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THE PAST YEAR.

WITH the present number we begin Vol. VII of the *Indian Textile Journal* and while tendering our best thanks to subscribers and advertisers for their support, we will briefly summarize some of the more important incidents that have happened during the past twelve months in connection with the cotton trade.

The year may be considered as one of exceptional prosperity, especially for the cotton mills of this country. All the well managed concerns have paid good dividends, and many have provided substantial reserves for the renewal of machinery. The question of the Cotton Duties disturbed the trade considerably. In consequence of the substitution of a 3½ per cent. duty on cotton goods for a 5 per cent. tax on yarns over 20's counts, a large number of the power-looms had to be stopped, throwing out of employment several hundreds of skilled workmen. The importation of the finer qualities of cottons has been drawing increasing attention, and the probability is that American and Egyptian cottons, which have been hitherto brought in on a small scale, will be in the near future used in larger quantities. The cultivation of Egyption cotton on Indian soil has also received serious attention, and experimental growing has been already taken in hand in certain quarters. With the necessary modifications in the machines, and above all in the application of proper humidifying and ventilating apparatus, there is no reason, as we have repeatedly explained, why the finer counts should not be as successfully spun in India as in any other country in the world. While India's exports of raw cotton to Japan may, in view of the numerous mills being erected there, be expected to increase, our trade in yarn with that country will probably cease within a measureable space of time. The annexation, however, by Japan of Formosa, with a population approaching 30 millions, may possibly alter the calculation. In China we are promised wonderful extensions in railways, so that our trade in that direction should benefit, if their construction should overtake the erection of mills, which we think very probable. A noteworthy fact in this connection is the export of Indian cotton to Shanghai shipped by some of the leading Bombay houses. We had something to say in a recent number of the laggard policy of Britain in pushing business in China, and now we read in one of Reuter's latest telegrams that a French firm had on the 11th instant signed at Pekin a contract for the reconstruction of the Dockyard at Foochow. The competition between Lancashire, India, China, and Japan, which promises to be somewhat severe, must in the end resolve itself into the questions of cost of materials, wages, and last, but not least, skill. On the last named point everybody must give way to the Lancashire man, but with exactly similar machinery and with men trained for many years to the work, with cotton close to hand, and with wages in the East much lower compared with those of the West, it is not to be wondered at if the industry progresses here. The Manchester Ship Canal, although still far from proving a financial success to its original shareholders, has indirectly been of immense benefit to the densely-populated portion of the country which it serves. While a saving of 5*s*. to 6*s*. is effected in transport of cotton to most Lancashire mills, machine makers will, as a rule, concede 2½ per cent. in their charges for packing and delivery to Manchester Docks, as against Liverpool or Birkenhead.

THE WORKING OF THE COTTON DUTIES ACT.

In submitting to Government the Annual Report on the working of the Indian Cotton Duties Act in the Bombay Presidency, the Collector, Dr. Pollen, in his short introduction, takes the opportunity of reminding the higher authorities that in such documents brevity is a highly commendable quality, provided that essential facts and reasonable deductions therefrom are put fully in evidence, and in these sentiments everyone must agree with him. For the Report itself we are indebted to Mr. R. E. Enthoven, Assistant Collector, and the Collector gives him credit for the "tact, judgment, and foresight" with which he has carried out his onerous and sometimes difficult duties. Mr. Enthoven, in his turn, bears testimony to the loyalty displayed by the Millowners' Association and individual millowners and managers towards the department, which is most creditable to all concerned, considering the strong feeling that existed here as a result of the imposition of the duties. With such mutua congratulations every reasonable man ought to be satisfied.

The Report begins by pointing out the change which has taken place in the incidence of taxation in the matter of cotton products as affected by the Acts of 1894 and 1896. Although the facts must be in the minds of those whom they most concern, it may be useful to summarise what the change amounts to.

The Act which came into force on December 29th, 1894. imposed a duty on yarns over 20's counts, and was repealed with effect from January 22nd, 1896. The present Act, imposing a duty on al. cotton goods produced in British India, came into operation on February 3rd, 1896, "Cotton goods" being used to denote all manufactures of cotton, except yarn and thread. The chief alteration lay in the substitution of a tax of 3½ per cent. on cotton goods for a 5 per cent. tax on yarns over 20's counts. Only half of the mills in this Presidency have looms, but we learn from the Report that the change above referred to realised for the revenue double the amount which was obtained from the tax on the finer classes of yarns. But, is the advantage of a trifling increase in Government receipts to be set alongside of the stoppage of a very large number of power looms throughout India, thus throwing out of work a proportionate number of skilled workmen who have been trained to this work alone, and know no other?

The second Act (1896) imposing a duty solely on cloth simplified the work of collection of excise inasmuch as it reduced the number of mills whose products became liable to taxation, from 95 to 51, of which 33 are in Bombay Town and Island, 12 in Ahmedabad, and the rest scattered throughout the Presidency. Thus the two principal centres of the industry contain all but one-tenth of the mills subject to assessment.

In the Report it is shown that while 17 mills, both spinning and weaving counts finer than 20's, must pay a largely increased amount on their production, there would be a saving of 5 per cent. duty to 27 other mills who deal in bundled yarns over 20's. The net result is not given in figures, but the total of the finer yarns (so-called) is shown to be not more than 10 per cent. of the whole. The gain to the Exchequer is acknowledged to be five lakhs. Nothing can be more detrimental to any industry than frequent changes in tariff legislation, and it is much to be regretted that the British Government in such matters should seem disposed to follow the example of the United States. An interesting table is attached to the Report showing the differences in various Bombay mills between the "nominal" counts and the actuals as tested officially. Taking extreme cases, we find yarns declared as 20's were ascertained in one instance to wrap 15·6 and in another 21·73. These wonderful facts would probably never have been discovered, but for the necessity of carrying out tests under the Act of 1894. It is most satisfactory to note that the cost of staff and establishment for the year 1895-96 amounted to only 3·46 per cent. of the amount of revenue received during that period.

TECHNICAL EDUCATION IN ENGLAND.

Circulars have been sent out by the Council of the National Association for the promotion of Technical Education to all the urban authorities in England having populations of 5,000 and upwards, enquiring how much was contributed by local rates, and how much by the County Council in aid of Technical Education. Although the information is not yet complete, it gives ample evidence of the great importance attached at home to this class of education. Roughly speaking, the County Council's annual grant is equal to that raised by local rates. The total amount contributed jointly in sixty-nine towns last year amounted to £79,862 as an annual subsidy, and the amount spent on college and school buildings reached a total of £381,500. The sums contributed locally have increased very rapidly of late, and show how the subject of Technical Education has taken hold of the public mind. During the year 1893-94 the proportion furnished from local sources only amounted to 5 per cent. of that furnished by the State.

Birmingham is at present spending £85,000 on the construction of a Technical School, which will be worthy of a city whose Mechanics Institute has for more than thirty years been the largest in the United Kingdom. So much outlay added to the existing provisions for education show how thoroughly alive the country is to the needs of her industries and operatives. Apprenticeships have to be shortened, bad work and the loss on it diminished, more work must be done with less muscular effort than before, but, on the other hand, brain work is now more active than ever it was before. This can only continue so long as the worker is properly fed, and free from disease. Fortunalely, the worker is better fed than ever. Great factories have nearly all left the large cities for the superior economy of the country, and practical sanitation has made immense strides in protecting the people from disease or in curing them.

The better knowledge regarding work, that is the object of Technical Education, may be imparted in many different ways, and its methods are governed in the first place by the resources available for the purpose. No community is too poor to have Technical Schools, provided they are properly based on the resources of the people and their intellectual state of progress. The education that applies directly to the manual efficiency of the smith, the carpenter, the mason, the plate worker, the painter and the plumber, will tell more readily on the producing power of this country than any of the more costly forms of Technical Education adopted from European models. No better proof of this is needed than the admirable examples of mechanical appliances to be found all over India, which have descended to the present generation from inventors who existed centuries ago, and whose history has completely disappeared. Among these may be mentioned various appliances for raising water from wells, for producing a continuous rotary motion from a reciprocating one without crank or fly wheel used among rope spinners, the employment of water for levelling purposes and the making of high quality steel. All these devices and methods indicate the existence at a remote period of a high standard of mechanical knowledge and aptitude in India which seems to have died out in more recent times.

UTILISING THE POWER OF TIDES.

A Paper which was recently read before the Institution of Electrical Engineers by Mr. A. Steiger, treating on the utilisation of low falls of water for turbines, opened up a question of very considerable importance in certain parts of India. The author referred to a flour mill on the River Stow in England. The mill being at the mouth of the river the available fall is interfered with by the tide. The maximum fall at ebb-tide is 4 ft. 10 ins., and at high tide the fall is *nil*. Forty horse-power is required to drive the mill, and the contract for the turbine motor stipulated

that this power should be maintained down to a fall of 3 ft. 4 ins. It was found, however, possible to drive the mill at full capacity and at full speed under a fall of only 32 inches, and thus the maximum power was available for sixteen hours out of twenty-four; and during a further six hours, making twenty-two in all, power corresponding to a fall of one foot was available by means of a turbine of the Jonval type, having two concentric rows of buckets. The inner row is provided with gates which are opened or closed by means of hand wheels. The outer row of buckets is just large enough to give the full power required under the maximum fall. As the fall decreases the gates of the inner row of buckets are gradually opened to make up the power by an increased quantity of water, and the more water that passes through the buckets of the inner row, the more it acts on a reduced mean diameter, thus maintaining a proper speed without a perceptible loss of efficiency. The speed of the turbine is 24 revolutions per minute and the outside diameter is 10 feet. Other installations are in operation, and the arrangement seems to offer the most practical solution to the problem of utilising the power of the tides that has yet appeared.

There are many places on the coast of India, where the tide enters creeks containing a large volume of water which might be utilised now that a water wheel of *variable diameter* is to be had which will work when completely submerged. As the current is reversed with each change of the tide, two turbines would be required with suitable gear for changing over with the current. The grinding of flour, bones, pigments, and other materials might be carried out with such an installation, also the sawing of timber and other work.

The large rivers of India offer very few opportunities for the utilisation of their power, as the enormous change of volume and level to which they are subject, and the quantity of trees and vegetation they carry in flood time, preclude all the known methods of applying hydraulic machinery, which, whether submerged or on the surface, would be consequently liable to derangement from floating *debris*. It is otherwise with tidal creeks whose volume and current can be easily ascertained and in many cases utilised.

There is another method of using the power of a current of water that may be found on various rivers extending from the Rhone in France to the Kour in the Caucasus. A water wheel is fixed between two barges or floating platforms which are anchored in the stream. The wheel may be made of any suitable width, and power is taken off both ends of the shaft to drive corn mills.

THE MANCHESTER COTTON ASSOCIATION.

In view of the approach of another cotton season, this Association held an extraordinary meeting at their rooms in Manchester, at which Mr. C. W. Macara, President of the Association, explained to the meeting what had been done during the past year. He was able to report an importation of American cotton through the Ship Canal of 121,336 bales, as against 26, 411 in the previous year. As regarded Egyptian, he said that, in spite of the offers of Liverpool to lay down the cotton at the mill doors at the same price as the Canal Co., the bales handled by the Canal Co. had increased from 33,720 to 66,123. The action of the consumers of Egyptian in supporting the Company, who had been the means of bringing about a reduction in the cost of transit of their raw material, he said, was most commendable, and he paid a similar compliment to the Yorkshire consumers of wool who had in the same way profited by the use of the Canal, and who had shown their appreciation of the benefits received by systematically continuing their support.

To attempt to meet the competition of Manchester, the Mersey Docks and Harbour Board have at last reduced their rates on cotton from 3*s.* to 2*s.* per ton, effecting a saving, approximately, of £35,000 per annum. Against this Mr. Macara points out that not only are local consumers saving on an average 5*s.* per ton on cotton, but Continental buyers of British yarns make an economy of 10*s.* to 12*s.* 6*d.* per ton altogether, owing to the opening of the Canal. As everyone knows, water-traffic is much more economical than that by rail, unless unfortunately the barge canal traffic has, as has happened in England, been practically absorbed by the Railway Companies. Then the rate per mile becomes the same by rail as by canal, as merchants have discovered to their cost.

Silk in India.

(*Specially written for the* Indian Textile Journal.)

Sericulture forms one of the most important industries of the world, and to the Indian manufacturer it will be almost next in importance to cotton and cotton manufacture. At a time when industrial competition is so great, any information that is likely to suggest the possibility of improvement in the raising of silk or bettering its quality, and extending the area of its culture or improving its manufacture, will be of great practical value in India.

The quantity of silk raised in different parts of the world is very large. A recent statistician observes, that Great Britain annually imports raw or unmanufactured silk to the extent of nearly ten million pounds, waste knubs or husks about four millions, and varying proportions of thread in different stages of manufacture. The money value of all these imports of raw silk is estimated to be above ten million pounds sterling. To this has to be added another six million pounds sterling worth of manufactured silks. Of these sixteen million pounds sterling spent by Great Britain on silks, India receives only about forty-five lakhs of rupees annually, whereas, it is perfectly evident that a much larger proportion of the trade can be secured for this country if proper steps are taken to extend and encourage this most important industry.

The term silk is said to be derived from the Latin *sericum*, and Greek *serikon*, so called, as coming from the country of Ceres or China. The silkworm is the caterpillar of a moth of the Lepidoptera order of insects. The silk-producing moth is best divided into two classes for purposes of study, *viz.*, the domesticated or the mulberry-feeding worm, and the wild or non-mulberry feeding worm. This division, it has to be understood, does not claim any scientific recognition, but is one solely made for the purposes of commerce to distinguish two kinds of silks possessing different manufacturing values.

A very large proportion of the Indian silk export is derived from the mulberry-feeding or the domesticated worms, and the collection of wild silks is only confined to a few forest tribes. However, the wild silks have been very little studied and their properties and capabilities little understood. Every additional bit of information gained regarding these silks will be undoubtedly of much value. At the same time it must be remembered that we should not overlook in our enthusiasm for securing new products, the many difficulties that we have to face. We shall, in the present paper, confine ourselves to a study of the domesticated or the mulberry silk worms, leaving the subject of wild silks to be dealt with on a future occasion.

Most writers on silk fix the home of the domesticated worm to be China, whereas a few have adduced arguments to prove an Indian origin for the worm. In fact, the popular idea in Europe and many other countries in coupling the name of silk and China together, and the derivation of the Latin *sericum* itself are in keeping with the view that China is the home of the cultivated silk-worm. Against the popular belief certain authorities produce evidence to show a Himalayan origin for the silk-worm. Mr. Mookerji in his extensive report on this subject, says that the ancient literature of the Hindus and the Sanskrit language afford valuable historical arguments in support of this thesis. China is not mentioned in the oldest Sanskrit works, although silk is taken for granted as the proper article of wear for ceremonial purposes. Not only was there an indigenous silk fabric, but there was also an indigenous art of bleaching and embroidery, unborrowed from foreign sources. Silk dress has been used among Indians for the most ancient of all religious ceremonies, *viz.*, that of marriage. The ancient method of bleaching silk had come to be looked upon even in the days of Manu, the codifier

of Hindu laws, as so venerable that it had already been associated with a superstition that lingers to the present day.

It would be well to give a short life-history of the silk-worm moth before we proceed to describe the various species or varieties that are reared at the present day in different parts of the world. The silk-worm moth, as already mentioned, belongs to the Lepidoptera division of insects. The perfect insect of the ordinary silk-worm moth is about an inch in length, the female rather larger than the male. The females die very soon after laying eggs, and the males do not survive much longer. The eggs are numerous, and generally about the size of a pin's head, though they somewhat vary in their size according to the variety of the worm. They are not attached together but are fastened to the surface on which they are laid by means of a gummy substance. The egg hatches and a small caterpillar is produced, about a quarter-of-an-inch in length. This increases in size rapidly till it often reaches about three inches. The head is large, and there is a horny process on the upper surface of the last joint of the body. The skin of the caterpillar is changed four or five times before it attains full size. The four different stages of the life of a silk-worm may be shortly described as the egg stage, the larval stage, the chrysalis stage, and the stage of the moth. The egg or seed, as it is usually named by sericulturists, is nearly round and slightly flattened, of a slight yellowish colour, which changes after impregnation to gray, violet, dark green, etc., according to the variety of the silk-worm. As the hatching period approaches, the egg becomes darker in colour, and the worm makes its exit by gnawing an aperture. A female moth produces on an average from 300 to 400 eggs. The specific gravity of an egg is slightly greater than water. The worm in the period of its growth undergoes four changes known as moults or sicknesses. The periods between these moults are known to sericulturists as ages. There are necessarily five of these ages—

(1) The period from the hatching out to the end of the first moult, usually taking from five to six days.
(2) From the end of the first moult to the end of the second, about four to five days.
(3) From the second to the third moult, occupying about five days.
(4) From the third to the fourth, five to six days.
(5) From the end of the fourth moult to the transformation of the worm into a chrysalis, usually occupying about nine days.

Thus the life of a worm from the time of hatching out to the time of the spinning of the cocoon varies from twenty to forty days according to the race, method of rearing, temperature, etc. During the period of the growth of the worm its feed has to be regulated according to the requirements of the various stages of its development. Before a moult the worm generally fasts for two or three days. When the worm is full grown it is ready to spin, the spinning of the cocoon taking from three to five days.

We have already stated that the different varieties of mulberry silk-worms had their origin in the original species of *Bombyx Mori*, but these varieties have attained such varying characters that a short description of the principal Indian ones will be noted in the next number.

(To be continued.)

