks.*

2. Give tests for distinguishing jute, linen and wool, from cotton and from one another. 12.

3. Describe a method of ascertaining the value of a sample of tannic acid. 12.

4. Mention three methods of fixing a basic dye (for example, rhodamine) on cotton. Which method gives the brightest shade? Which the fastest? 12.

5. Potassium permanganate is sometimes employed for "stripping" the colour from dyed cotton materials. Describe how it is used, and explain the chemical changes which take place. 12.

6. A sample of commercial alizarin is given you to test as to (*a*) strength; (*b*) purity; and (*c*) shade. How would you proceed? 12.

7. Enumerate the chief colouring matters available for dyeing pink on cotton; give their chemical formulæ, and state what you know regarding their fastness. 14.

8. Give an account of the method of, and materials employed for, producing insoluble azo-colours on cotton. What serious defect is met with in many of these colours? 14.

9. Describe, with the aid of a sketch (sectional elevation), the construction and mode of working of a dye-jigger and padding machine. 12.

10. Describe the process of velvet painting, and sketch the mechanism employed. 12.

11. Explain the terms "topping," "secondary dyeing," and "bottoming." 12.

12. Give an account of any recently published discovery or invention affecting cotton or linen dyeing which you consider of importance. 12.

COTTON AND LINEN BLEACHING.

Instructions.—As above.

Ordinary Grade.

1. Give a short account of the physical structure of the cotton fibre in the unripe and the fully ripe condition. 30 *marks.*

2. Give the chemical name and formula of the pure cotton fibre, and describe the action of mineral acids and of alkalis upon it.

3. Give a list of the materials commonly used in the sizings of cotton warps, and classify them into such as are injurious and such as are harmless from the bleacher's point of view. 35.

4. Give a description and sketch of a plate singeing machine. 30.

5 State the purpose of the following operations in calico-bleaching:—(1) The steep after singeing; (2) the wash after the lime-boil; (3) the sour after chemicking. 40.

6. In what stage of the bleaching process is rosin used, in what form is it applied, and what purpose is it supposed to serve? 35.

7. Give a careful explanation of the theory of the lime-boil, and explain its relation to the subsequent stages of the bleaching process. 45.

8. Under what circumstances will caustic soda tender cotton cloth? How may such tendering of the cloth occur in calico-bleaching? 40.

9. Give an account of the method of making up the charge for the soda (ley) boil of a madder bleach. 35.

10. State what impurities commonly occur in river water, and point out such as render it unsuitable for use in bleaching. 35.

11. Give a description and sketch of an ordinary starching mangle. 30.

12. For what purposes are starch, China clay, and soluble oil used in the finishing of cotton prints? 30.

Honours Grade.

1. Give a careful account of the chemical nature of cellulose, and describe the action of chemical reagents (mineral and organic acids, alkalis, metallic salts, etc.) upon it. 30 *marks.*

2. Give a short account of the method of bleaching jute, and point out in what respects, and why, it differs from cotton bleaching. 35.

3. How would you examine, by chemical analysis, a water intended for use in a bleach works? 30.

4. Give description of a process for the bleaching of cotton thread. 35.

5. Discuss the following points in calico-bleaching:—(1) The utility or otherwise of the lime-boil; (2) the composition of the charge for the ley-boil,—should it be all caustic soda, all carbonate of soda, or a mixture of the two? (3) the choice between sulphuric and hydrochloric acids for souring purposes. 40.

6. Give a description and sketch of Edmeston's machine for bleaching calico at width. 45.

7. Give an account of the stains that may occur in bleached calico, distinguishing between such as may be due to the cloth itself, and such as arise from faults in the process. How would you examine a stained piece, in order to determine the nature of the damage? 35.

8. Point out the essential points of difference between Barlow's two-kier system of bleaching and the Mather steamer-kier system. Discuss how far these differences influence the comparative cost and efficiency of the two systems. 40.

9. Give an account of the substitutes that have been proposed to replace chloride of lime in calico-bleaching, and discuss their practical value. 35.