Germany and the Customs Duties in Japan.—The *Deutsche Volkswirth-schatfliche Correspondent* publishes a list of the Customs duties on the textile, iron, and steel industries contained in the new commercial treaty between Germany and Japan. The duties to be levied in Japan have been fixed as follows:—Ten per cent. on velvet and on velveteen textiles; 10 per cent. on cotton textiles, pure or mixed; 8 per cent. on cotton, linen, hemp, and jute yarns; 8 per cent. on woollen and carded woollen yarns; 10 per cent. on other kinds of yarns; 10 per cent. each on half silk satin, woollen textiles, covers, muslin, cloth, etc., linen textiles, iron wire, steel wire, and thin steel and iron rods; 5 per cent. each on big iron and on rails, whether steel or iron; 10 per cent. on galvanized tin manufactured from hard steel, on tinplates, and on tubing.

Machinery Stores in Bombay.

MACHINERY business in India has increased enormously of late, and the attention of importers has been drawn to the necessity of having in stock, at least the kind most generally in demand. Nearly all the importing houses hold stocks of one kind of machinery or another, and among those who deal in steam engines and boilers, ginning, pressing, and oil mill machinery, lathes, tools, etc., is the firm of Messrs. Jamasjee & Manekjee, Bombay, whose stock we have recently had an opportunity of inspecting at Frere Road. Large size Lancashire and Cornish boilers, over half-a-dozen in number, nearly a dozen tandem, compound, and horizontal engines with cylinders, ranging from 10″×20″ to 16″ ×32″ in size, cotton gins and openers, lathes, drilling machines, and pumps of all kinds of good workmanship and finish, were lying in the firm's yard, together with hydraulic cotton baling presses, of which the enterprising proprietors have fitted and erected quite a number.

The native buyer of machinery is, as a rule, the hardest to please, and an amount of tact and patience is necessary in dealing with him, and the situation is rendered the more difficult when he does not understand his own requirements. Owing to their long acquaintance with factory owners, Messrs. Jamasjee & Manekjee have been able to secure the confidence of a large number of clients, who have entrusted them with orders for machinery for complete factories, for cotton ginning, pressing, oil-extracting, etc. In their success in business their sound mechanical knowledge and extensive experience, particularly of the ginning, pressing and oil crushing industries, have been of material assistance to them. A new type of hydraulic pumping engine for cotton presses has been the result of their joint invention, which has found great favour wherever it has been adopted. They have just completed large orders for machinery including cotton gins, engines, boilers, gearing, etc., for ginning factories at Agra and Cawnpore, belonging to Messrs. G. Wense & Co. The firm are representatives in India for some of the most well-known makers in Europe, among them being Messrs. Penman & Company Ld., Boilermakers of Glasgow, Messrs. Humpidge, Holborow & Company, Ld., Engine-builders, of Stroud, and Messrs. Rose, Downs & Thompson, Limited, Hull, Manufacturers of Oil-mill Machinery on the original Anglo-American system. We propose to describe and illustrate in future issues some of the leading specialities manufactured by these firms. The enterprising partners who constitute the firm of Messrs. Jamasjee & Manekjee have risen from the position of ordinary mechanics to that of machinery merchants and agents, and deserve great credit for their energy and industry. We hope they may continue to receive increasing support at the hands of factory owners and other machinery buyers throughout the country.

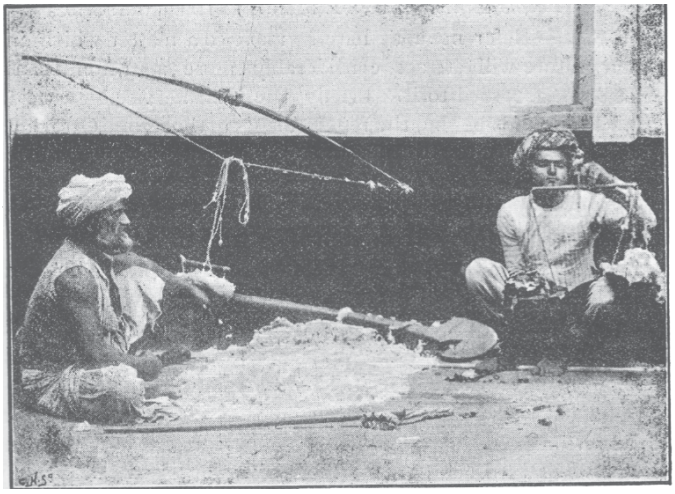
Home Cotton Mills —A home contemporary writes as follows:—

"Manchester Cotton Mills are not at present at a premium, evidently. The mill of Mr. Thomas Chadwick in this city was offered for sale by auction, but no bid being forthcoming, it was withdrawn."

Before engaging in cotton spinning, Mr. Chadwick was one of the largest cotton waste merchants and paper makers in the district, but in the palmy days of the Oldham "boom" Mr. Chadwick, with ample capital at his command, conceived the idea of "dropping into" cotton spinning, and straightway he converted his large waste warehouse in Miller Street, formerly named Miller's Lane, into a cotton mill, capable of containing some 30,000 to 40,000 spindles, but from its construction ill adapted to compete with an up-to-date mill. Then Mr. Chadwick purchased Bowler's Mill in Ancoats, Manchester, far from a modern mill, but which had to a certain extent been renovated. It is more than probable that it is owing to the prolonged unprofitable state of the Lancashire cotton trade and the enormously increased imports of wood pulp through the Manchester Ship Canal, that he is now once more inclined tofollow paper trade exclusively.

The "Pinjara" or Cotton "Opener."

TO our Indian readers the sight of the instrument illustrated herewith is no doubt familiar, for who would not recognise the twang of the "bow and string" of the *Pinjara* (Cotton "Opener") as they announce to all and sundry that its proprietor is open to do business in the flocking of bed material. The instrument has been in use in the country for centuries for opening or loosening cotton. Our foreign readers, who might have only seen crude illustrations of the device from antiquated drawings, will be interested in the present illustrations, which show the machine and the workers as at the present day. It is now chiefly used for loosening the cotton for beddings, pillows, &c. Unlike all other machines doing similar work, it is light, and can be readily taken to the spot where the work is to be done, which, being carried on under the eyes of the customer, he can make sure of getting back his own bedding—a most important matter.



REFERRING to Mr. J. N Tata's pamphlet on "The Cultivation of Egyptian Cotton in India," briefly reviewed in our last issue, Mr. Seddon, Asistant Collector of Surat, writes to the *Times of India* as under:—"I should like to make some remarks on the subject, premising that they apply especially to the Surat District. There are two important points. The first is whether the crop can be grown, and the second whether it would pay to grow. It is to my mind extremely doubtful how far the crop can be grown as a rabi crop. Mr. Tata states that it takes seven or eight months to mature in Egypt, and I can see no particular reason why it should take less in this country, nor does Mr. Tata suppose that it will. Country cotton here is mostly picked in February, and if it is not ready then it is probably spoilt by the fierceness of the March sun. The same result might very probably happen to Egyptian cotton in April. And it must be remembered that though our climate from October to May may resemble an Egyptian summer in dryness, it differs from it entirely in temperature. In Egypt the power of the sun declines as the crop ripens. Here it will increase, and increase to an uncomfortable degree. Nevertheless this may be found not to affect the Egyptian cotton. It is therefore important to consider whether, supposing the crop to succeed, it would pay. And on this point I find it impossible to agree with the views expressed in your leading article. Granting that Mr. Tata's facts as to the Egyptian cotton outturn are correct, the out-turn of clean cotton should weigh six times as much as we get from the Surat crop. Allowing for the difference in value it should be worth ten times as much. Now the value of the outturn from one acre of Surat cotton may be put down as over Rs. 30. This means to say that our Egyptian cotton should be worth more than Rs. 300 per acre. There are very few garden crops now grown in the neighbourhood of Surat City worth so much as this. Cabbages alone—a recently introduced vegetable—seem to give a more valuable outturn; sugarcane, expensive to cultivate and expensive to gather in, is almost always less valuable. The same remark applies to onions, yams, ratulu, groundnut, ginger, sweet potatoes, and even potatoes. And most of these crops are difficult and expensive to harvest, requiring deep digging and needing probably considerably more manure than Egyptian cotton would want. Nor can I agree that the black cotton soils are always totally unsuited to regular irrigation."

The Testing of Disinfectants.

THERE are a number of disinfectants on the market of more or less value, and it is the object of this paper to give the dealer and consumer some method of determining the relative value of these various products. Infections are caused by various kinds of bacteria, but all these bacteria do not thrive under the same conditions. A substance may form an excellent medium for the growth of one kind of bacteria, while it may be positively fatal to other kinds. So, in determining the value of a disinfectant, it is necessary to determine its effect upon specific forms of bacteria.

Although the chemical constitution and strength of a disinfectant can be determined by chemical means, it is necessary to resort to a bacteriological examination in order to be certain of its value as a disinfectant. A bacteriological examination may be conducted as follows:—

A series of test tubes are filled with solutions of disinfectants of different degrees of strength, and in each of them is placed a silk thread impregnated with some specific form of bacteria (*e.g.*, bacterium coli). At the end of definite intervals of time the threads are removed, washed with sterilised water and placed in a culture medium of gelatine or agar. The culture tubes, containing the culture medium, are then placed in a sterilised chamber until the bacteria shall have had time to develop. If the solutions are strong enough, and if sufficient time be allowed for the action of the disinfectants, no colonies of bacteria will be found; but if, on the other hand, the solutions were too weak, or if the time for the action of the disinfectant be too short, numerous colonies of bacteria will be found. In every case it will be found that in a certain strength of solution the bacteria will thrive, while in a somewhat stronger solution they will be killed. Thus, a solution of one part of thymol in three thousand of water will prevent alcoholic fermentation, but if the solution be diluted to one in thirty-five hundred the fermentation will proceed A solution of one part of salicylic acid in one thousand parts of water will prevent fermentation, but if diluted to one in twelve hundred fermentation will take place. A solution of one part thymol in three thousand of water is the weakest solution of that antiseptic that will prevent fermentation, while a solution of one part of salicylic acid in one thousand of water is the equivalent strength of that solution for hindering fermentation.

Therefore, it may be said that thymol has three times the disinfecting power of salicylic acid. In a similar way all antiseptics may be compared. The following table gives the minimum strength of some well-known antiseptics that will prevent alcoholic fermentation.

Antiseptic.	*Weakest concentration to prevent fermentation.*
Corrosive sublimate	1·20000
Potassium permanganate	1·10000
Copper sulphate (blue vitriol)	1·4000
Bromin	1·3000
Thymol	1·3000
Benzoic acid	1·2000
Salicylic acid	1·1000
Quinine	1·400
Carbolic acid	1·200
Sulphuric acid	1·100
Resorcin	1·100
Pyrogallol	1·50
Boric acid	1·25
Chloral hydrate	1·25

—*Foreign and Colonial Trade Review.*

To Certain Correspondents.

ALL journals receive a certain proportion of letters which they do not publish for various reasons. They may be libellous, or they may contain untrue statements, or they may be intemperate or spiteful. They may also be of no utility whatever. These letters are generally accompanied by a correct name and address. This is the general experience of journals.

For a better understanding with our own correspondents, who at times send letters that are "unfit for publication," we shall make the following remarks :—It is an excellent, although not imperative rule to sign all you write, for your style and composition is always the most careful when your name is at the foot. In controversial matters, when dealing with another correspondent, whose name is given, or in criticising other men by name, the writer's true name should invariably appear at the foot of his contribution. There is nothing more contemptible than to attack an individual from the shelter of an anonymous letter—a practice that is far too common in India.

In discussing questions of fact or opinion, it is astonishing how intemperate some writers become. They must smash, pulverise, and jump upon the adversary, whose opinions alone they do not accept, but whose personality is a matter of perfect indifference to them. What is there in pen, ink, and paper that has such stimulating effects ? The same men, if they could "have it out" in person instead of by correspondence, would, in all probability, rise in each other's esteem and enjoy their discussion as they would any other agreeable entertainment.

There are, of course, many matters of correspondence in which the subject may be of considerable interest while the writer's name has comparatively none. For instance, a man drives an engine that has hot bearings which he cannot cure, so he writes to a journal that takes cognisance of such things, states clearly all he knows about the difficulty, and asks for advice from some other man of experience. There is here no need of a signature.

Another correspondent is one to whom we would address a mild but serious reproach. He is the man who writes us frequent letters on very interesting and varied subjects—mentally. He even prepares notes for them, but they never reach the office of the *Indian Textile Journal*. It only aggravates the situation to know that he is a man of varied and ripe experience, able and willing to share his knowledge with his neighbour, and distinguishing clearly one end of a subject from the other. Still he cannot get beyond the most excellent intentions—which unfortunately leave no record. He is the man who should write often and always sign his name, but we will make an exception on his account if modesty stands in the way.

Strikes.—Since writing the article "Strikes accompanied by Violence" which appeared in our last issue, the following arrives from England :—"At the Oldham Police Court this week a piecer, named Fred. Gascoyne, was fined 40s., and costs, for having committed malicious damage to the premises at the Banktop Mill, Sett. There has been a strike proceeding at this mill for some weeks. On Sunday night a number of the work-people were returning to the mill in cabs, and when they were getting out of the cabs to go into the mill there was a crowd of about 300 people shouting and hooting. The prisoner followed behind the cabs, with a stone (produced in court, weighing several pounds), and threw it through the mill lodge window. The chairman (Mr. John Wild) strongly commented on prisoner's conduct, saying that was not the way to settle disputes. If any future cases were brought before them of doing damage without reason a full penalty would be inflicted, as the Bench were determined to put a stop to such conduct. Future offenders would be sent to prison."

The judgment shows most clearly that the "Striker" must not take the law into his own hands, much less with those same hands throw (what in America is called a "rock,") the missile weighing several pounds, at his supposed opponents. The full penalty of imprisonment, without option of fine, is promised, and it is to be hoped that the example will be followed in all civilised countries.

Correspondence.

N.B.—The Proprietors or Editor are not responsible for the views of their corresponents, nor do they necessarily endorse the opinions expressed.

All letters must be properly authenticated with the name and address of the writer, not necessarily for publication, but as a guarantee of their origin.

OVERLOADED ENGINES.

To the Editor of the "INDIAN TEXTILE JOURNAL."

SIR,—Are not overloaded engines dangerous ? Why should not Government take steps to inspect overloaded engines just as they have Inspectors to inspect boilers.

Yours, &c.,
D. N. AMIN, L. M. E.

THE MAIL SERVICE BETWEEN INDIA AND ENGLAND.

To the Editor of the "INDIAN TEXTILE JOURNAL."

SIR,—Reference may here be made to a matter which in the near future will attract considerably more attention than has yet been accorded to it. Briefly, the Mail Service between India and England is behind the requirements of the age. Occasionally, it is true, we have a delivery in 14 days; but ignoring occasional services of this kind there is the broad fact to consider that on the Atlantic there have been steamers running for years averaging over 21 knots on every trip. If the *Campania* or *St. Paul* were placed on the Bombay Service, the records of the P. & O. would be broken on the first voyage. Judged by the comparative importance of English trade between England and her Eastern markets on the one hand, and those of the West on the other, it does not appear to be in accordance with the requirements of the situation that India and the East generally should be served by boats so much slower in speed than those which connect Britain with the markets of the New World. Ten years back the P. & O. boats were referred to as "old tubs" by the commanders of the crack New York flyers. Even to-day the best of the Bombay liners is a poor voyager compared with any of the leading dozen steamers sailing between this country and the States. The exports of home products from this country to the United States average roughly about thirty millions sterling ; those to British India (excluding Ceylon and the Straits Settlements) are a million or two in excess of this amount. Our imports from India are rather over thirty millions ; those from the States are three times as large. This circumstance, however, loses much of its importance when it is remembered that the Indian Service is to a large extent a link in the chain of ocean navigation between this country and the East generally, and that the improvement in the Indian Service must necessarily mean quicker communication between England and China and Japan, not to mention Australia, which is served in some cases by boats calling at Colombo.

The question of an improved Bombay Service has, I believe, received the attention of the Bombay Chamber of Commerce, the argument being adduced that by abolishing the restriction of thirty hours for the passage of the Suez Canal and raising the steaming limit to fifteen knots, it would be possible for the mails to reach Bombay at five o'clock in the afternoon of the second Friday after despatch. The new hour of departure from the London, Chatham, and Dover Railway Terminus at Holborn Viaduct is nine o'clock, and it is suggested that a mail bag should be held at the barrier of London Road Station, Manchester, on Friday afternoon up to the time for the departure of the 4-15 train due at Euston at 8-30. A cab across from the Metropolitan Terminus would catch the mail at Holborn Viaduct, and the result would be an immense advantage to Manchester, whose

merchants would probably raise the half-crown for the cab by subscription should the Post Office, with the meanness occasionally characterising its methods, complain on the score of expense. Seeing that the profits of the Department for the past financial year were well on the way of three and a-half millions sterling, Manchester, with its vast Indian trade reckoned by tens of millions, may hope for a little generosity in this instance.

Yours, &c.,

Manchester, August 28th. F. A. N.

MORTALITY AMONGST EUROPEAN MILL EMPLOYES IN INDIA.

To the Editor of the "INDIAN TEXTILE JOURNAL."

SIR,—Allow me to address you on what is undoubtedly a painful subject—I mean the increasing death rate amongst Lancashire men working in Indian cotton mills. Of late, we have read of several deaths, recorded in your Journal, which might not include those poor souls who might have been carried off in an out-of-the way place or invalided home, the water becoming their grave. Many a man has come out, Sir, hearing of the warm climate, the many so-called social intercourses and, above all, the inducement of good salary. Those who have, like myself, worked in Bombay or other central place, and have thence been forced to accept an appointment in a district at once lonely and unhealthy, can only realize the misery of the situation. I have no wish to frighten your readers or cause any uneasy feeling in the minds of those contemplating starting for this country, but I think through the medium of your widely read Journal, people in Lancashire and the surrounding districts must be informed of the true state of affairs down with us here. In the first place, the climate is against a new arrival, and although the Indian workman is better off as regards sanitation in the factory than in his dwelling, to the European the general surroundings are anything but pleasant. Excepting in the Bombay Island and certain parts of up-country, the climate is decidedly unhealthy. and in an important centre like Ahmedabad, it has been known to have proved fatal in many cases. The Indian mill agent, as a rule, offers very tempting terms, and those of the Lancashire men who are ignorant of mill-life in India, are simply carried away into signing a three or five years' agreement, which, by the way, is mostly worded all in favour of the employer. It is when they arrive at their destination that they find they have to deal very often with an ignorant, interfering, and unreasonable lot of employers, making work positvely unpleasant.