10. Describe and sketch two forms of apparatus for drying back-starched goods. Explain why a special arrangement is necessary for drying such goods, and point out the distinctive features of each of the systems you describe. 35.

11. Give a description and sketch of a beetling machine. For what styles of finish is this machine used? 30.

COTTON WEAVING.

Instructions as above. Also point paper and patterns for analysis are supplied to each candidate. Patterns *A*, *B* and *C* for the Ordinary Grade, and patterns *E*, *F*, *G* and *H* for the Honours Grade. *Four hours allowed for this paper.* Not more than *twelve* questions to be attempted in either grade. Marks appended to each question.

Ordinary Grade.

1. Describe the progress of twist from the cop or throstle bobbin to the loom, and explain the purpose of each process. (35 marks.)

2. You have 52½ lb. of 20's twist (less 5% waste in working) to make a warp of 700 yards; how many ends will it give? (15.)

3. What value of weft only is there in a piece of cloth 50 yards long, with 1 960 ends (allowing 40 for self edges) in a 60 reed, Stockport counts, 20 picks per quarter inch, 24's weft at 8d. per lb.? (20.)

4. Describe a dobby or jacquard which will change shedding so as to obtain a cross border, as used in handkerchiefs, towels, etc. (30.)

5. Draw roughly 4 rows of holes in a jacquard card, 8 holes to the row, and number them in the order they are cut from the design. (20)

6. Make rough drawing of one row of jacquard hooks, half the hooks up and half down; also shew the harness from these hooks as tied up in a cumber board, 4 holes in a row, numbering them in all their consecutive order. (30.)

7. Explain the use of lease-rods, healds, reed, and temples. (25.)

8. What is the cause of a cop breaking and flying off the peg whilst weaving? (15.)

9. At what point of the shed do the healds cross in a 3-end twill (1 up) and a 4-end twill (1 up), where stocks and bowls are used? (15)

10. A loom has a pulley of 9 inches diameter, and is driven by a drum of 15 inches diameter, running 108 revolutions per minute. How much cloth will the loom produce per week, the engine running 55 hours, and ⅛ of time allowed for stoppages; there are 90 picks per inch in cloth? (20.)

11. Why do you put less weight on a warp as the beam weaves down? What is the effect of having a warp weighted too little? (15)

12. A tappet has 180 teeth on and runs 14 picks to the round. There is a 15's pinion on the loom shaft. Give the required intermediate wheels. (15.)

13. Prick up a specimen of each of the following twills:—plain, broken, fancy, and corkscrews. (30.)

14. Give design of cloth marked *A*, also the number of ends and picks per inch. (30.) [Pattern of cloth supplied.]

15. Give design of cloth marked *B*, also the number of ends and picks per inch, and shew draft and shedding. (35.) [Pattern of cloth supplied.]

16. Give draft and shedding of cloth marked *C*. (30.) Pattern supplied.

Honours Grade.

1. Give an arrangement for driving the looms in a shed—from engine to loom, shewing all speeds and dimensions of wheels, drums and pulleys. (50 marks)

2. Give the proportions of the ingredients of any size you know, including the process of mixing, also state for what twist the size is used, and the class of cloth produced therefrom. (25.)

3. Describe fully the method or methods you know of transferring a pattern from design paper to Jacquard cards. Also the methods of reproducing duplicate sets of cards. (30.)

4. Give full instructions to heald knitter for 5-end satin, 4 in dent, and 3-end twill 2 in dent, 60 reed Stockport counts, a pattern being on 1½ inches, ½

satin and 3/5 twill, half a twill stripe at each self-edge 36 inches in reed. (25.)

5. Give a drawing showing method of giving two blows of the slay to each pick of weft, and say when and why it is required. (30.)

6. What lift should a tappet have to make a plain cloth, the other arrangements in the loom being as follows:—Sweep of lay 5½ inches, distance of healds from fell of cloth 8 inches, length of treadle 24 inches, distance from heel of treadle to centre of treadle-bowl 16 inches. Size of shuttle, 1½ inches broad and 1¼ inches deep? (20.)

7. What will be the difference in the strain upon the yarn if you take off a tappet with ⅕ dwell and put on a tappet with ⅗ dwell? (15.)

8. There have been various attempts to let off the warp positively by means of rollers. Say why they have failed. (20.)

9. You require a Granderelle thread to equal 10's counts, and have 60's red and 30's blue; what counts of white will be required to double with them? Also what will be the cost per lb. of the Granderelle, if the 60's is 16d. per lb., the 30's 14d. per lb., and the white 10d. per lb and the cost of doubling 2d. per lb. (20.)

10. Prick up a 7, 10 and 14-end satin, and say upon what principle these and all other satins are produced. (25.)

11. Give a tie-up for a damask table-cloth 60 reed Stockport counts. To have middle, trimming, and border. 612 hooks. (25.)

12. The accompanying cloth marked E is a single cloth, that is, composed of one warp and one weft. Prick up the design and shew how you would "back" this cloth with an extra warp and weft, adding half the number of ends and picks respectively for the back to those now used. (40.)

13. Make a dice pattern on 64 hooks and cards with 8-end satin binding, ground and figure, the respective warp and weft bindings to check each other on the edges of the figure. (40.)

14. Give reed, picks, draft and shedding of the cloth marked F. (50)

15. Give reed, etc, as above of the cloth marked G. (40.)

16. Give reed, picks and design of the cloth marked H, also describe the kind of harness you would require to weave the same. (40.)

Textile Markets.

COTTON.

MANCHESTER, FRIDAY.

It is impossible to report any improvement in the condition of our staple industry. Since the termination of the lock-out spinners have bought cotton a little more freely, probably thinking it desirable to replenish their stores to a trifling extent. This, however, has been quite enough to give an upward turn to spot prices in Liverpool, coupled with the determined efforts of jobbers and dealers of various kinds. That this is a great and dangerous advance on which spinners are called upon to operate is incontestable. Here the trade is again within a couple of months of seeing the commencement of the delivery of the new crop in considerable abundance, and this with the unprecedented stock of nearly one and a half million bales of American cotton in Liverpool. Concurrently with this, only the most unsatisfactory state of trade can be reported from every department. On the basis of current prices of cotton, and the very best prices obtainable for yarns, spinners would be heavy losers on the transaction. With the transfer of the margin to the wrong side of the ledger in spinning, nothing of a better character comes from the manufacturing section. The spinner who buys cotton and turns it into yarn, cannot recover his outlay. The manufacturer who buys the yarn at lowest obtainable prices and turns it into cloth loses an additional sum. It often happens that when one branch is bad the other is good, and in cases where the two are combined in one spinning and manufacturing establishment, those engaged in the trade can manage to work satisfactorily. This, however, is not so to-day, both divisions shewing losses upon the best that can be done. Many looms are stopped in various localities, and it is an indisputable fact that much more yarn is being produced than can be sold. The advent of the Whitsuntide holidays is thus being welcomed on every hand, and it is not improbable, notwithstanding recent stoppages, that the holidays will be extended beyond what would be the case in ordinary conditions of trade. There is as yet no particular improvement in the general aspect of the consuming markets, and until this takes place every transaction should be most carefully scrutinised in all its details, to guard the acceptor of the order from the serious risk of there being something rotten in its foundation. We feel compelled again to point out the great risk of relying upon American advices regarding the new crop. The desperate efforts that have just been successfully made to advance prices seem to us to have been dictated quite as much with a view to transfer the burden of existing stocks to other shoulders, at such an improvement in value as could be engineered before all chance of establishing one at all disappeared in the presence of reliable details of the new crop, as from any more accurate estimate of the intrinsic value of cotton in present circumstances.

COTTON.—There has been a moderately fair demand for cotton throughout the week. The tendency of prices has again been upward, and changes effected in the official quotations shew an advance of 1/16d. each in brown Egyptians, American, and Tinnevellies. Other qualities and growths are unchanged, but with a general hardening tendency. Futures, as will be seen from our tabular statement, have gained in the various positions from 4 to 5 points. Yesterday the speculative side of the market was excited by reports of further breaks in the embankments of the Mississippi, and jobbers did not fail to make the best use of the allegation, running up futures 3 to 4½ points on the day. Spots hardened a little in sympathy, but there was only a moderate demand from the trade. Other growths were unchanged.