It takes one some time to get accustomed to the situation, and unless a man has patience, a change has to be made. If you resent what you consider to be an unjust treatment, your master never thinks of forgiving you for it, and at the first opportunity you are "sacked" under one pretence or another, or life is made so unpleasant for you by petty annoyances and insults, that despite a tight agreement, you prefer to leave. The next obnoxious man to your employer or perhaps superseding him, is the relative detective paid for supplying information at your back, and having pretensions to be the judge of your work. If you run about with your sleeves rolled up high and your hands soiled with oil and dirt, showing that you have been at something, you might find favour, provided always that you bow to the will of your master, however unreasonable, and pay homage to the favourite. An honest man, whatever may be his qualifications, cannot long pull on, I dare say, with over 30 per cent. of Indian cotton mill agents, if he has not the necessary patience and tact. I can point to mills where changes have been taking place almost every six months. I must not of course lay the blame for this state of matters wholly at the door of the master, as no doubt some useless men might have come out, or even qualified ones, whose sobriety and character might have been responsible for the changes. What I want to point out to those intending to take up appointments in this country is the true state of affairs. I think the increasing death-rate is owing to the unhealthiness of many of the districts where cotton mills are situated, aggravated by the worry and annoyance at the hands of your masters, despite every effort on your part to do your best for them. The distance you are placed from home and those dear to you, is certainly another cause, and lastly the habit of drinking to which many a good man gives himself up without restriction or control, to drown his troubles—so at least he thinks. I hope, Sir, I have tried to make myself understood, at least to some extent.—Yours, &c.

A SPINNER.

October 12th.

European Notes.

A GENERAL rise of from 25 per cent. to 50 per cent. per ton in German coal is anticipated.

THE great foundry of the Societe Alsacienne de Constructions Mechaniques at Mulhouse is now supplied with electricity not only for lighting, but for driving the machinery, which includes rolling bridges, cranes, electric drills, lathes, ventilators, and so forth.

A PROCESS has lately been observed for improving cotton goods. The goods are moistened in water at about 160° Fah. About 100lbs. would call for a compound made of 2lbs. of silicate of potash and 8 oz. of chloride of magnesia. This mixture, combined with the goods, possesses the properties needed to solidify the fibre, which finally is rendered smoother.

THE death took place lately in Dundee of Mr. John Alexander, who may fairly be described as one of the pioneers of the jute industry in this country. In 1857 he left for India in the sailing vessel *Mary Spencer*, which had on board the machinery for the Barnagore Jute Mill, where he had been appointed as spinning overseer. Naturally he had his work before him, as the natives at that remote period knew nothing of the art of spinning jute. Latterly Mr. Alexander acted in Dundee as the local agent of the Union Jute Company, Calcutta.

A SPECIAL article in the *Ironmonger* directs attention to the serious manner in which British trade is handicapped by the shipowner. Bar iron shipped from Liverpool to Java is charged 25*s.* and 10 per cent., whereas from Amsterdam to Java direct or *via* Liverpool by the same ships the rate is only 14*s.* 2*d.* Other examples are cited to prove how severely our trade is thus handicapped, and Chambers of Commerce, manufacturers, and merchants are appealed to unite and act promptly to put an end to this unpatriotic and suicidal tyranny.

SOME of the American wholesale houses are boycotting Coat's and Clark's Syndicate threads, and have intimated that they will only carry Willimantic thread, the product of an American mill. They allege that the Syndicate have been offering discount inducements to retailers to buy direct. The boycott may, of course, put the Paisley combination to some extra expense in the way of extra travellers, says *Capital*, but there should be compensation in the saving of the middleman's commission. Besides, direct dealing with the retailer will give them a better hold on the market. The *Pall Mall Gazette* makes reference to the boycott. It specialises the wholesale houses as being Boston firms who represent a large aggregate capital, and it adds that the opinion of leading New York merchants is that the competing American sewing thread manufactories will ultimately be absorbed by the great Coat's Syndicates.

A 1,000 *Horse-Power Boiler.*—The New York Steam Company is fixing a boiler which, on account of its great size, attracted considerable attention during its transit from the works of the Edgar Boiler Company, of Warren, Pa. The boiler is of the vertical shell pattern, and is guaranteed to develop 1,000 horse-power with 1-in. draught pressure when burning buckwheat coal. The boiler consists of a cylinder 10 ft. in diameter and 23 ft. long, and contains two hundred and twenty 5-in. tubes, furnishing in all about 6,000 square feet of water and 600 square feet of steam-heating surface. The shell and heads are of steel $\frac{3}{4}$ in. in thickness, but the former is not exposed to the action of the fire. The shell is constructed of three circumferential courses, each being made of two sheets, but riveted with four rows of rivets. Each tube is surrounded by a 7-in. circulating tube, extending from a point just above the bottom tube sheet to the water line. The boiler weighs about 59½ tons, and required thirty-six horses to transport it through the streets.

In Bombay the transport of such a boiler would be accompanied by the yells of at least 500 coolies making night hideous, as this class of work is not allowed during the day, and there is no possibility of inducing bullocks of equivalent power to work in unison.

Miscellaneous Questions and Answers for Engineers Preparing for Examinations.

(*Specially Written for the* "INDIAN TEXTILE JOURNAL.")

By A. HULLAH, M.I.M.E., Lecturer, V.J.T. Institute, Bombay.

(*Continued from page* 220 *Vol. VI.*)

QUES. 123.—The cylinders of a compound engine are 50" and 84" dia., respectively, and the initial steam pressure is 100 lbs., the receiver pressure is 22 lbs., and the condenser pressure 3 lbs. What is approximately the ratio of work done in the cylinders?

NOTE.—The above are all absolute pressures.

Hyperbolic Log 4.54 = 1·5129

" " 7·33 = 1·9920

Rule : Mean Pressure $= \frac{P}{r}(1 \times \text{Logr}) - Pv.$

ANS.—First find the values of r for each cylinder, by applying Boyle's Law.

For high pressure cylinder $r = \frac{100}{22} = 4{\cdot}54$

" Low " " $r = \frac{22}{3} = 7{\cdot}33$

For high pressure cylinder—

Mean pressure ... $= \frac{100}{4{\cdot}54}(1 + 1{\cdot}5129) - 22$

" " $= \frac{100 \times 2{\cdot}5129}{4{\cdot}54} - 22$

" " $= 55{\cdot}35 - 22$

" " $= 33{\cdot}35$ lbs.

For low pressure cylinder—

Mean pressure ... $= \frac{22}{7{\cdot}33}(1 + 1{\cdot}9920) - 3$

" " $= \frac{22 \times 2{\cdot}992}{7{\cdot}33} - 3$

" " $= \frac{65{\cdot}824}{7{\cdot}33} - 3$

" " $= 8{\cdot}98 - 3$

" " $= 5{\cdot}98$ lbs.

NOTE.—The work done in each cylinder depends upon the total pressures upon the pistons, being directly proportional to same.

The total pressure on high pressure piston $= 50^2 \times {\cdot}7854 \times 33{\cdot}35$

" " " $= 1963{\cdot}5 \times 33{\cdot}35$

" " " $= 65482{\cdot}725$ lbs.

The total pressure on low pressure piston $= 84^2 \times {\cdot}7854 \times 5{\cdot}98$

" " " $= 5541{\cdot}7824 \times 5{\cdot}98$

" " " $= 33139{\cdot}858$ lbs.

∴ Ratio of work done $= \frac{65482{\cdot}725}{33139{\cdot}858}$

$= \frac{1{\cdot}97}{1} = \frac{197}{100}$

That is approximately 97 per cent. more work is done in the high pressure cylinder than in the low pressure cylinder.

QUES. 124.—The boilers supplying steam to an engine generating an average of 1,500 I. H. P. evaporate 15 lbs. of water per I. H. P. per hour. How many cubic feet and gallons of water must be forced into the boilers per day of 10 working hours?

ANS.—Evaporation per hour = 1,500 × 15

" " 10 hours = 1,500 × 15 × 10 = lbs.

Gallons of water supplied to boilers in 10 hours ... ... $= \frac{1500 \times 15 \times 10}{10}$

" " " " ... = 22500

Cubic feet of water supplied in 10 hours ... ... $= \frac{22500}{6{\cdot}25} \quad 3600$

QUES. 125.—Explain the process known as Case-Hardening.

ANS.—Case-Hardening is a process by means of which the outer surface of articles made of wrought-iron are converted into steel.

The articles are carefully packed in a box—generally made of sheet iron—to prevent them bending, and surrounded with small pieces of bone, hoof, leather, etc. After the box is carefully covered over the top with clay, it is placed in a furnace—or stove—where it is gradually heated until the box and contents arrive at a red heat, when the temperature is kept constant for several hours, after which the articles are suddenly cooled by being put in a cold-water tank. The outer casing—or surface—of articles treated in this way absorb carbon to a depth of one-sixteenth ($\frac{1}{16}$), or one-eighth ($\frac{1}{8}$) of an inch.

QUES. 126.—A crab attached to a crane is so designed that the relative motion of the handle to which the power is applied, and the snatch block which raises the weight is 224 to 1. But in order to lift a weight of 5 tons, a force of 100 lbs. is required on the handle. What is the efficiency of the arrangement?

ANS.—Assuming that there was no loss in friction, etc., the weight lifted would be 224 times the force applied to the handle.

That is, if the force applied = 100 lbs.

$W = 100 \times 224 = 22400$

∴ The efficiency $= \frac{5 \text{ tons}}{22400} = \frac{5 \times 2240}{22400}$

" " $= \frac{5}{10} = {\cdot}5 = 50$ per cent.

QUES. 127.—(1) Explain how the rivets are arranged in a double riveted joint; (2) Why are some joints in a boiler double riveted, and others single riveted?

ANS.—The rivets are arranged in two parallel lines, sometimes the rivets in one line being opposite the rivets in the other line, called chain riveting; or the rivets in one line alternate with those in the other line, this arrangement is known as zig-zag riveting.

(2) Because the longitudinal joints are subjected to greater stress than the circumferential joints; and a double riveted joint being stronger than a single riveted joint, explains why longitudinal joints are double, and circumferential joints single, riveted.

QUES. 128—A certain quality of coal evaporates 9½ times its weight of water from and at 212° Fah. How much water would 1 lb. of this coal convert into steam at a temperature of 320° Fah., if the temperature of the feed water was 200° Fah.?

ANS.—Total heat per lb. of steam = Latent + Sensible Heat.

Latent Heat = 966 — 0·7 (320 — 212)

" " = 966 — 75·6

" " = 890·4 units.

Sensible Heat = Rise in Temperature.

= 320 — 200 = 120 units.

∴ Total heat per lb. of steam = 890·4 + 120.

= 1010·4 units.

Now the heat given to steam by each lb. of coal = 9·5 × 966

= 9177 units

Therefore the lbs. of water converted into steam by each lb. of coal $= \frac{9177}{1010{\cdot}4}$

= 9·08 lbs.

Ans.—9·08 lbs.

(*To be continued.*)

Cotton Mill Management.

(Continued from page 241, Vol. VI.)

THE SLUBBING FRAME.

THE replacing of the spring by dead weights as the power to force down that part of the "box of tricks" which carries the set screws by which the traverse of the rail is both regulated and changed, is an improvement which all practical men will value. With the spring it was the custom of overlookers and jobbers, should the change fail to take place in the proper manner, to tighten up the main spring to such an extent that the strain on both would be increased irregularly, whereas, if the one small spring which had become weakened had been slightly tightened, the needs of the case would have been met. In consequence of the excessive strain put on this main spring, the shock, when the change is made, is very excessive, resulting in damage to some portion of the complicated mechanism. With dead weighting this cannot possibly take place.

The traverse motion is a part of this class of Frames from which full duty is not always exacted. It happens often that owing to some portion of the mechanism having become loose, or to the existence of "back lash" resulting from excessive wear, the rod will not move the roving along the rollers more than $\frac{1}{8}$ inch, with a long dwell at each end of that distance as evidenced by two parallel grooves in the leather.

In this case a most cursory examination of the machine will reveal the fact that something is wrong, and the moving of the rod backwards and forwards by hand will soon remedy the mischief.

Brakes on the fly wheels of the frames are most useful when properly set, as they save time by assisting to bring the machine to rest quickly, but if not set so that they clear when the belt is on the fast pulley, they become, instead of a help, a nuisance, and a whole room allowed to run in this neglected state would add its needless quota to the coal bill.

The running back of the bottom cone and the unwinding of the sliver on the bobbins (when running, the necessary slack on the top of flyer for the purpose of doffing), is caused by the differential becoming a driver when bottom cone is released from contact with the belt. This could be prevented by applying a suitable brake to come into action when the cone is raised, whereby a certain amount of waste would be saved.

The custom of piecing the slivers at the bobbins instead of at the rollers seems to have obtained so firm a footing, that the most hopeful seem to think it useless to try and change it; yet it is altogether wrong and seldom fails to give trouble at the next operation by breaking either at the back or front of the rollers. On the other hand, when the piecing is properly made at the rollers, it is very likely that it passes on unnoticed.

A firm of cotton spinners in Bolton at one time had their preparatory frames made with one line of spindles only to obviate, it was said, the difference in twist which existed between slivers made on the front, and those made on the back row. Why they should have differed is not quite evident, but there are people who say the back row puts in more twist than the front. This contention is not any easier to explain than the other one,—when we know that for every revolution of the roller both lines of spindles have revolved equally with each other. The difference in the angles at which the two slivers leave the rollers may have given rise to this impression, as owing to this difference, the twist in one row does seem to run more into the bite of the rollers than in the other. The way the twist runs up to the rollers is affected also by the size of the hole in the top of the flyer, as well as by the distance of the side hole from the top of the flyer. This, if small, will cause the twist to run well up.

The late Mr. Evan Leigh gave out the opinion that if the twist of Slubbing was right hand, that of Intermediate should be left, and that of Roving right, and claimed that there were certain advantages attending this system. The writer of the present article had an opportunity some four or five years ago of inspecting a mill laid out on this system, and failed to see wherein lay the advantages. It was certain that if a tenter was taken from a right-hand frame to a left-hand she was of little use until the strangeness had gone off, which fact can justly be set down as a disadvantage resulting from the system.

A trifling thing, perhaps, is the proper adjusting of the roving rod in the creel. Usually this is set on a level with the middle of the bobbin, and when the sliver is coming from the bottom the friction arising from contact with the body of the bobbin is so great as to cause breakage of the sliver, unless it is very hard twisted. If the rod be lowered to one-fourth in the height of the bobbins, annoyance from this cause will vanish.

In this class of machines, especially in the Slubbing and Intermediate frames, an arrangement for winding the rail to the bottom of the lift after doffing should be applied, as then the tension is not affected by winding on the bare bobbin in one position and on the top of the first layer in the other position of the lift; for it is when the bobbin is small in diameter, and a layer represents a large fractional part of the diameter, that stretching can and does easily occur.

The bane of the spinning room is "single" sliver from the card room; and of these the "singles" that are allowed to pass at the Intermediate are the very worst, because they are the most difficult to detect. The electric stop motion for the prevention of "single" at this point has not been an unqualified success. A system of fines, where the roving tenter who reports the fault is rewarded by being allowed a part of the fine (each roving tenter having his particular frame to get his supply of bobbins from), has been known to go a long way to reduce the evil. Compared with Intermediate "single," that from the Roving frames is a very small evil, and it is hardly worth while insisting on tenters stopping their frames to take it off should any unavoidably pass the roller. In the case of a frame tenter however, when he is guilty of allowing the frame to run with empty bobbins in the creel, a small fine should be insisted on, and doffer boys are sometimes used as detectives, receiving half the fine, as in the former instance, for all cases reported.

The conveyance of bobbins from one part of the mill to the other is always a matter of some difficulty; this difficulty being increased if the mill happens to be a shed mill. A good level floor is of the greatest help in the matter, as in such a case trucks can be used freely. In some mills small tramways have been introduced with great benefit; but there is still room for improvement in this respect, and the direction this improvement is likely to go in is towards the system with a single line on the floor, and a complimentary one overhead. Such a tramway running along a row of pillars or a wall occupies very little space, and is generally arranged to go round corners of a reasonable radius with ease.

The holes in the traverse rods, and the guide wires of the same, through which the sliver passes, as well as the side holes at the top of the flyers, may often be choked up, partially or wholly, by tufts of fibres, owing to a defect for which the machine maker at times is responsible. When the traverse rod is of iron, the hole should be put far enough from the edge to prevent a fibre passing round and through the hole again, and joining ends. When this takes place other fibres are attracted, aided by the friction of the passing sliver until the collection is such that the sliver is broken. It is only then that the attention of the tenter is directed to the obstruction, which is then removed, but by that time the sliver will have been stretched considerably. For guide wires there is no remedy in similar cases, and they should never be used for guiding slivers, but only for yarns and threads.

Inventors and Inventions.

ONE of the most deeply-rooted of popular fallacies is to the effect that a quick way to fortune, or at least, to competence, consists of inventing something useful; and the delusion is kept up by certain interested persons, who, at regular intervals, and by advertisement, invite the public to "sit down and think of something." It is, of course, understood that as soon as something is thought of, the thinker must go at once to the advertiser, and engage him to obtain a patent for the idea. If the idea is turbid, the advertiser will, for a consideration, assist in precipitating or developing it: in giving it a lift from the blooming fields of imagination towards the very stormy sea of commercial experience. The fact is, that the average man can no more invent a new and useful thing than he can write a new popular song. The two things are fairly comparable. Numbers of successful engineers never trouble themselves with attempting new inventions. Many of them have a positive aversion to the uncertainty that surrounds all new departures in physical science, and they insist that everything they adopt shall bear the stamp of practical experience and ample trial. A decided preference for novelties, because they are new, is a very dangerous taste, and is only excusable in young men with limited responsibilities. It is only safe when controlled by an old or thoroughly experienced head with a strong critical talent.

Any one who would revel in new inventions has only to buy a few copies of the journal published by the Patent Office in London. One of the recent weekly issues of this publication contains details of patents which number in all four hundred and fifty-eight, nearly all of which are illustrated. In order to thoroughly appreciate this list, a very extensive experience in inventions would be necessary; there is, however, ample subject of interest to the intelligent reader with a moderate knowledge of mechanics, who will probably come upon more than one old acquaintance under the guise of a new invention. The volume before us has the usual variety of "notions," many of which are palpably old or palpably useless, for the Government, although it requires that, in order to be entitled to the privilege of a patent, the invention shall be new and useful, does not guarantee the novelty or utility of anything that is offered. There is a boiler for heating water for domestic purposes by means of a petroleum lamp. A hollow dish full of water is suspended below the boiler and over the lamp. No provision is made for removing calcarious deposit from this dish, which would in time be filled solid, and would spoil the boiler. A washing "dolly" is patented, in which the twisting movement of the "dolly" is effected by an up and down pumping motion, which would at least double the labour of washing by increased friction without corresponding advantage. An ice store box is another example of useless invention, which, after enveloping the box in several non-conductors, exhausts the air in it for the better preservation of the ice. The trouble of making a durable air-tight joint alone would destroy the utility of the invention. The use of sheets of coloured glass to be cemented to walls, instead of tiles, is an old idea that has been known for many years. An improvement in furnaces provides an elaborate washing apparatus for arresting soot. It, of course, destroys the draught of the furnace, and, further, demands a supply of steam to effect its object. The same result could be accomplished by a similar sacrifice of steam to render combustion more complete. This would dispense with the costly washing apparatus. A horse collar filled with compressed air is another old friend, which will continue from time to time to appear as a novelty. It is an excellent cushion as long as it remains inflated, but if the air gets out, the horse is wounded before the accident is discovered. The pressure on a collar may at times amount to four hundred pounds, and sudden strains of this sort always wreck the bag some time or other.

For the jointing of lead or other soft metal pipes a screw is provided similar, but not quite so good or cheap, as one that was in use in 1870, on tin-lined lead pipes in England. A much more ancient idea is that of mounting a water wheel between two moored barges, anchored in a river or tidal estuary, in order to obtain power to generate electricity or for other purposes. There are other inventions undoubted of merit, such as an apparatus for sizing balls or spherical objects. This operation used to be done by means of sieves, but when the spheres only varied by very small amounts, the sieves were rapidly blocked. The new apparatus consists of an inclined trough of convenient size and of a V-section; the two sides are made adjustable, so that a tapered slit may appear at the bottom, which will suit the largest and the smallest spheres of the lot to be sorted. Below the trough, at close intervals, are small funnels with pipes leading to different boxes. The use of the apparatus may be thus explained. Suppose a pound of mixed lead shot has to be sized, it is poured slowly into the upper end of the inclined trough, and, as the pellets roll down it, they drop through as soon as they reach a part of the slit that is wide enough, and each size falls into the box provided for it. Balls for bicycle bearings are thus sorted, and shot required for a percentage balance have been satisfactorily sorted by the same means.

Other inventions of interest are to be found for imbedding woven wire in glass, for the tuning of wind instruments, for silencing the noise of the exhaust from gas and oil engines, for weighing machines, lamps, sprayers for applying paint, preserving wood, pressure filters, knitting machines, wood working machines, and the making of packing cases. Most of the inventions bear evidence of a certain amount of thought and experiment, and among them a lecturer on mechanics would find numerous examples of good and bad design. All of them represent work done without pay, for a prospective reward, and of this reward Mr. Carpenal's summary will go into a very short sentence. Not more than 5 per cent. of the inventions that are patented bring profit to the inventor. This does not mean that only 5 per cent. had any merit, but that only that number of inventors were fortunate in getting their inventions into good commercial hands capable of making money with them.

Useful Note on Shafting.—Don't buy light hangers and think they will do well enough when your own judgment tells you that they will spring. Remember the shafting is turned one-sixteenth inch smaller than the normal size. Cold rolled and hot rolled shafting can be obtained the full size. The sizes of shafting vary by quarter inch up to three and a-half inches. The ordinary run of shafting is not manufactured longer than from eighteen to twenty feet. For line shafts never use any that is smaller than one and eleven-sixteenths inches in diameter, as the smallest diameters are not strong enough to withstand the (strain of the belts without springing. The economical speed of shafting for machine shops has been found to be from one hundred and twenty-five to one hundred and fifty revolutions per minute, and for wood-working shops from two to three hundred revolutions. A jack-shaft is a shaft that is used to receive the entire power direct from the engine or other motor, which it delivers to the various main shafts. Keep the shaftings well lined up at all times, and this will ward off a break-down and avoid a waste of power. Know that the pulleys are well balanced before they are put in motion, as a pulley much out of balance is quite a sure method to throw shafting out of line. Look to the pulleys and see that they have been bored to the size of the shaft, for unless this is done the pulley may be out of centre on the shaft and prevent smooth running. If possible, apply the power to a line of shafting at or near the centre of its length, as this will enable you to use the lightest possible weight of shafting. Hangers with adjustable boxes will be found to be the most convenient for keeping the shafting in line. Keep your drip cups cleaned and do not allow them to overflow or get loose. Never lay tools or other things on belts that are standing still, for they may be forgotten and cause a break-down when the machinery is started. In erecting a line of shafting the longest sections should be placed at the point where the power is applied. The diameter can then be gradually decreased towards the extremities remote from this point.—*Power and Transmission.*

Built-up Crank Shafts.

BY AN INDIAN MILL ENGINEER.

THE term "built-up crank shafts" signifies that the shafts are made up of several pieces, the parts forming the shaft, crank, and crank pins being each a distinct piece of iron for steel, as the case may be.

There are many reasons which have led our engineers to see the merits of the built-up shaft. In the days of iron shafts, when they were made up in the forge, a slab large enough to form the sweep of the crank was first got together, then the pieces to form the shaft were welded on each side, and so on, until he forging was finished. It is easy to see how numerous must have been the flaws in large shafts made in this manner, both trom imperfect welds, and the difficulty in handling large forgings under a steam hammer. In fact, many of these large forgings have been found quite spongy internally. The same difficulty has also been the case with large steel castings which have proved entirely unreliable for this class of work.

Different methods of building up crank shafts, both for compound and triple expansion vertical engines, have been tried. Some have had one part of the shaft solid with the crank, and the cranks connected together by a flanged crank pin, secured by a number of bolts, the flanges accurately fitting into a recess in the faces of the two cranks, thus making a sound connection between the two. By this method some of the trouble of making crank shafts were removed, making the forgings less difficult, and in some engines the sections composing the shaft could be all in duplicate.

A later and better plan has now been adopted for land engines by some of the leading makers of vertical triple expansion engines. These shafts contain no less than thirteen separate pieces (for a three cylinder vertical triple expansion engine) apart from the piece carrying the fly-wheel or rope pulley. The whole shaft consists of three pairs of cranks, three crank pins and four short lengths of shaft. The method of building up the sections is as follows:—The two slabs of steel forming each crank are first planed on the faces, they are then securely clamped together face to face and bored out to receive the crank pins, and the two ends of the adjoining pieces of shaft. This is done without loosening the clamps, so that the eyes for recieving the crank pins and shafts will be absolutely true with each other. The edges of the cranks are milled or planed perfectly parallel with each other, so that at the time of shrinking the several parts together, the whole may come in truly. The cylindrical parts of the shafts are, of course, prepared in the lathe, and are not difficult to get perfectly true. In putting the shafts together the cranks are bolted down to a planed surface at the proper distance apart, after having been heated for shrinkage, the proper amount having been allowed in borings for the whole to shrink firmly together. The pin is then inserted, and the whole allowed to cool down, thus making a perfectly true and solid crank or cranks. The pieces forming the shaft and the cranks are key-wayed at the proper positions for giving the necessary angles of the cranks with each other, and shrunk together in a manner similar to the cranks, the whole forming a true shaft if the workmanship has been perfectly and carefully done. The cranks are keyed to the shafts, but it is not considered necessary to put keys into the crank pins as they are seized at both ends, and have little or no twisting strain on them when working.

The advantages of built-up crank shafts are that the parts are easily renewed in case of fracture, and so each part is not of very large size compared with forged crank shafts; they are easily manipulated in the forgings, and, are, therefore, less liable to contain hidden flaws and imperfections which have wrecked many apparently good looking shafts.

They are usually made of good Martins Siemen's steel, and it only requires good and accurate workmanship to secure a reliable shaft fit for any class of work.

The writer has seen a shaft of this class which has driven a cotton mill for four years in this country and running at a speed of 100 revolutions per minute, indicating 1,000 horse-power, and it is apparently as sound as when first put together. Several of these shafts are now working in India and giving every satisfaction, and the writer thinks that they are the crank shafts, *par excellence*, for vertical engines.

Paint-Removing Powders.

VARIOUS compositions for removing paint, etc., from wood, iron, and stone have been patented by Baron de Liebhaber, Fulham.

These compositions are made in the form of dry powders, which are inert, but when mixed with water act as substitute for soda. They are intended to be applied by means of a painter's brush, the work being thoroughly washed down two or three times.

The first of the powders is made of cryolithe finely ground and slaked lime, to which is added an absorbing inert matter such as china clay or pipe clay or some other clay, with or without chalk. The proportions should be about 170 parts of slaked lime to 100 of cryolithe, and absorbing matter more or less acording to the quantity of water desired in the paste and the degree of causticity to result therefrom.

Another powder is made of fluoride of sodium finely ground or in a pulverulent state and slaked lime in about equal parts carefully mixed, with the addition of china or other clay, chalk, or some other absorbing matter as aforesaid.

The last kind of powder is made of carbonate of soda, slaked lime and clay or chalk, or a mixture of both. Its efficiency is founded on a curious property of hydrated soda which the patentee says he has noticed, and which is this: Caustic soda diluted in a quantity of water less than twenty-four equivalents decomposes carbonate of lime, and consequently, when itself carbonated, is not acted upon by lime. But when the quantity of water is increased to twenty-four equivalents, *i.e.*, about seven times the weight of anhydrous soda, it forms a definite compound (NaO 24 HO) with other properties, one, among others, being that when put in contact with carbonate of lime it does not act on it, and, on the contrary, if carbonated (NaO CO_2 24 HO), it is deprived of its carbonic acid and becomes caustic. Water added to this definite compound does not modify this affinity; on the contrary, it makes it more energetic.

The consequence is that for a mixture of carbonate of soda and lime to become caustic by the addition of water, the condition is that the quantity of water be little over four times the quantity of carbonate of soda (NaO CO_2^1), and, of course, the presence of at least one equivalent of lime is necessary. It is generally more advantageous to bring the proportion of water to five times the weight of the carbonate or thereabout; for although the caustic soda thus produced is in a more diluted state (under 16° Beaumé, the maximum corresponding to a little over four parts of water to one part of carbonate of soda), the action is more complete and rapid.

To obtain these proportions a certain quantity of absorbing inert matter like china clay or other clay, with or without chalk, has to be added to the mixture, the quantity to be ascertained for each kind of clay empirically, and to be greater or smaller according to the required degree of concentration of soda. For that purpose, after having intimately mixed dry carbonate of soda (such as the anhydrous carbonate in the ammonia process with slaked lime in the proportion of about three parts of carbonate to two of slaked lime, water is added in the proportion of five (more or less as required for the final result), and the china or other clay or absorbing matter is mixed, the quantity used being carefully noted, until it produces a rather light paste. It is then left for two or three hours. If it does not thicken or become firm, more is added until a paste of the proper consistency, and which does not thicken, is obtained. If it does become thick and hard it is a proof that the quantity of absorbing matter is in excess, and a smaller proportion is tried. Thus is ascertained the exact quantity of absorbing matter to be added to the mixture of carbonate of soda and lime in order to obtain a paste of the proper consistency and the exact proportion of water, and it is only necessary to m ix the ingredients in the proportions thus determined as intimately as pos sible.

This last powder differs from similar powders of an analogousy composition by the mode of preparation, which insures mathematicallp the proportions of the components, and particularly of the water in the aste, a condition essential to its efficiency; and also by the fact that when used (on wood, for example) there remains no lime in a free state, which could injure the material itself or the new paint afterwards. The last powder may be improved by mixing it with one of the preceding powders..—*Oils, Colours, and Drysalteries.*

Leather Dyeing with Coal Tar Colours.*

ALL leathers which are to be dyed, whether tanned or prepared with sumac must first be thoroughly cleansed from all foreign bodies, and must also be completely softened, especially on the grain side, which has to receive the colour. These two objects are attained at one operation by careful treatment with lukewarm water.

Split leather is usually treated in the following manner :—The pieces are first soaked in water at about 95 deg. F. The pieces must be capable of being removed from the water separately, as any entanglement of them will result in the tearing of the thin ones. After half-an-hour they are removed to a milling vat, where they are treated for five or six minutes with 1½ to 1¾ gallons of lukewarm water to each dozen pieces. Fresh water is then added (2¼ to 2⅝ gallons), and the process continued for another ten minutes. The pieces are then very carefully taken out, as they are in a condition at this stage to be very easily damaged.

The milling frees the leather from superfluous tannin, and serves to complete the cleansing and softening generally, for only with leather which is absolutely clean and soft can good results be got in dyeing.

Goat and calf skins are treated as above, but require a third lot of water in the milling, which should last one to two hours for goat, and half to one hour for calf-leather. If a milling vat is not available, an hour's treatment with an oaken rammer in a wooden trough with lukewarm water, after a few hours' soaking, will do nearly as well, with the water at 100 deg. F.

For dyeing, a wooden vat, about 39ins. by 20ins. by 10ins. is used, and this is tilted up, so that a gallon or so of dye collects in one place. Very soft water, free from lime and iron, must be used for the dye-bath, but if such water cannot be got, a little acetic acid should be added to the bath. There must be no exposed surface of iron within the vat, as otherwise stains, for the most part indelible, will be imparted to the leather. Slight iron marks may sometimes be removed by treatment with weak sulphuric acid, followed by a good rinsing.

Before dyeing, the skins are stretched in pairs (each of two skins of equal size) with a brass roller upon a glass or zinc table. The flesh sides of the two skins must be together and the grain outside. This prevents waste of dye on the inside of the skin. In the dye-trough a gallon or so of water at 100 deg. F. is put, and the dye-stuff added to get uniformity ; the proper quantity of dye for the shade required must be added in portions at intervals during the process. For light colours, two baths are sufficient.

For grounding mode-shades, various mordants serve, but their use is only to be recommended for basic dyes, which thereby acquire a deeper shade. It is well to use a little acetic acid if the water is hard, as lime tends to make the leather harsh. The mordants generally used are bichromate, acetate of iron, and pyrolignite of iron, the first for the lighter tints, the second for medium shades, and the last for dark tones. Bichromate is very suitable for light mode-colours, because it causes the dye to take slowly and uniformly, and produces intense hues with small expenditure of colouring matter. In grounding with very small amounts of bichromate, it can be added with the dye, but for larger amounts one proceeds as follows :—

To a bath of about a gallon of water from 1 to 2 oz. of bichromate, according to the shade eventually desired, is added, and the skins are worked in the solution for 10 minutes or so. They are then placed in a bath containing a portion of the dye, and finally in a third bath with the balance.

Iron mordants act more vigorously than the bichromate, but surer and better work is got when they are diluted. The pyrolignite, for example, sold at 30 deg. Bé., should be diluted to 15 deg. Bé. It is, however still better to make one's own iron-salt, for doing which the following receipt may be relied on :—Into 5 gallons water place one quart acetic acid (6 deg. Bé) and 5 lb. iron (clean strips are best), and let this rest for 5 days, stirring occasionally. Pour off carefully at last from any insoluble residue. The strength will be about 1½ deg. Bé, a strength which invariably gives good results, as it works slowly and steadily, and the dye goes on quite uniformly.

After dyeing, the leather is rinsed, and then wrung carefully by placing the skins singly on a slanting plate of zinc or glass, and passing over them an iron or brass roller, exerting a steady pressure.

Skins which are to go into the polishing machine (*i.e.*, thick leathers, such as calf and goat only) receive at this stage a careful painting with raw linseed oil, and are then dried in the open air or in a room having a regulated temperature, and stretched perfectly flat on frames. The drying should not take too long, as thereby want of uniformity of tint may result, and there must be no folding of the leather during the process.

Leather may be dyed by brushing on the warm dye with a long-haired brush. As it is difficult to put on the full colour desired, without streakiness or other want of uniformity, in once going over, the dye is diluted and several coats are laid on, taking care that each coat dries before the next is applied. In using acid-dyes a little acetic acid or the corresponding quanitity of vitriol is added.

The leathers are finished to make them smooth, and to give them a dull lustre, results which require special methods for their realization. The finishing materials used are milk, fleabane seeds, and linseed. Milk is used for light shades, in the proportion of 1 part of good milk to 10 of water.

Fleabane is used for intermediate, and linseed for the darker grades. Both are boiled in water, and the extract is used after filtration, and dilution until it just feels slimy. The finishing material, whatever it may be, is applied uniformly but not too liberally, to the dry leather with a soft sponge. This should not be done in too dry a room, so that the leather may not receive too much moisture, and thereby suffer in elasticity. When dry, the finished surface is brushed with a good hair-brush or coarse flannel, till it shows a dull lustre. Then they go to the smoothing iron, which must not be used too softly, or the rolling which follows will be made more difficult and only a second-rate lustre obtained. The rolling is done by a brass roller pressing very gently. If any pattern is wanted on the leather, it must be steeped in water and the roller must have the pattern engraved on it.