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..	13,020..	47,389	49,670	1,417,850	11,798
Brazilian ..	— ..	2,501	1,070	44,330..	48
Egyptian ..	2,487..	4,826	3,240	98,680..	477
West Indian	191..	596	750	35,260..	77
East Indian	2,109..	3,530	2,590	38,740..	473
Total ..	17,807..	58,842	57,320	1,634,860	12,873

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

	G.O.	L.M.	Md.	G.M.	M.F.
American.....	3¾ ..	3 11/16 ..	4 1/16 ..	4 5/16 ..	4 9/16
			M.F.	Fair.	G.F.
Pernam.....			3 15/16 ..	4 5/16 ..	4 9/16
Ceara			3 15/16 ..	4¼ ..	4 7/16
Paraiba			3 15/16 ..	4¼ ..	4½
Maranham			4 1/16 ..	4¼ ..	4½
			Fr. G.F.	F.G.F.	Gd.
Egyptian			4½	4¾	4 7/8 5 1/16
Ditto white			4½*	4 3/8* —	5*

	Fr. F.F.	G.F. F.	G.F. Gd.	F.G.Fine.
M.G. Broach..	— —	— —	3 5/8	3 13/16 4
Dhollerah	2 15/16 3 1/16	3 5/16 3 7/16	3 7/16	3 9/16 3¾
Oomra	2 15/16* 3 1/16	3 5/16 3 7/16	3 7/16	3 9/16 3¾*
Bengal	— —	2 1/16* 2 3/16*	3 1/8	3 5/16 3½*
Tinnivelly	3½* —	3 1/16* 3 3/16*	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.

	Saturday.	Monday.	Tuesday.	Wednesday.	Thursday	Friday
May.....	4·2 3	4·4 b	—	—	4·8 b	4·13 14
May-June.	4·2 3	4·4 b	4·5 6	4·7 b	4·6 b	4·13 14
June-July..	4·3 s	4·4 5	4·5 6	4·7 b	4·11 b	4·16 17
July-Aug..	4·5 6	4·7 8	4·8 b	4·10 s	4·13 14	4·19 20
Aug.-Sept.	4·8 s	4·9 10	4·10 11	4·12 13	4·16 b	4·22 s
September.	4·10 v	4·12 s	4·13 s	4·14 15	4·16 b	4·22 —
Sept.-Oct..	4·10 v	4·12 s	4·13 s	4·14 15	4·18 19	4·24 b
Oct.-Nov..	4·12 b	4·14 b	4·15 b	4·17 v	4·20 21	4·26 27
Nov.-Dec..	4·14 15	4·16 17	4·17 b	4·19 v	4·22 23	4·28 29
Dec.-Jan..	4·16 17	4·18 19	4·19 10	4·21 22	4·24 25	4·31 s
Jan.-Feb..	—	4·21	—	—	—	—
Price of Mid American.	4 7-16	4 5/8	4 5/8	4 5/8	4 5/8	4 3-16
Estimated Sales including Spec. and Export.	7,000 500	10,000 1,000	7,000 500	8,000 1,000	8,000 1,000	10,000 1,000

YARNS.—There is a uniformly dull report to be given of the yarn market. In no section do buyers succeed in securing advances equivalent to the enhanced values of cotton. The result is a slow, dragging trade, as spinners are compelled, in view of the firmness of Liverpool, to advance their quotations. Still there is already evidence of such abundance of yarn being upon the market that buyers are steadily holding aloof, and only operating when their necessities compel them. This is not frequent, nor to a large degree when it does occur. Already the producers of yarns are in a worse position than before the recent stoppage, Liverpool having obtained a much greater advance than has been secured upon yarn. The quarterly stock-takings that are beginning to be revealed demonstrate, beyond any dispute, the disastrous state of the trade. Yarns yesterday were distinctly worse. The holidays upon which the district is entering were undoubtedly restrictive of the demand, as they will diminish requirements. There is a great amount of extreme dissatisfaction seething in the trade, and we should not be surprised at some vigorous step being adopted, with a view of modifying the severe pressure to which producers are subjected.

CLOTH.—Cloth all round continues in slow and very unsatisfactory request. Here and there slight improvements have been made in offers, but it is only rarely that they come sufficiently near to allow producers to accept them even on the basis of a loss. In most cases they are quite below consideration. In some sections producers still hold a moderate amount of orders, but they are diminishing. In others again it is quite impossible to procure work for the looms; consequently many are stopped, and the probabilities are great that the number will be increased. Yesterday business in cloth continued to drag heavily, and the best articles going through are very unsatisfactory to producers. Enquiries for parcels of any weight are few and far between, whilst even then prices are so low as to quite preclude acceptance. There are many looms stopped, and it is not unlikely that the number will be increased should the holidays pass without developing an improved demand.

To-day the market wears quite a holiday appearance, the attendance being much smaller than usual for a chief market day. Cotton is dearer in Liverpool, but no improvement is discoverable here.

WOOLLENS AND WORSTEDS.

BRADFORD.—Some spinners are kept busy on old contracts, but frames are being stopped as these are completed. There is little doing in Botany, but mohair yarns are still doing well. The piece trade is also about as on last market day. Business with the Continent is flat and the home trade is unsatisfactory.

HUDDERSFIELD.—Worsteds have been bought more freely by the trade generally, and looms have been more busily employed. Light trouserings and suitings have been briskly enquired for, as a result of the sunny weather which has prevailed of late.

LEEDS.—There has been a run for ready-mades, both in superior and inferior fabrics. On shipping account many large orders are being despatched. Army and Navy cloths are steady.

LONDON.—The selling brokers held a meeting on Thursday afternoon to draw for sale dates at the ensuing series commencing on June 14. The auctions as at present arranged will finish on Tuesday, July 19, and the daily offerings average about 12,000 bales. The quantity available for auction totals about 367,000 bales, of which about two-thirds consist of New South Wales and New Zealand produce.

ROCHDALE.—Manufacturers do not expect any improvement until the Whitsuntide holidays are over. Merchants' travellers who are now on their rounds at the end of this week will return home and report the prospects of the season's trade and the amount of orders so far placed. This will enable the merchants to give particulars as to the various patterns and place further orders if thought desirable.

GLASGOW.—Messrs. Ramsey and Co., Wool Brokers, Glasgow, in their report dated 31st May, say:—Wool: There has been another quiet week in the wool market. Reports from the English centres are unsatisfactory, and buyers are still holding aloof in the hope of some concession in price. The near approach of the new clip is also tending to quieten things just now. The opening sales of the season have been fixed for 22nd June, when it is expected there will be a good demand for the new wool. Sheepskins: The supply has been fair and of good qualities, with a fuller proportion of lambs and shorlings. Competition continues fairly steady, but without change in values.

FLAX AND JUTE.

DUNDEE, WEDNESDAY.—Short time, silent mills, and machinery stopped within mills not altogether silent, have reduced the output of jute goods in the Dundee district probably quite a third. Still the advices from abroad tell of no important movement in the advance of values. After this has been done it is not possible to buy Hessians in Dundee and sell them at a profit. It is not possible to buy yarn and turn it into cloth and "make ends meet," nor is it yet possible to turn jute into yarn save at a heavy loss. *Jute* still recedes, but as it is strongly held and the shipment is undoubtedly very short, holders are naturally very unwilling to give way, and cling to the hope that before the new crop appears spinners will be forced to come to their terms. New crop is offering at £15, a drop of £1 per bale from the top. On the spot it is not possible to buy save at pounds over this quotation, but prices are irregular and the market is disorganised. Jute yarn is no lower: indeed, spinners refusing to go on at a heavy loss, yarn buyers find themselves this week—if compelled to place their orders—forced to pay