Calf leather is treated as above, but special care must be taken in the milling, as much depends upon the thoroughness with which this operation is carried out. As already mentioned, it should last from 30 to 60 minutes, according to the thickness of the leather.

By buck leather East Indian goat leather is chiefly understood, and this contains more or less fat, so that it wants warmer water (120 deg. F.) for milling, and a longer duration (1 to 2 hours) of that process. If the leather is to be parti-coloured it receives after drying a slight coat of linseed oil, is stretched, dried, then damped with reference to the separate colours, brushed, ironed, and coloured by means of a trestle on which lies a plate of wood, over which a glass roller is pushed with moderate pressure, thereby giving a polish to the leather.

The skins of young lambs are imported, prepared with alum-dressing from South America. They are used for gloves and letter cases, and are treated according to the use to which they are to be put, in dyeing by painting or by dipping. Those dyed by painting are used for gloves, and are treated as follows :—The leathers are softened in water at 100 deg. F. for 10 minutes. Fresh water is then added together with 10 grm. common salt, and half of egg yolk for every two leathers, and the leathers are worked about for another 10 minutes. They are then placed on a platform, flesh side downwards, and stretched out with a soft lignum vitæ or brass roller, then painted with bichromate, etc., and finally with the dye.

Leather for letter-cases is dyed by dipping, and after five minutes-treatment with warm water is dyed at once in three baths, adding a little yolk at the conclusion. The water is then pressed out, the skins are dried in a lofty room, and after staying a short time (say overnight) in a damp cellar, they are ironed and rubbed with pumice to give them a velvety look, while, for the other leathers, of which mention has been made, both acid and basic dyes can be used ; only acid ones should be used for lamb skins and all alumed leathers.

* Translated by *The Dyer and Calico Printer* from the pamphlet issued in German by the Action Gesellschaft fur Anilin Fabrikation

Some Japanese Alloys.—Following is the composition, according to the *Iron Industry Gazette*, of a number of Japanese alloys, hitherto kept a close secret, and now revealed by workmen engaged in making them : The "Shadko" is an alloy of copper and from 1 to 10 per cent. of gold ; the objects are placed in a mordant of sulphate of copper, alum and verdigris until they have assumed the coppered or blue-black hue of sword-sheaths and decorative articles. "Gni-shi-bu-ichi" is a copper alloy with 30 or 50 per cent. of silver of the well-known grey color. "Mokume" is a compound of several alloys. About thirty plates or foils of gold, "shadko," copper, silver, and the last-mentioned alloy are soldered together, holes are made, the plate hammered out and put in the mordant. The finest Japanese brass, "Sin-chu," consists of 10 parts of copper and 5 of zinc. Bell metals, "Karakane," are made of 10 parts of copper, 4 tin, ½ iron, 1½ zinc, the copper being melted first, and the other metals added in the above order. Other proportions give inferior bell metals.

Cotton Mill Building in China.

DESPITE the present prosperous condition of our cotton trade the Indian manufacturer has to look with alarm on the situation of the industry in China, where cotton mills are being erected with increasing activity. An almost complete list of the mills working at the time in that country was given in our issue of May last. Since then there have been nearly half-a-dozen concerns projected, and it is generally expected that further capital, native and foreign, will find investment in manufacturing indigenous staple in the Celestial Empire. An exceedingly smart race, the Chinese have been quick in picking up factory work, and are reported—men, women, and children—to be able within a short time to piece up ends as quickly and neatly as the best hands in Lancashire.

By the courtesy of Messrs. Dobson & Barlow, Ld., the eminent firm of cotton machinists of Bolton, who have been the largest suppliers of machinery both in Japan and in China, we are enabled in this issue to present our readers with full-page illustrations, representing views of the mills of the Hua Sheng Cotton Mills Company situated on Yangtsze Poo Road, Shanghai, China. The mills contain something like 90,000 ring spinning spindles, and all the necessary preparing machinery consisting of openers, scutchers, carding engines, draw and fly frames, ring spinning frames, reels, bundling presses, etc., which were all supplied by Messrs. Dobson & Barlow, Ld. They also contain 750 looms and all preparing machinery for the same.

There is no doubt that the cotton-spinning and weaving industry in Shanghai has a great future before it. There are already over six native mills at work in Shanghai, and by the close of the present year three English and one German concern are expected to be started. The establishing of the European mills is a consequence of the provision in the Shimonoseki Treaty, permitting the import of foreign machinery into all treaty ports.

The demand for yarn from Bombay on the average of the last three years, according to Mr. Consul Jamieson, was 180,000 bales per annum for Shanghai alone, valued at nearly 10,000,000 taels, or say £1,500,000. Yarn is now, since the commencement of the year, being imported freely from Japan at 72 taels per bale, 4 taels over what Bombay yarn fetches. This yarn is made mostly from Chinese cotton, which after export duty and bearing all the costs of transport, can be sent back to China in its maunfactured state, and yet pay the millowner a profit. It is, therefore, difficult to see, the Consul goes on to say, what is to prevent China in time manufacturing the whole of her yarn, and a very considerable proportion of the cloth which she now buys in the form of drills and sheetings, and even the commoner forms of shirtings.

The manufacture of her own yarn and commoner cloth will set free a present annual payment of, say, £2,000,000 to £3,000,000. She will want to spend this in something, no doubt; what particular form it will take remains to be seen, but, doubtless, Lancashire will have a share in supplying her with an increased quantity of the finer cloth. Just as India continues a good customer, notwithstanding the Bombay mills, concludes Mr. Jamieson, so, no doubt, will China, long after she has learnt to make her own yarns, and all the better probably for the increased wealth which the new industries will bring to the labourers of China.

The cotton growing is carried on chiefly in the northern provinces. The yellow kind, used in the manufacture of the celebrated Nankeen, is grown round Shanghai on the great plain, and is the staple summer crop of that locality. Here, again, the want of machinery has long been felt, although some of the finest mechanical appliances are found in a rudimentary form containing the germs of some of the modern complex machines.

The ordinary spinning apparatus is driven by the foot, and the work is said to be well done. The left foot is placed upon a beam resting in crescent-shaped axis of iron so as to keep it in position, while the other extremity of the beam has a pivot which works in an aperture in the wheel. The right foot of the spinner imparts to this beam the eccentric motion, which sets the wheel rotating. A belt on the wheel communicates this rotation to three upper spindles, whose motion is as many times accelerated as the circumference of each spindle is contained in the circumference of the wheel. By this simple contrivance a great velocity is obtained. The spindles not only spin the cotton, but they act as bobbins, and reel the thread as it is spun.

Cotton Spinning and Manufacturing in Japan.

WHILE remarking briefly on the cotton trade of China, it will be interesting to review as briefly the trade of her more advanced neighbour. We have gone rather fully into the subject in previous numbers, and in the present article we propose giving some figures as to the number of spinning spindles and hand looms, as obtained from the latest official reports and other sources. The latest official statistics available give the following figures:—

	No. of Companies.	No. of Spindles.	Cotton Consumed. *Kwan	Product. Kwan	Steam H.P.	Water H.P.
1894	45	530,074	17,179,274	14,620,008	12,439	317
1893	40	381,781	11,531,307	10,666,744	8,110	470
1892	39	385,314	12,240,793	9 977,208	8,604	435
1891	36	353,980	8,995,293	7,689.938	8,247	375
1890	30	277,895	5,962,484	5,132,588	not reported.	not reported.

*One Kwan=1⅓ lbs.

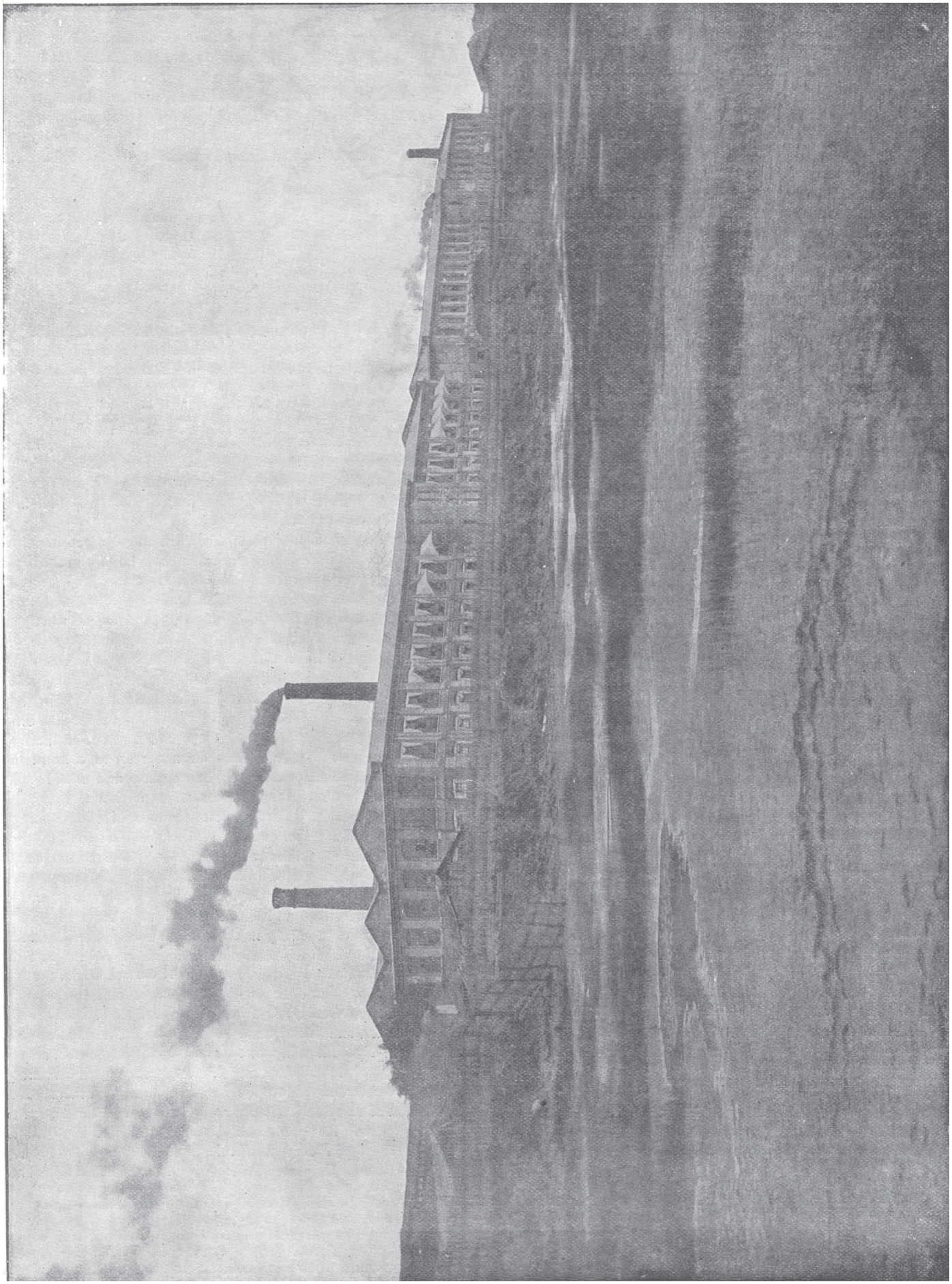
The Japan Cotton Spinners' Association in their report for the month of June, 1896, give the following figures which are limited only to those mills that have joined the Association:—

On June 30th, 1896.

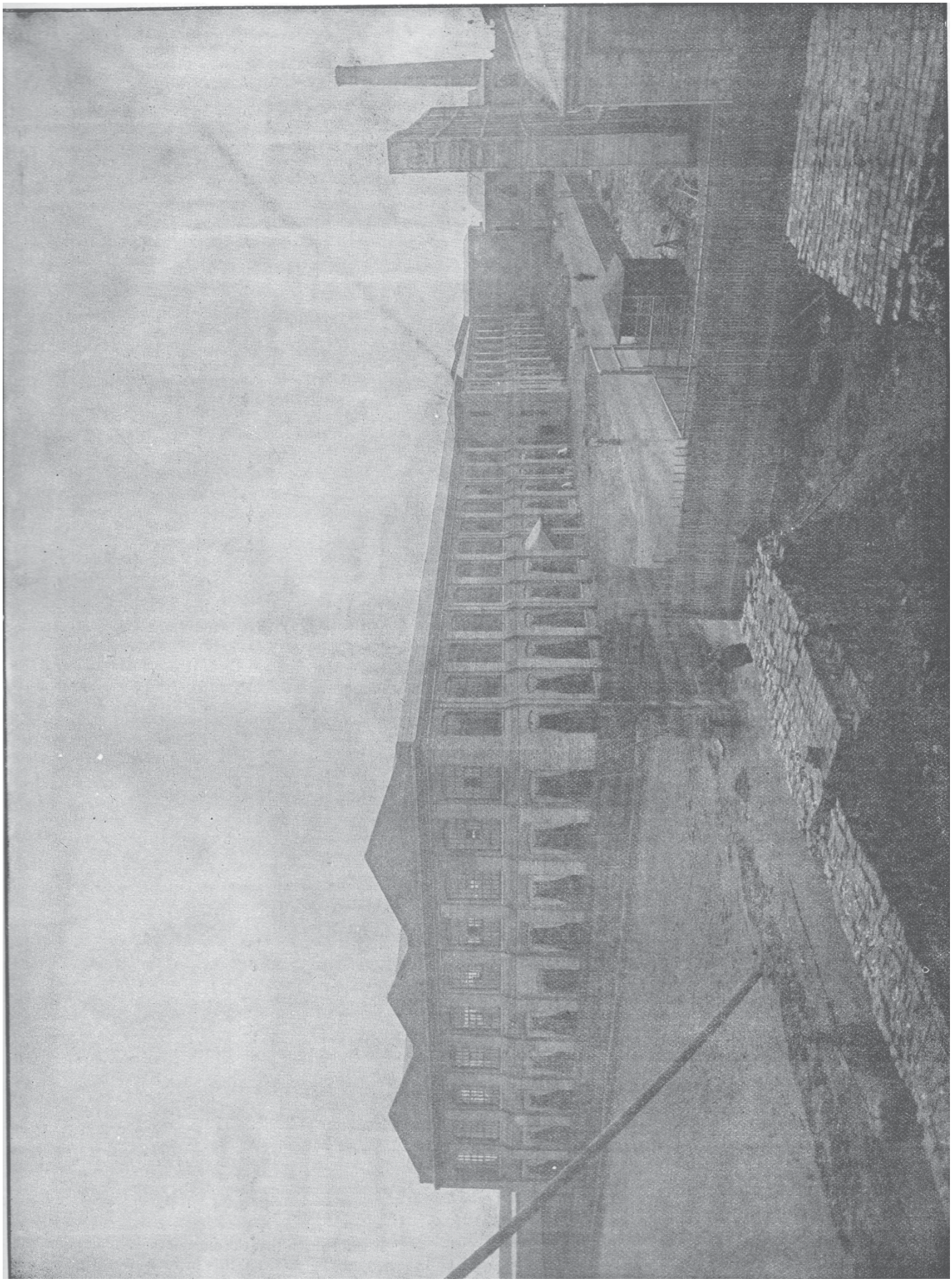
No. of Companies	59
Spindles, straight	536,897
,, slanting	38,763
Cotton consumed	1,826 487 Kwan.

We are informed, however, from an authoritative source that the actual working mills are now 63, containing 693,909 spindles, and projected ones 4, with 85,000 spindles, inclusive of all mills outside the Association.

According to official reports, there are now 850,000 looms in all Japan, chiefly hand-looms, the trade being largely in the hands of small weavers who own one or two looms and work at home. The number of these establishments is estimated to be 601,000, employing nearly a million people, 950,000 of whom are women. The principal centre of the weaving industry is the Aichi district, which includes the city of Nagoya. Aichi has 60,243 looms, Saitama 48,841, and Ehime 44,211. Osaka, where nearly the whole of the spindles are concentrated, has no more than 28,589 looms; Wakayama boasts of 25,682 looms, Shiga 23,131, and Fukuoka, Gumba Kyoto, and Yamanashi between 20,000 and 21,000. These figures do not refer to cotton looms alone, but to those adapted for silk, hemp, jute, and mixed goods. Cotton looms, however, represent a vast proportion of the whole. The last ten years have seen a great advance in the export of Japanese textiles. The value in silver dollars in 1885 was 511,990dols; in 1895 it was 22,177,626dols. The cotton fabrics exported are white cotton piece-goods, corrugated piece-goods, black-dyed piece-goods, cotton flannels, towels, shirtings, and the like. Of these, white and black goods, together with *futa-ko* fabrics, are produced chiefly in Yamato and Owari provinces and in the city of Himeji; corrugated cotton goods in Ashikaga, Sano, Awa, Tokyo, and Yamaguchi; towels in Kobe and Osaka; cotton flannels in Ku, Izumi Kawachi, Kyoto, Iyo, and Awa; *chijira* cloths in Tokyo, Osaka, and Yamashino; and cotton shirtings in Tokyo, Osaka, and Wakayama. The bulk of the exports go to China, but Kyoto has, in some classes of cotton goods, a respectable business with the United States. Only a very small percentage, however, of the annual output is sent abroad, though there is every likelihood of an extensive trade with China in the course of the next few years. At present the demand does not keep all the weavers employed even half time, and they have, moreover, to compete with the imported article, which has obtained a firm hold in the appreciation of consumers. But there can be no doubt, says the Report, that the Japanese looms, if profitable employment could be found for them throughout the year, could supply the whole of the home demand and could also reach out and capture £10,000,000, or £20,000,000, worth of trade in the neighbouring markets. One of their disabilities is that they turn out only the lower grades of stuffs.



The Hua Sheng Cotton Mills Shanghai. No. 1 Mill.