a shade more. The feeling strengthens, therefore, that the bottom has been reached. So with Hessians, for the best goods especially, makers utterly refuse to look at current quotations. But there are still sellers of common qualities at very low and irregular prices. *Flax* is quiet, but not easier to buy. For good brown flax especially prices are very firm. Good tows are also firm. No 1 Archangel, done in winter at £22, has been sold at £24 15s. c.i.f.—a smart rise. Common tows are neglected, and easy to buy. Linens are in fair demand, and for the best makers' goods full list prices are got. Hence linen yarns of the best warp qualities are stiffer: indeed some spinners quote more money. For common wefts the price is still irregular and is in favour of buyers. The Dundee jute *Fancy* trade is dull and disorganised, owing to the state of the jute trade. Twines, cords, and ropes only are in brisk demand, and makers are well employed. The destruction by fire on Monday of the works of Messrs. W. Fergusson and Sons causes some inconvenience to spinners. These works consisted entirely of looms for ordinary Hessian, and their stoppage tends further to glut the market for common yarns. About 400 operatives are thrown idle, and in the present state of trade they will find great difficulty in getting employment.

LACE AND HOSIERY.

NOTTINGHAM.—The lace trade does not change materially. There is a far steadier demand for cotton yarns than was the case twelve months ago. The local staple is bought much more freely on the whole, notwithstanding the complaints of manufacturers.

LEICESTER.—The yarn market presents an increased turnover for the past week. In the knitting and fingering yarn trade some considerable business has been done lately for home and export, but at very low rates. Lambs' wool spinners are busy for the next few months. Cashmere and fine Botany yarns share to an extent in the increased consumption. The fancy hosiery manufacturers do not complain very much. Full employment is and will be general for some time to come, and buyers are frequently here.

DRY GOODS.

MANCHESTER.—The demand this week for fancy goods, although extensive, has not come up to the expectations of merchants. Business has, in fact, been unsatisfactory throughout the season, and merchants are in many cases despondent. The fancy rooms have done fairly well, but heavy goods have not moved freely. Carpets of the narrow tapestry description have moved off fairly well, but Brussels and Wiltons are slow. The linen trade gives dissatisfaction to producers. Jute goods, such as hessians, have for a considerable time been dull, as all our Dundee readers of necessity know. Our references to the condition of this market are a mere repetition of what is heard from other centres of the trade. Silks are languid. The enquiry for Windsors has practically subsided, although manufacturers indignantly deny that such is the case. There are orders here and there, but the demand is not general. The shipping trade does not appear to change for the better, except in the South American branches. A few good orders have been received from that quarter, but otherwise the outlook is depressing.

Joint Stock and Financial News.

NEW COMPANIES.

LEVANT MANUFACTURING COMPANY, LIMITED.

Registered by Fielder and Fielder, 58, Lincoln's Inn Fields, W.C., with a capital of £2,500 in £5 shares. Object, to carry on in all their respective branches the businesses of cloth, cotton and yarn dealers and manufacturers, cotton spinners, doublers and weavers, etc.

DAVID WHITEHEAD AND SONS, LTD., RAWTENSTALL.

Capital, £50,000, in £5 shares. Object, the acquisition of the business of cotton spinners and manufacturers now carried on by T. H. Whitehead and J. O. Whitehead, under the style of David Whitehead and Sons, at Tower Mill, Rawtenstall, Lancashire. Subscribers:—

	Shares.
T. H. Whitehead, Holly Mount, Rawtenstall	1
J. O. Whitehead, Holly Mount, Rawtenstall	1
T. Smithson, Facit, Rochdale	1
E. Lord, Belmont, Rawtenstall	1
S. Whittaker, Broad Clough, Bacup	1
J. Barlow, Ausdell, Lytham	1
J. B. Stockwell, 6, Redfern-street, Manchester	1

The first directors are T. H. Whitehead, J. O. Whitehead, E. Lord, S. Whittaker, and J. Barlow. Qualification, £500. Remuneration to be fixed by the company.

PATENT INLAID LINOLEUM COMPANY, LIMITED.