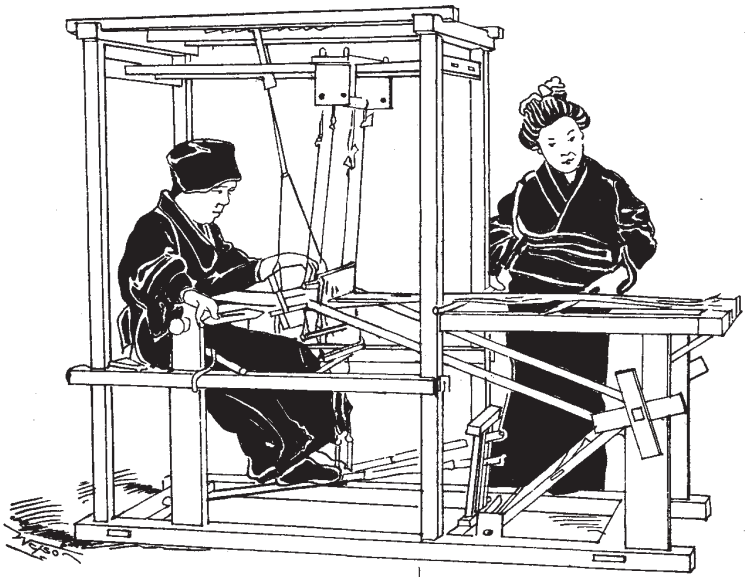
The Hua Sheng Cotton Mills, Shanghai. No. 2 Mill.

Cotton Spinning in Japan.

MR ROBERT P. PORTER, in a letter to the *Cleveland World* writing from Tokyo, gives the following account of the rise and present condition of the cotton industry in Japan. Our illustrations, which orginally appeared in the same paper, show in the first figure a Japanese hand loom and in the second the hand gin or *churka* and the ancient spinning device.

"Before taking up the centres of the cotton industry in Japan," Mr. Porter writes, "it may be well, in connection with these general statistics, to give such data as the Government has been able to supply me with at Tokyo. The spinning and manufacture of cotton into cloth by power machinery is one of Japan's new industries. In an incredibly short time they have reduced their imports, and experts believe that they have facilities enough to supply the home demand. If this is true, the British cotton manufacturer may well be on the lookout, for Japan will most assuredly capture the Chinese market. Last year Japan exported about 5,500,000 dols. of manufactures of cotton, mostly to China, though we took over 1,000,000 dols. of cotton rugs. This does not seem much, and yet our own exportation of cotton goods is only 11,000,000 dols. When we recall what Japan has done in the manufacture of silk and of matches in four or five years, five millions of exports of cotton goods must seem like a good beginning with the home market supplied. The story of the rise of cotton spinning by machinery in Japan is best told by the following table :—

Year.	Amount imported. Kin.	Amount produced in the country. Kin.	Total. Kin.
1887.....	47,439,693 ...	5,542,438 ...	52,982,077
1888.....	42,810,912 ...	20,938,963 ...	63,749,875
1890.....	31,908,302 ...	32,512,250 ...	64,420,552
1891.....	17,337,600 ...	45,306,406 ...	62,644,006
1892.....	24,308,491 ...	64,064,925 ...	80,975,140
1893.....	19,405,152 ...	63,632,100 ...	82,705,509
1894.....	15 942,797 ...	92,285,550 ...	101,854,759
1895.....	14,591,083 ...	uncertain ...	uncertain



"Thus, since 1888, Japan has reduced the importation of cotton yarn from England and India by 33,000,000 kin, or 46,000,000 pounds. Actually the importation has gone down as the home product increased. It is also noteworthy that relatively the consumption of cotton yarn by the people has increased with the manufacture at home. The following table shows the amount consumed per head in one year :—

	1894. Kin.	1893. Kin.	1892. Kin.	Average. Kin.
Amount consumed...	101,845,759	84.799,553	80,083,563	88,896.261
Population	41,695 565	41,385,040	48,669,942	41,390,182
Amount consumed per head.....	2·4	2·0	1·9	2·1

"It will be seen that the amount of consumption per head increased year by year, and this increase is still going on at the present time.

"The latest report on the growth of cotton manufacturing, especially spinning, may be found in the following official figures of the number of spindles at work since 1890 :—

Year.	Perpendicular spindles.	Oblique spindles.	Total.
1890.....	141.921 ...	111,545 ...	253,466
1891	213,729 ...	103,366 ..	317,095
1892.....	239,014 ...	99,294 ...	238,308
1893.....	269,669 ...	70,588 ...	340,255
1894.....	409,404 ...	66,588 ...	475.992
1895.....	489.202 ..	42,555 ...	531.757

"According to the examination made in December, 1895, the number of spindles is over 632,130, and the spindles under construction, or planned, are over 352,427, which, when added together, make a sum of 948,557. Moreover, as people are still planning new enterprises, the number of spindles will exceed 1,000,000 before the close of this year.

"Japan, with 1,000,000 cotton spindles rattling and clattering in the neat little factories which abound in the Osaka district, will close up the market as tight as a drum against John Bull, and give him a close fight in China.

"But will Japan stop at 1,000,000 ?

"The question may well trouble the Manchester millowner, especially when he contemplates the following table, which is official, and has been supplied me by M. Motoyama, chief statistician of the Imperial Cabinet :—

Year.	Number of Cotton Operatives.		Average Daily pay per Operator.	
	Men.	Women.	Men.	Women.
1895.....	8.129 ...	26,929	17·1 ...	8·9
1894.....	6 164 ...	12,214	17·4 ...	9·4
1893.....	6,354 ...	18.978	17·4 ..	8·9
1892.....	5,051 ...	14,246	17·7 ..	9·0
1891.....	4,089 ...	10,330	17·0 ...	8·2
1890.....	2,539 ...	5,391	17·1 ...	8·1

"The wages are given in sen, which at the present rate of exchange means that the men engaged in cotton spinning in Japan receive, according to the official reports, less than 10 cents per day of about twelve hours, and the women about 5 cents per day. It must be remembered that this is good, efficient labour, and that these people make excellent operatives in textile mills. Those who redicule the idea of a still further development of this industry should note that in six years the number employed in this branch of the cotton industry in Japan increased four-fold, from 8,930 in 1890 to 34,058 in 1895. In no country, except possibly the United States, have such stupendous industrial advances been made in so short a time."

The Production of Small Clean Castings.—A contribution to the *Colliery Guardian* states that many of the difficulties attendant on obtaining clean small castings would be overcome by using ferro-sodium in the ladle or crucible just before the metal is poured, as the action of this material is to increase the heat and fluidity of the metal, thus allowing all impurities to rise in the ladle, while in all cases the metal is rendered more homogeneous and free from cracks and blowholes, as there is no possibility of grains of sand or other substance remaining in the metal in the mould, as these rise to the surface in either the head or riser as the case my be. The cost of ferro-sodium varies from less than 1*d.* to possibly 2*d.* per cwt. of molten metal, and this expenditure is compensated for by the saving effected by having fewer wasters. With iron of a low grade, however, ferro-sodium gives greater results than with steel, the iron being rendered homogeneous and uniform in texture, and tooling up without speck or flaw. In fact, it is possible to use common London cast scrap—practically the worst mixture of iron to get sound, homogeneous castings from,—and from this to produce really good sound engineers' castings. Of course, this means a lot from a money point of view, as scrap of this kind cannot be purchased under 25*s.* per ton ; and although possibly only 15 cwt. of castings can be had from each ton of scrap metal, yet this is far cheaper than pig-iron castings.

Advance of Wages at Messrs Howard and Bullough's Works, Accrington.

WE have much pleasure in printing the following extract from the *Accrington Observer and Times* of August 29th, bearing on the advance of wages recently given to their hands by this eminent firm of machinists :—

Years ago, Messrs. Howard & Bullough had the distinction of being the first firm in the country to reduce the hours of labour to 54 per week. The experiment was, at the time, considered very daring, but time proved that the step was a wise one. Then, in order that the men might have a full half-holiday on the Saturday, the hours at Globe Works were further curtailed to 53, the works being opened at half-past eight on the Monday morning instead of eight, and closing at 11-30 instead of 12 noon on Saturday. This concession was much appreciated by the work-people. It enabled them to take advantage of the early half-day trips, and to enjoy themselves in various ways. And now the great Company have taken another step in advance. Without solicitation and without any preliminary notice, they gave what practically amounts to an all-round advance of wages last Saturday. The secret had been well guarded, and great was the surprise of the hands to find (as they thought) that a "mistake" had been made in their respective wages—an event of very rare occurrence under the very careful mode of checking at Globe Works; and it was gratifying to see the large number who returned to the pay-box to point out the supposed error. The question may be asked: "Why did not the firm take the course adopted by some other firms, and give, say, a month's notice of the advance ?" This certainly would have afforded an opportunity for the "blowing of trumpets," but would not have been in keeping with the quiet and business-like methods of Howard and Bullough. Since the formation into a Limited Liability Company, Globe Works have made gigantic advances. The output of the firm is, at the present moment, greater than ever, and, although one large extension has followed another with startling rapidity, during the past few years, the management are still crippled for room to deal with the large increase in orders, and have just completed the purchase of the large spinning mill, with weaving shed and land adjoining, in possession of Councillor Ratcliffe, and have plans before the Council for a further large extension. The Board of Directors may be congratulated on the excellent results of their policy in the past. In giving an advance of wages, which the men had not even asked for, the Directors have demonstrated that while they strive for the prosperity of the company they are not unmindful of the welfare of their work-people. The extent of the increase has not transpired, but it is known that some of the men received 1*s.* 6*d.*, 1*s.* 9*d.*, and even 2*s.* more than usual last Saturday. To the firm of Howard and Bullough this will mean many thousands of pounds of an increased outlay in wages per annum, which will make a wonderful difference in the spending powers of the work-people, and Accrington will derive benefit from the generous action of the Company in many ways.

Importation of Turkey Red Yarn.

A RESOLUTION by the Government of India, Finance and Commerce Department, says :—With the despatch of the 26th December, 1895, the Secretary of State forwarded a memorial from certain firms of Scotch dyers complaining that hanks of Turkey-red yarn of lengths less than the minimum prescribed by Rule IV of the rules under the Merchandise Marks Act, 1889 (published in Home Department Notification No. 1474, dated the 13th November, 1891) are imported into India from Germany and Switzerland. The memorialists suggested that such importations, being clear evasions of the law, should be prohibited by the issue, if necessary, of new or amended regulations.

2. From the replies of the local Governments, to whom the matter was referred for enquiry and report, it appears that such yarns are not imported into Madras and Burmah, that they have not been imported into Bombay since 1893, and that imports into Bengal have also recently ceased.

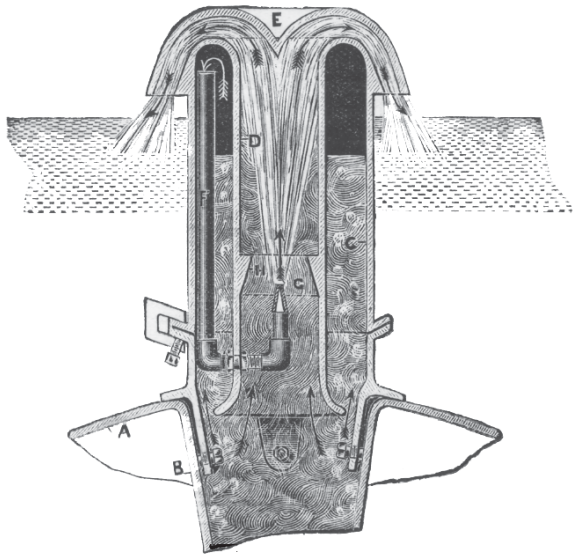
3. Such imports are distinctly in contravention of the rule which has the force of law, and the consumer, it is understood, is deceived by goods so described. These imports should therefore be dealt with, in case of renewal, in accordance with law. No amendment of existing rules is necessary.

Machinery and Appliances.

THE ACME DUPLEX CIRCULATION DOMES.

(*Makers : Messrs. The Steam Users Patent Co., Ld., Manchester.*)

THE Lancashire type of boiler, although in many respects an admirable instrument for its purpose, is defective in respect of its circulatory powers, the water below the flues being always of much lower temperature than that above it. We illustrate herewith a device to overcome this difficulty. It consists in the application to the top of an ordinary Galloway tube B of a saddle with a double flange, on to which is fixed the dome C. The latter is formed, as shown, with an annular space by fixing in it the tube D, which is flared at the bottom so as to restrict the opening through which the water in the tube can pass. It will be noticed that the water in the tube tends to rise in the dome and naturally fills the annular space. The steam which is emitted from the water within the latter finding no escape accumulates therein, and finds an outlet only by the tube F, which finally discharges below the water level by the jet G. At this point, as shown at H, the tube is contracted. Above the top of the dome is fixed a baffling plate E of the shape shown.



When in operation, the action of this device is as follows :—As the temperature of the water rises, a convection current is set up in the tube D, which on the generation of the steam is aided by its discharge from the jet G, which, combined with the throttling ring H, tends to act as an ejector. As the area of the annular outlet at the top of the dome is equal to that of the inner tube, as soon as a current is created it is aided by a syphon action. There is thus the combined power of three forces brought to bear upon the water, so that a current is set up which under all ordinary circumstances is sufficient to considerably improve the circulation.

A number of tests have been made with boilers before and after they have been fitted with these domes. In one case, although conditions were not so favourable on the occasion of the second trial, after the application of the domes as on that of the first prior to their being fixed, an eight hours' trial gave a coal consumption of 6·86lbs. of water evaporated per lb. of coal when the boiler was in its usual state, and 7·33lbs. after it had been fitted with the domes. In another case by drawing off the water from below the Galloway tubes and testing its temperature it was found that the application of the domes led to a rapid rise in the temperature of the water below the flues, which was the more marked as the steam pressure rose. A test made at the mills of Messrs. Thomas Emmott and Sons, of Oldham, with the same boiler with and without the domes fitted gave the following results :—In six days' working, during which steam was sent through the heating pipes for 21 hours, 21 tons and 2 quarters of coal were burned when the domes were not fitted. During the next week, steam being admitted to the mill for 32½ hours and the boilers being fitted with the domes, 19 tons 9 cwts. of coal were burned, being 31½ cwts. less, or 7½ per cent. These tests are borne out by others extending over five and nine months, showing that a saving is effected. It is also claimed that owing to the circulation set up, the chances of incrustation are materially lessened, and that after application any that may exist is softened and removed. Messrs. The Steam Users Patent Company, Limited, of Barton Arcade, Manchester, who are makers of this useful device will be glad to supply further details to intending purchasers.

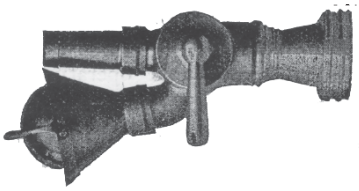
THE BALL FIRE NOZZLE.

(*Makers : Messrs. The British-American Ball Nozzle Co., London.*)

WE illustrate herewith an exceedingly simple and ingenius device applicable to fire extinguishing apparatus that has found universal favour wherever it has been tried. From reports submitted to us it seems that scarcely an important Factory or Brigade is without it, and we have pleasure in bringing it to the notice of factory owners and others in this country as one of the best fittings to the general fire service.

As will be seen from the illustration, it consists merely of a bell-shaped nozzle and a round ball. The ball is placed loosely in the bell and stands a strong pressure. It is claimed that so much as two hundred pounds of pressure of either air or water behind it will not dislodge it, and yet its resistance is so gentle that no pressure is given back to the pipe or hose.

The Ball Nozzle permits the flow of the same quantity of water from the hose as a straight nozzle without producing back pressure on the hose. A single man with one hand can manage it when it takes two or more men to manage a straight stream. It enables firemen to enter buildings in the face of flame and smoke, and to go to any part of a burning structure, fighting the fire at close range, and covering the area quickly and effectively.



According to the *Canadian Engineer*, a competitive test was made in Montreal between this and another nozzle with a stream from the hydrant at about 55 lb. pressure. Chief Benoit did not consider that the possibilities of either nozzle could be shown from so low a pressure, and suggested bringing down an engine. This was done, and the two nozzles were each given a 100 ft. of hose connected with the Silsby engine. The result showed the Ball Nozzle's superiority both in volume and range of spray and stream, the latter reaching a height of over 150 ft., against an extremely high wind. Chief Benoit and members of the Board of Underwriters were unanimous in their expressions of admiration of the valuable fire fighting qualities of this nozzle, which, as against the ordinary straight stream nozzle, an English authority has likened to the Gatling gun compared with the ordinary rifle. The victory was all the more creditable from the fact that Mr. Howard had had no intimation that his nozzle would be called into contest with one worked by its inventor, while the Ball Nozzle was put in charge of a member of the fire-brigade, who had not had it in his hands before, all of which goes to prove the contention of the manufacturer that simplicity is one of its strongest points.

IMPROVED WINDING MACHINES.

(*Makers : Messrs. Hahlo and Liebreich, Bradford.*)

A GREAT improvement in winding machines has been made during recent years, machinists being principally concerned about increased speed and productive capacity, to meet the demands made by manufacturers. The accompanying illustrations show two types of Winding Machine made by Messrs. Hahlo and Liebreich, Mill Street, Bradford, and specially adapted for linen yarns. Each of the machines shown in figs. 1 and 2 is a cop-winding machine intended for winding linen and cotton yarns in tubular form—that is to say, the machine will produce cops in which the yarn may be run off either from the inside or the outside, as may be desired. One of the most valuable features about it is that the cops (which are of large size) are wound upon the bare spindle, thus dispensing with the use of bobbins, pirns, or paper tubes, though it will also wind upon wooden pirns, if preferred.