Registered by W. H. Martin and Co., 15, King-street, Cheapside, E.C., with a capital of £5,000 in £1 shares. Object, to acquire certain patents relating to improvements in the manufacture of floor coverings, and to develop and work the same.

Gazette News.

DISSOLUTIONS OF PARTNERSHIPS

J. Yates, O. Bury, E. Dewhurst, and J. Turner, Darwen, cotton manufacturers; as regards J. Yates.

M. Lazarus and H. Harrison, Kilvert's Buildings, Withy-grove, Manchester, manufacturers and importers.

F. and A. Nicholson, Fountain-street, Manchester, grey cloth agents; as regards F. Nicholson.

J. Chadwick and G. W. Haigh, Linthwaite, near Huddersfield, knit goods manufacturers.

Patents.

SPECIFICATIONS PUBLISHED.

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

1891.

5,658 MONCRIEFF. Jacquard, design, reading, and card punching machinery.
7,133 COTTRILL AND BROWN. Shuttle guard.
7,772 PICOT. Woven fabric for surgical purposes.
10,797 MOSELEY. Flyers for spinning machines.
11,049 IMRAY (*Farbwerke vorm. Meister, Lucius and Brüning.*) *Meta*-amido benzaldehyde.
11,085 DONISTHORPE AND BURROWS. Decorticating rhea, etc.
11,206 AUSTIN AND HARGREAVES. Looms.
11,275 JOHNSON (*Badische Fabrik*). New dyes.
11,327 IMRAY (*Farbwerke*). Dyeing silk.
11,328 IMRAY (*Farbwerke*). Colouring matters.
11,521 CLARINGBURN AND CLARKE. Knitting machines.
11,629 JOHNSON (*Badische Fabrik*). Colouring matters.
11,663 WILLCOX (*Farbenfabriken vorm. F. Bayer and Co.*) Colouring matters.
15,264 DOBSON AND BROMILEY. Carding engines.
19,875 AINSWORTH AND HAYDOCK. Scutching machines.

1892.

5,223 HATSCHEK. Scutching flax, etc.
5,804 ROUSSEAU. Lined fabrics.

SECOND EDITIONS.

18,737 (1888) (BARLOW). Tubular bobbins.
15,206 (1889) MCFERRAN AND PIRRIE. Wet spinning of flax, etc.

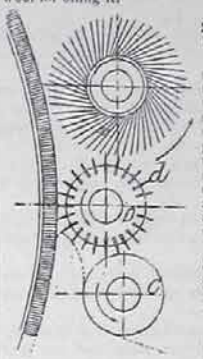
ABSTRACTS OF SPECIFICATIONS.

20,910. December 23, 1890. **Winding yarn.** R. ARMITAGE, Paradise-street, Bradford.

Relates to apparatus for winding yarn from the warp, particularly yarn dyed in the warp, and also for winding damaged or rejected warps for the purpose of re-dressing, etc. A warp beam, having a number of flanges, is employed, and is fitted with a brake or tension device. The warp is drawn off from successive divisions and passes over guide rollers, through guides, to the bobbins of the winding frame. The beam is shifted endwise on rails to bring it to the required positions, the threads of the new division being tied to those of the preceding division. The winding frame is knocked off by means of a rod, which also applies a brake to a drum on the warp beam. *Drawings.*

21,062. December 24, 1890. **Saponaceous matter, etc.** C. E. MAISTRE, and J. M. CAMPAGNE, both of 45, Rue St. Sebastien, Paris.