The machine shown in Fig. 1 is arranged to wind from warping bobbins, whilst that shown in Fig. 2 is arranged to wind from hanks placed on races or swifts. Both are made from newly designed and most approved patterns which have been constructed with a view to neatness in appearance, combined with strength, and the materials and workmanship are of the highest class throughout. The frame ends have a good broad base, and are of the wide type, the spring pieces or intermediate frames also having a large base. The frames are coupled together by the rails carrying the cups and gearing. The spindles are driven from two separate shafts—one at each side of the machine—each of which is provided with a fast and loose pulley, so that one side of the machine may be stopped independently of the other. The faller or guide-wire shafts are operated from the same shafts by means of the spur gear shown and the connecting rods. The traverse of the fallers can be adjusted to suit the cops being wound. The machines are fitted up with an excellent automatic stopping motion to stop each spindle separately when an end or thread breaks or when any one spindle is full ; and notwithstanding its great simplicity, it is very reliable and serviceable.

The cops are well built both as regards firmness and shape, and the output of the machines is large. The workmanship of these machines is of the highest class, and, generally speaking, they fulfil all the requirements of manufacturers. Indian and Eastern Cotton Manufacturers who may feel interested in the above description should write for further details to the makers at their head office in Mill Street, Bradford, England.

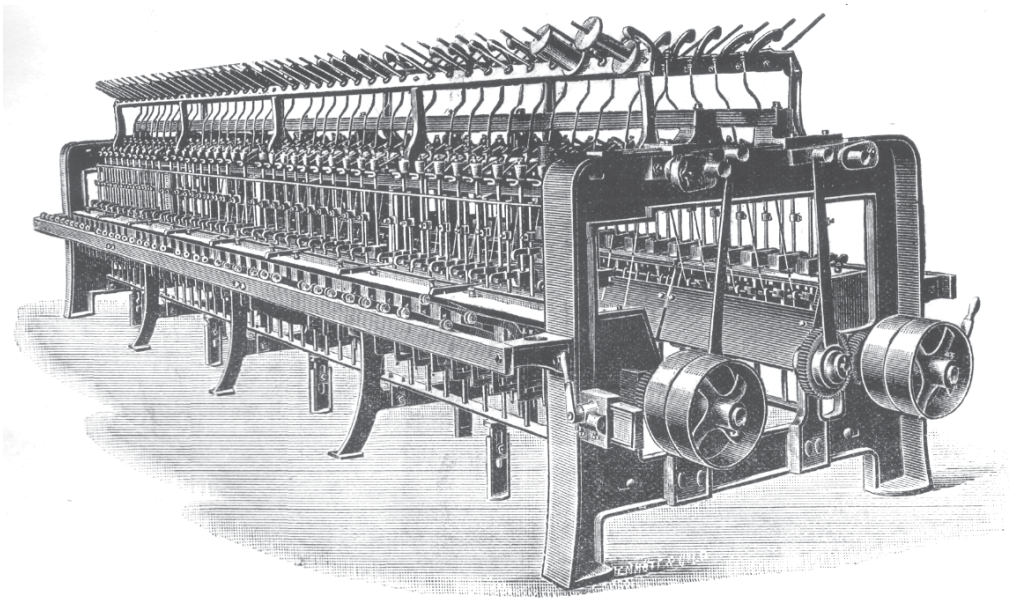


Fig. 1.—Improved Winding Machine.

Duty on Embroidered Cotton Goods.

A CUSTOMS Circular (No. XIX. of 1896) has been issued as under :—

I am directed to acknowledge the receipt of your letter No. 6089, dated the 4th August, 1896, requesting orders on certain points raised by the Collector of Customs, Bombay, on the instructions contained in the letter from this Department, No. 2589, dated the 15th, June 1896, regarding the levy of duty on cotton goods bordered or embroidered with silk or wool.

2. I am to explain that the principle of the instructions conveyed in the letter of the 15th June is that although the law (Section 21 of the Sea Customs Act) prescribes the levy of the higher rate of duty on cotton goods ornamented with silk or wool, the Government prefer to levy the lower rate applicable to cotton goods when the articles inserted in the fabric are inserted simply for decorative effect and are not so interwoven as to form a substantial portion of the fabric.

3. On the principle here stated, it would not be expedient to tax, as silk goods, cotton socks, vests, and drawers, because they have, for the purpose of decorative finish, a silk clock on the socks, a waist band of silk on the drawers, or a border of silk where the buttons and button-holes are inserted in the vest. Nor would it be in accordance with the wish of the Government to tax a piece of cotton muslin or grenadine at the higher rate applicable to silk or woollen goods because the piece is decorated with embroidered flowers like the samples received with your letter. The article, even so embroidered, remains a piece of cotton muslin and would not be treated in the trade, and should not be treated in the Custom-house, as anything but cotton. The higher value imparted to it by the embroidery is, as in all the cases under discussion sufficiently met by the tax being assessed on the market value, whatever that is. The case is entirely different where the cotton forms but a part of the fabric, as where cotton is the warp and silk or wool the weft, or where the embroidery practically covers and disguises the fabric. In such cases the article must be treated as made of the more highly taxed article. No rules are required for the treatment of such cases, which can easily be differentiated in practice from cases where the embroidery is merely a decoration on a cotton tissue which remains in substance and to sight a cotton tissue.

4. Similar remarks apply to the case of dhutis, saris, scarves, or other goods bordered with silk. In essence the case does not differ from that of embroidered goods, and, as it is not possible to define a limit for a decorative embroidery, so it is not possible to define a limit for a narrow ornamental border. If, for instance, a limit of one inch were fixed, the effect of the decision would be to penalise goods with a border of 1½ inch, with the effect of restricting and harassing trade in goods which are as much cotton goods as those with a border an eighth of an inch less wide. It must be left to the Customs authorities to decide in the exercise of their discretion when borders, embroideries, or stripes are of such a nature that they particularly disguise or alter the appearance or substance of the cotton fabric, the article then being taxed at the rate applying to the tissue of such borders, embroideries, or stripes.

Roller Cloth.

Its Advantages and Essential Features.

THE great care and perfection of details in cotton spinning is evident in the very existence of roller cloth. Arkwright and his successors for a considerable time were content to cover their rollers with leather ; but it was found that more compressibility and expansibility of the roller surface was required for the best results than could be obtained from leather. It was desirable that the surface should yield more easily than was found to be the case when the sliver was passing between the rollers, and that after it had passed it should return to its former state, so as to be ready to resume its work when coming round to it again in the course of the roller's revolution. This it was found to do imperfectly and too slowly. A happy thought arose in someone's mind to provide a cushion upon which the leather should rest. They therefore covered the roller with cloth or flannel, and upon this placed the leather. The advantages were at once evident. Roller cloth has never since been abandoned ; it has rather come more and more to the front, and has become indispensable where good work is required ; and that, in these days of competition, is everywhere.

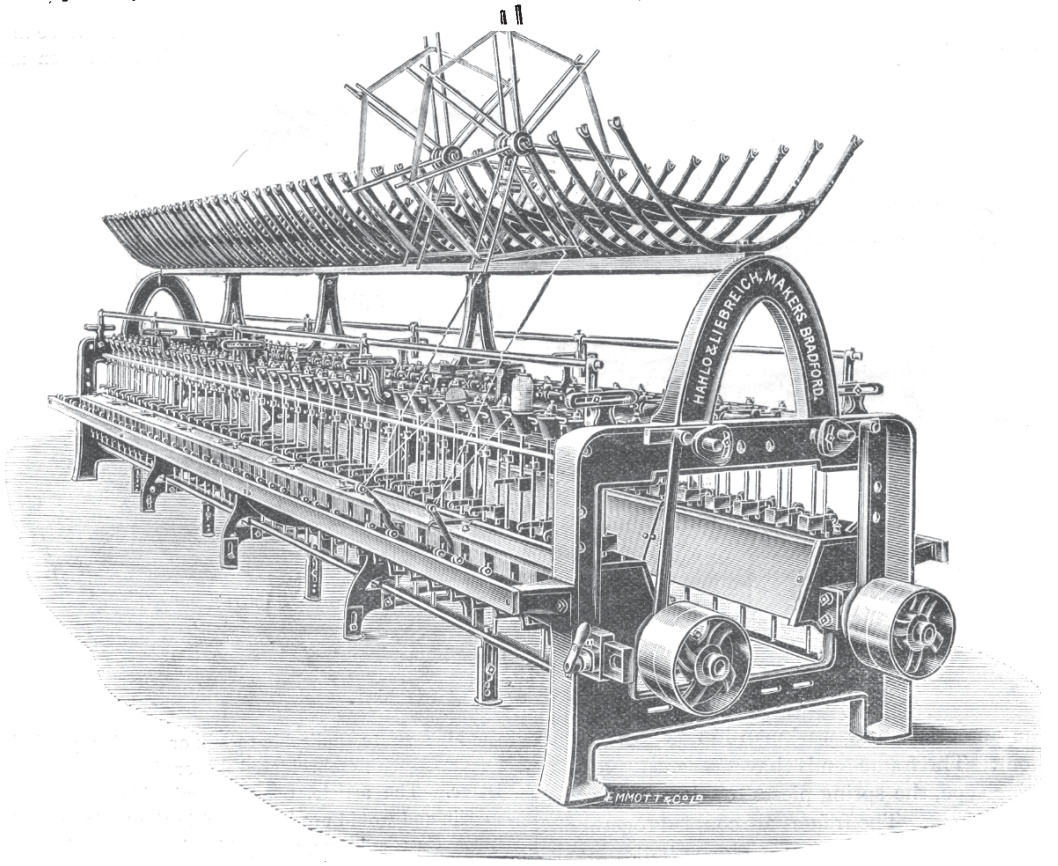


Fig. 2.- Improved Winding Machine.

The manufacture of roller cloth is peculiar to Lancashire, and it has been produced by a few firms for upwards of half a century. Its essential points are—firmness, equality of thickness, and quality of wool. To produce the best roller cloth only the finest and soundest wool ought to be used, and the best, most servicable, and most economical can only be made from the best raw wool. The wool must possess milling qualities, by which is meant fibres that will shrink and adhere together firmly, so that the cloth when made has the appearance of having been felted together, no threads being perceptible to the eye. To make a level cloth, the yarns used must be very carefully carded and spun, all vegetable fibre or bite being carefully removed from the wool in the process of carding. The weaving must also be very carefully performed, as the weight and levelness of the finished cloth depend entirely on this operation. Then comes the milling and finishing, the milling being the shrinking or thickening up of the cloth to the weight for which it is intended. These weights vary from 12 ounces per yard to 27 inches wide to 28 ounces or 30 ounces, and it is being able to produce the exact thickness for the weight that the skill and care of the manufacturer is displayed. A cloth, for instance, of 16 ounces, which is the weight most commonly used, may be thicker or thinner, in accordance with the way in which it has been finished ; and it causes great trouble to the roller coverer, and consequent damage to the roller leather, if this point is not exact. A soft, pliable, fuzzy cloth, which is the outcome of using inferior wool and waste, will very soon be marked or identified in working, by the cotton thread passing through the rollers. When this occurs the roller does not do its work, and, consequently, has to be re-covered, thereby wasting both cloth and leather. On the other hand, a boardy, hard cloth, and more especially if it has had any sort of stiffening put into it in finishing, will be thinner than it ought to be, and, consequently, the leathers will not fit tight ; or, if they are put on tight, in all probability the cloth will give, and break the joint of the leather ; besides which, there is no spring, and the roller might almost as well be left uncovered. The softness or hardness, and consequent apparent thickness, of roller cloth is mainly accounted for by the pressing, which process is accomplished by means of hydraulic presses with heated plates, or continuous heated hydraulic rotary presses. It will be easily understood, therefore, that if more pressure is given to one piece than another, a difference in thickness will result. This is only avoided by knowing and ascertaining the exact pressure registered on the hydraulics, and carefully adhering to one standard.

A reliable and satisfactory roller cloth is one which, whilst being firm, is still pliable, and weighing, for 36 inches long by 27 inches wide, the exact weight specified, made from pure wool, free from moisture, etc. The color is not of vital importance, but the best is of a creamy shade, which is the natural color of the best wool. It is a mistake to conclude that a very white roller cloth is necessarily a good one. The reverse is often the case, for if inferior wool or waste is used, a greater amount of bleaching is necessary to make the cloth pleasing to the eye and touch. This process is to some extent detrimental to the durability of the fibre. An unbleached roller cloth is the best, although not so slightly, and until recent years, it was often specially required unbleached. There is no doubt it wears better.

Low-priced roller cloths are a mistaken economy, and often the best roller leather is condemned and wasted by their use. Best cloth covered with best leather, both are equally essential to economy and good work. In these days, when many mills send out, or contract for, the covering of the rollers, inferior and cheap qualities are used, on account of the competition and low prices paid for covering. Spinners would be well advised if they bought their own roller cloth, as they cannot see what quality is under the roller leather.—A. S. J., in the *Industrial Record.*

The Lancashire Cotton Trade.

(Letter from our Manchester Correspondent.)

Dated September 24.

DURING the last month, or rather two months, the cotton trade of Lancashire has been in a complete state of bewilderment. It will be remembered that the price of cotton reached its highest point on October 18th last year, since when, owing to the cautious policy on the part of spinners of only buying the raw material from hand to mouth, prices have continually fallen week by week until July 24th. There have, of course, been frequent fluctuations during the whole period, sometimes, indeed, several variations taking place in a single day. But the net result was a gradual fall, a gain one day being followed by a greater loss the following day, the final result being as follows :—

Mid-American Cotton.

	per lb.
October 18	$5\frac{1}{16}$ *d.*
July 24	$3\frac{3}{4}$ *d.*

At the latter date, however, a reaction set in. The market was flooded with alarming reports from America as to the condition of the forthcoming crop, and cotton "bulls" in Liverpool and America ran up prices to $4\frac{3}{8}$*d.* a pound by August 22nd. I said in my last letter that this sharp advance was entirely the work of speculators, and that our spinners did not believe in it, and were not following the market; nevertheless the rushing up of prices had affected spinners for the worse, as they had not been able to get a proportionate advance for their yarns, and that manufacturers of piece-goods were similarly situated. Moreover, we could see no justification for alarm in respect to the probable size of the new crop, and spinners would act wisely to anticipate lower prices and only buy sparingly. No one, however, expected what actually took place. In eight days from August 22, cotton tumbled down more than a half-penny a pound; but the manipulators of the market and coiners of false alarms got to work again and forced cotton up, recovering the whole of the previous fall in about a week's time. Speaking roughly, and omitting small fractions, the two months ending to-day have witnessed three movements in the prices of cotton: an advance of a half-penny; a fall of a half-penny; and the recovery of a halfpenny, leaving the price to-day about the same as at the date of my last letter. But, during these eventful two months, prices have not been steady a single day or even hour, as witness the daily reports of cotton sales in Liverpool, of which the following may be taken as a sample of each day's report:—First report: "Cotton opened three points down." Second report: "Cotton recovered two points." Final report: "Cotton closed three points down from last night's quotations." A "point," I need scarcely remind your readers, is the 64th of a penny. Is it to be wondered at that our spinners and manufacturers have been fairly puzzled, and, in sheer despair, are stopping spindles and looms rather than risk losses by buying at present prices?

In addition to these harrassing fluctuations in cotton prices, the trade has received little help or guidance from the Manchester daily and evening papers which are supposed to contain accurate information of transactions and feeling on Exchange for the benefit of all concerned. These reports for many weeks have been constantly pessimistic, and evidently written in the interests of merchants from whom the so-called information has been collected. This special pleading on behalf of the buying merchants who naturally want to "hammer" prices and disguise their operations, is becoming something like a scandal. The unfortunate spinner or manufacturer, who goes home at night with our evening papers for his guidance and, relying upon the accuracy of the market reports, would conclude that there was nothing doing and no signs of new business, and that he had better do the best he can as regards prices for his goods the next day. The following is taken from the Manchester market report in last Tuesday's issue of our chief evening paper: "The market is very quiet all round. Orders are needed, but rather than take the prices offered, producers continue to stop machinery. Cloth is not doing well. Some Bombay offers are on the market and something for Madras, but limits are so low that nothing is put through. Nothing of moment doing for Calcutta. Some China offers are found, but only easy sellers will consider them. Printers and similar cloths move slowly at easier rates. Heavy goods are difficult to sell; fine goods move quietly and looms are stopping. Yarns are not moving freely, few lines of magnitude being about." Such unfair representations of the actual feeling on Exchange have been continued day by day with unvarying iteration. "In such manner," to quote a high authority, Mr. Henry Binns, "is our market perpetually bastinadoed for months past.'

I have said that looms and spindles are stopping, but the number of either are not ascertainable; but from the most reliable information at my disposal those numbers are very few, and a mere fractional percentage of the producing-power of Lancashire, and are confined to the lower qualities of yarn and goods, machinery employed in finer counts of yarns and higher grades of goods being well engaged. That the Lancashire cotton trade is not in the parlous state these reports suggest may be gathered from the monthly returns of the Board of Trade. I tabulate the following figures, which speak for themselves :—

Exports of Cotton Piece-goods.

	August. Yards.	Eight months ending August 31. Yards.
1896	482,000,000	3,525,000,000
1895	432,000,000	3,347,000,000
1894	427,000,000	3,520,000,000

The record year for exports of cotton piece-goods was 1894, when the gross shipments reached 5,312 millions of yards. This huge total was, however, considerably helped up by extraordinary increases in exports to India in anticipation of the intended re-imposition of the Indian import duties on Lancashire goods. If the trade this year is divided amongst our three sets of customers, the following is the result :—

	Yards.
India	1,407,000,000
Foreigners	1,988,000,000
Colonies and other possessions	130,000,000

The beggarly proportion of the last item will strike the reader, when it is remembered that the colonies of Canada, Australasia, and South Africa are included. The figures do not furnish an encouraging or convincing argument in favour of so-called Imperial Commercial Federation from which happy brotherhood India is to be kept outside along with foreigners.

Our export trade in yarns, although not so favourable as that of piece-goods, does not justify any feeling of pessimism, but rather to the contrary, if an explanation of the position is sought :—

Exports of Yarn.