Relates to a saponaceous preparation applicable for recovery of unfixed indigo from textile materials, for preparing dyeing baths, and for scouring textile materials and skins, etc. Consists in saponifying fatty matters, such as olien, by means of sulphurized alkaline salts, with or without alkaline hydrates or carbonates, or other alkaline salts. Consists, for example, in adding solid carbonate of soda to mixed solutions of sulphydrate of sodium and caustic soda, and then adding olein in quantities regulated according to the purposes for which the preparation is to be applied. The alkaline salts, etc., may also be mixed with the olein in the dry state, with or without application of heat. A bath prepared with the new soap may be employed for removing unfixed indigo from textile materials. The saponaceous bath, when charged with indigo, may be itself used as a dyeing vat by stirring it up by means of steam, and adding hydrosulphite of soda or other suitable reducing agent, and steeping hatches of wool therein until the indigo is exhausted. The soap may similarly be used directly in conjunction with indigo and a reducing agent in preparing indigo vats. The soap may also be employed for the simultaneous dyeing and scouring of unwashed wool, oily wool, spinners' waste, or unscoured fabrics; for scouring and dyeing silk; for lixiviating and dyeing ramie cotton; for unhairing skins; and generally for scouring textile materials in the manufactured, or other state, especially wool. For this purpose a tank is employed provided with squeezing rollers and with a perforated bottom carrying a partition for the tank, and capable of being raised. Linen and piece goods are soaked in a bath prepared from the soap, and heated to 40° to 50° C. A solution of the soap containing 40% of olein may also be sprinkled on wool for oiling it.

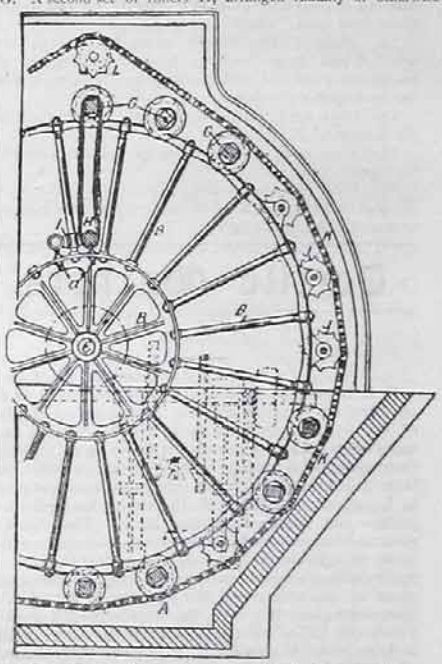


21,084. December 27, 1890. **Spinning.** A. LEJUNE, Verviers, Belgium.

Carding-engines.—The doffer is stripped continuously by a revolving toothed roller D, the teeth of which are formed by notching spirally arranged ribs or blades, *d*, secured at intervals round its periphery. The roller is driven so that the points of its teeth travel at the same speed as the surface of the doffer, the fleece is prevented from adhering to the teeth by a roller C, and the teeth are cleaned by a revolving brush or fancy roller V.

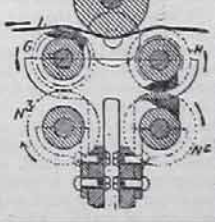
21,115. December 27, 1890. **Scouring; dyeing.** E. SYKES, and D. SYKES, Turnbridge Machine Works, and E. HEFFENSTALL, all of Huddersfield.

Hank machines.—Relates to apparatus for dyeing and scouring hanks of yarn. Consists in a spider wheel or face plate B rotated by worm gearing in a tank A and and carrying a number of rollers G. A second set of rollers H, arranged radially or otherwise



with respect to the former, are mounted in brackets I which are adjustable by screws *a* to suit hanks of different lengths. A chain K is driven at a slower speed than the wheel B by a wheel L which is driven from the shaft C by another chain. The chain K gears with chain wheels J on the rollers G and rotates the latter continuously so as to change the position of the hanks thereon as they are carried through the tank A. Guide rollers may be interposed to keep the chain K clear of the alternate wheels J, and thus render the rotary motion of the rollers intermittent.

21,162. December 29, 1890. **Nap-raising machines.** O. IMRAY, 28, Southampton Buildings, London.—(*F. Martinot, Sedan, France.*)



Improvements upon the invention described in Specification No. 10,076, A.D. 1887. The card rollers G, H are mounted in pairs in stationary bearings, and are geared together to rotate in the same direction at different speeds. The teeth of the cards are set in opposite directions, as shewn, and the first roller G of each pair is driven by the cloth I. The stripping or clearing rollers N3, N4 are driven in opposite directions by cross and open belting respectively.