	August. lbs.	Eight months. lbs.
1896	20,242,000	165,600,000
1895	21,200,000	170,200,000
1894	19,400,000	154,000,000

The decrease of 1,000,000 lbs. on the month may be put down at once to Germany, the decline being over 1,100,000 lbs. as compared with August, 1895, and the decrease of nearly five millions on the eight months may be put to the accounts of stagnant Austria and decrepit Turkey, who together reduced their takings by over 6,000,000 lbs. Other countries also took smaller quantities from us, but these losses were more than made up by increases of 6,000,000 lbs. to India and 4,000,000 lbs. to Japan. Of the increase to India, Madras is responsible for nearly 3,000,000 lbs., and we in Lancashire cannot account for this increase in face of a decrease of 55,000,000 yards in cotton piece-goods; especially is this difficult to understand if considered along with the big increases of 270,000,000 yards to Bengal, Bombay, and Burma.

The all-absorbing topic in Lancashire just now, however, refers to the probable size of the present cotton crop. There are absolutely no reliable reports coming from the Cotton States as to its condition. The rumours of damage from drought, heavy rains, and early frost are all concocted and paid for by "bulls" in America and Liverpool. Moreover, the receipts of new crop cotton at American ports are out of all proportion to past experiences, and destroy all calculations based on the averages of previous years. The following figures are nothing short of astounding, but cannot be interpreted in any other way than forecasting a much bigger crop than last year, probably approaching the ten-million bale crop of 1894 :—

New Crop Receipts at American Ports.

	Sept. 1 to 23.	Before Sept. 1	Total Bales.
1896	...791,000	166,000	957,000
1895	...299,000	8,000	307,000
1894	...483,000	37,000	520,000

The big receipts prior to September 1 indicate an earlier ripening of the crop. Any way the figures certainly do not support the alarmist accounts of damage. It is ridiculous to suppose that planters would hurry their cotton to market in this fashion if they thought that injury had occurred which would mean a short crop and considerably higher

prices. We have seen nothing to alter our belief in a plentiful supply of cotton at a moderate price, perhaps fourpence, as the average for the whole season, with consequent good trade for Lancashire. Our operatives do not believe in bad prospects for Lancashire, judging from the way they have spent their holidays this year. Since my last letter the annual "wakes" have been held in various other manufacturing towns in this country. These "wakes" usually last a week, and all mills and workshops are closed. The workers prepare for these holiday times by putting by weekly savings in what are called "going-away clubs" connected with mills, Sunday schools, and, regrettable to say, public houses. This year Oldhamers drew out of these clubs £150,000 and Blackburn £50,000, and other towns varying amounts from a few thousands upwards. Seaside resorts, such as Blackpool and the Isle of Man are blocked with visitors. There is no mistaking whence these crowds come. On promenade and pier the rich, emphatic, yet quaint dialect of Edwin Waugh and Ben Brierley is heard everywhere.

About seventy cotton companies take stock and publish balance-sheets at the end of this month. The results are looked forward to with much curiosity, as they will show the effects of the recent fluctuations in cotton.

Reviews of Books.

Chemical Recipes—A work which is unique of its kind has been published by the Atlas Chemical Company, of Sunderland (England). Under the title of *Chemical Recipes* it contains a large and varied assortment of information of a kind which is most urgently wanted by Indian manufacturers whose industrial work is generally full of indications of imperfect knowledge and absence of good training. In the preface the authors state that the main object of their work is to place within the reach of small manufacturers, managers, and skilled workmen, the means of producing the different commodities for which recipes are given, without putting them to the cost and difficulty of erecting expensive plant and machinery. The preparation and blending of mineral pigment for paints, fusible enamels for earthenware or metals, glazes for earthenware and bricks, stains for bricks, and special recipes for pottery, brick and tile works and for painting on glass have a prominent place in the book. A chapter is given to ship composition paints, varnishes, polishes, stains, and blacking; and another deals with inks of all kinds for printing, writing, stamping, copying, and lithographing, also sealing wax. Soaps of all kinds are treated in detail. Greases for lubricating have a section, and also stains for dyeing and finishing leather. There are also recipes for essences, perfumes, cordials, syrups, bitters, beers, and aerated drinks. The book in its present form contains knowledge in its most concentrated state, which, in many cases pre-supposes a very considerable amount of collateral knowledge on the part of the reader, in whose interest we would suggest the addition of a table of contents by chapters, and an introduction to each chapter. India is only at present on the threshold of an immense development of industries which have in some cases been touched by unskilled hands and for a time discredited, but we may be certain that, of the enormous quantities of raw products that the country produces and to some extent exports, that part which returns in the form of soap, leather, drugs, paints, varnish, oils, candles, condiments, and other merchandise will stimulate the growth of local industries, whose progress will only be limited not by lack of either material or capital, but only by lack of technical knowledge such as *Chemical Recipes* endeavours to supply, and without which no advantage either of cheap labour or material is of any avail in the market. India is plentifully sprinkled with the wrecks of all kinds of industrial enterprises started by untrained adventurers, who imagined that money alone would insure commercial success. Each of those failures, besides doing injury to persons responsible for it, breed distrust in all new departures among the onlookers. There is now a healthier impression gaining ground, to the effect that in order to ensure success in any industry, there must not only be money but also brains. *(Chemical Recipes, Atlas Chemical Co., Sunderland. Price 50s.)*

Engineer Draughtsman's Work.—It is quite refreshing to read a work so thoroughly practical and to the point as that before us, which really does all its unknown author proposes, and a little more. The choice of instruments, their purchase in detail, the sharpening of pens, an art so little known, and the methods of work are explained by a writer, who, while he knows his trade well, has not forgotten his early experiences and difficulties. The later chapters dealing with the use of the planimeter and the indicator, on estimating, and on the studies requisite for draughtsmen engaged on various branches of work are excellent, and the whole work is a void reminder of the enormous difference which separates the draughtsman in India from his fellow in England. What we call draughtsman in India is a person who never handled a tool, who has learned no trade, and whose career very often begin as a tracer, ending, as a rule, in something very little better. He has few instruments of his own, and knows nothing of setting or adjusting them. His business is really copying and making alterations under instructions from some chief who must do every calculation for him. Many of the most important works in India have been carried out by engineers with no better help than this, but the labour of the chief is enormously increased in consequence. Our Indian draughtsman's pay is about as poor as his work, and as he has no knowledge of practical mechanics he can never rise above the commonest office drudgery. Among mechanical engineers and on the Railways there are, of necessity, a few good men possessing the requisite knowledge, but the bulk of draughtsmen resemble only closely the description given above. In designing a house, for example, the draughtsman may make plans and elevations, but it is the builder who determines the scantling of any part, and it seldom happens that any house is built exactly to the design. The builder, who cannot draw, takes such liberties with it as he thinks proper, and the timbering is proportioned to his idea of what he has seen done before. We should therefore be glad to see *Engineer Draughtsman's Work* adopted in Engineering Colleges in India—("*Engineer Draughtsman's Work*," *Whittaker & Co., London. Price* 1s. 6d.)

Books Received.

Ruhmkorff Induction Coils : Their Construction, Operation, and Application, by H. S. Norrie. Price 2s.—E. & F. N. Spon, London.

Modren Bleaching and Finishing, by a Practical Bleacher. Price 2s.—John Heywood, Deansgate, Manchester.

A Practical Handbook on the Care and Management of Gas Engines, by G. Lieckfeld, C. E. Translated by G. Richmond, M. E. Price $1.—Spon & Chamberlain, 12, Cortlandt Street, New York.

A Practical Treatise on the "Otto" Cycle Gas Engine, by William Norris, M. I. M. E.—Longmans, Green & No., London, New York, and Bombay.

Technical Education: A National Necessity, its Uses and Advantages, by Henry Corby, B. A., M. D., &c. Price 3d.—J. Mahony, Cook Street, Cork.

Letters from India & Ceylon, by Sir John Leng, M. P.—John Leng & Co., Dundee.

Tabular Survey of the Artificial Organic Colouring Matters and their Application in Dyeing and Calico Printing, by Dr. Adolf Lehne. Translated into English by Prof. T. K. Gajjar, B.Sc., M. A. A. J. Combridge & Co. Bombay.

Prevention of Boiler Incrustation.—An Austrian chemist recommends a new method for the prevention or removal of boiler incrustation which has furnished remarkably good results since about one year that it has been in use at Anina and other localities in Austria-Hungary. To the feed-water there is added a mixture consisting of 90 per cent. of soluble chromates and 10 per cent. of soda. These salts transform the more or less soluble carbonates contained by the water into soluble chromates which settle in the shape of slime without adhering to the walls of the boiler, and the latter can easily be cleaned by washing. The beneficial effect of the process will be felt even in the case of boilers which are already lined with thick layers of incrustation, for these will be gradually reduced and transformed into slime. On an average $\frac{1}{10}$ of an ounce of the mixture should be added to 35 cubic ft. of water. For an ordinary boiler 3 to 4 ounces per day would be sufficient. Where water with very high lime contents is being used, the dose should be increased a little; the exact quantity needed can easily be determined by a preliminary test.

Cotton Machinery Calculations.

SCUTCHERS.

(1). The Speed of counter-shaft is 500 revolutions per minute; a 21-inch drum on it drives $7\frac{1}{2}$" belt pulley on beater-shaft; find the speed of the beater. Rule: Multiply the speed of the counter-shaft by the diameter of the driving drum and divide the product by the diameter of the driven pulley on the beater-shaft.

$$\therefore \frac{500\times21}{7\frac{1}{2}} = \frac{500\times2\times21}{15} = 1{,}400 \text{ revs. of beater.}$$

(2). The callender rollers of a finisher lap machine are 5" diameter, and make 12 revolutions per minute; if the feed-rollers be $2\frac{1}{2}$" diameter and make during the same time 7 revolutions, what will be the draft. Rule: Multiply the speed of the callender rollers by their circumference, and divide the product by the circumferential speed of the feed rollers.

$$\therefore \frac{12\times5\times3{\cdot}1416}{7\times2\frac{1}{2}\times3{\cdot}1416} = \frac{12\times5}{7\times2\frac{1}{2}} = 3\tfrac{3}{7} \text{ draft.}$$

(3). If three yards of lap weigh $2\frac{1}{2}$ lbs., what will be its hank? Rule: Multiply the number of yards of lap by $8\frac{1}{3}$, and divide the product by its weight in grains.

$$\therefore \frac{3\times8\frac{1}{3}}{2\frac{1}{2}\times7000} = \frac{25}{17500} = \frac{1}{700} = {\cdot}00142 \text{ hank.}$$

(4). A lap is 36 yards long, and ·0012 hank, what will be its weight in pounds? Rule: Multiply the length of lap in yards by $8\frac{1}{3}$, and divide the product by its hank multiplied into 7000.

$$\therefore \frac{36\times8\frac{1}{3}}{{\cdot}00012\times7000} = \frac{350}{8{\cdot}4} = 35{\cdot}71 \text{ lbs. weight.}$$

(5). If with a 10" rope pulley, driving the feed regulator cone, the draft be 4, and the weight of the lap 5100 grains per yard, what pulley will be required if the draft has to be changed to 3, and what will be the weight of the lap with the new draft. Rule: Multiply the diameter of the rope pulley driving the feed regulator cone, by the present draft, and divide the product by the draft required.

$$\therefore \frac{10\times4}{3} = 13\tfrac{1}{3}\text{"}$$

Note—Weight of the lap varies inversely as the draft.

$$\therefore\ 4:3::x:5100\ \therefore\ x = \frac{4\times5100}{3} = 6800 \text{ grs. per yards}$$

CARDING ENGINES.

(1). The line shaft of a card-room makes 138 revolutions per minute; and a 21" drum on it drives an 18" pulley on the cylinder shaft. Find the speed of the cylinder. Rule: Multiply the speed of the line shaft, by the diameter of the drum on it, and divide the product by the diameter of the pulley on the cylinder shaft.

$$\therefore \frac{138\times21}{18} = 161 \text{ revs. of cylinder.}$$

(2). The callender rollers of a carding engine are 4·5" dia., and make 100 revolutions per minute; if the feed rollers be 2·25" diameter and make ·2 revolutions during the same time, what will be the draft in the machine? Rule: Multiply the speed of the callender rollers by their circumference, and divide the product by the circumferential speed of the feed roller.

$$\therefore \frac{100\times4{\cdot}5\times3{\cdot}1416}{2\times2{\cdot}25\times3{\cdot}1416} = \frac{100\times4{\cdot}5}{2\times2{\cdot}25} = 100 \text{ draft.}$$

(3). The number of points in a $2\frac{1}{2}$" fillet is 60; what are the counts of the wires. Rule: Multiply the number of points in the width of the fillet by 4, and divide the product by the width of the fillet in inches.

$$\therefore \frac{60\times4}{2\frac{1}{2}} = 96 \text{ counts of wires.}$$

(4). If the weight of 6 yards of card sliver be 357 grains, what will be its hank. Rule: Multiply the given length of sliver in yards by $8\frac{1}{3}$ and divide the product by its weight in grains.

$$\therefore \frac{6\times8\frac{1}{3}}{357} = {\cdot}14 \text{ hank.}$$

(5). The callender rollers are $4\frac{1}{2}$" diameter, and make 98 revolutions per minute; if the hank of the sliver be ·15, find the production in pounds per day of twelve hours. Rule: Multiply the surface speed of the callender rollers in inches by the number of minutes the machine is working per day, and divide the product by 12×3×840 and the hank of the sliver.

$$\therefore \frac{98\times4{\cdot}5\times3{\cdot}1416\times60\times12}{12\times3\times840\times{\cdot}15} = 219{\cdot}91 \text{ lbs.}$$

(6). The cylinder and doffer are respectively 50" and 24" diameter and 40" wide; what length of $2\frac{1}{2}$" fillet will be required to cover each of them? Rule: Multiply the circumference in inches of the cylinder or doffer by the width in inches of the cylinder or doffer, and divide the product by the width of the fillet in inches multiplied into 12.

$$\therefore \frac{50\times3{\cdot}1416\times40}{2\frac{1}{2}\times12} = 209{\cdot}4 \text{ feet for cylinder.}$$

$$\text{and } \frac{24\times3{\cdot}1416\times40}{2\frac{1}{2}\times12} = 100{\cdot}5 \text{ feet for doffer.}$$

(7). The weight of one yard of lap is 5500 grains, and the draft is 100. If the weight of the sliver per yard be 51·7 grains, find the amount of waste made at the machine. Rule: Divide the weight in grains of one yard lap by the draft; this gives the calculated weight per yard of sliver; and from the result subtract the actual weight in grains of one yard sliver; then as the calculated weight of the sliver is to the difference so is 100 to the percentage required.

$$\therefore \frac{5500}{100} = 55 \text{ grains calculated weight per yard of sliver.}$$

55—51·7 = 3·3 grains = difference between calculated and actual weight of the sliver.

$$\therefore\ 55:3{\cdot}3::100:x$$

$$\therefore\ x = \frac{3{\cdot}3\times100}{55} = 6 \text{ per cent. waste.}$$

(8) Suppose the weight of the sliver is 60 grains per yard with a pinion of 18 teeth driving the feed roller; what pinion will be necessary if it be required to produce a sliver weighing 50 grains per yard? Rule: Multiply the teeth of the change pinion on the side shaft that drives the feed roller by the required weight of the sliver and divide the product by the present weight of the sliver.

$$\therefore \frac{18\times50}{60} = 15 \text{ teeth pinion.}$$

DRAWING FRAMES.

(1). The bottom frame shaft of a drawing frame is making 216 revolutions per minute, and a 15" pulley on it drives another of 10" on the front roller spindle; find the speed of the front roller. Rule: Multiply the speed of the bottom frame shaft by the diameter of the pulley upon it, and divide the product by the diameter of the pulley on the front roller spindle.

$$\therefore \frac{216\times15}{10} = 324 \text{ revolutions.}$$

(2). The front roller wheel has got 20 teeth, crown wheel 100, change wheel 40, back-roller wheel 50, and the diameters of the front and back rollers are $1\frac{1}{4}$"; find the draft in the machine. Rule: Multiply the product of teeth in the crown and back roller wheels by the circumference of the front roller, and divide the result by the product of teeth in the front roller and change wheels multiplied into the circumference of the back roller.

$$\therefore \frac{100\times50\times1{\cdot}25\times3{\cdot}1416}{20\times40\times1{\cdot}25\times3{\cdot}1416} = \frac{100\times50}{20\times40} = 6{\cdot}25 \text{ drafts.}$$

(3). A frame is producing with a 40 change pinion a sliver weighing 50 grains per yard; if it be afterwards desired to alter the weight to 55 grains per yard, what pinion will be necessary? Rule: Multiply the number of teeth in the change pinion, by the required weight of the sliver, and divide the product by the present weight of the sliver.

$$\therefore \frac{40\times55}{50} = 44 \text{ teeth pinion.}$$

(4). The hank of the card sliver is ·14, and 6 ends go in together; if the draft be 6·5, find the hank of the resultant sliver. Rule: Divide the hank of the card sliver put up at the back by the number of ends going together, and multiply the result by the draft.

$$\therefore \frac{{\cdot}14\times6{\cdot}5}{6} = {\cdot}15 \text{ hank.}$$

(5). The front rollers of a drawing frame with six deliveries in each head are $1\frac{1}{8}$" diameter and make 322 revolutions per minute; if the hank of the sliver be ·16, what would be the production in pounds per each day of twelve hours from each head. Rule: Multiply the speed of the front roller by its circumference in inches, the number of minutes the machine is working per day, and the number of deliveries in the machine; and divide the product by 12 × 3 × 840, and the hank of the sliver; the result will be the production in pounds.

$$\therefore \frac{322\times1{\cdot}125\times3{\cdot}1416\times60\times12\times6}{12\times3\times840\times{\cdot}16} = 1016{\cdot}11 \text{ lbs. production.}$$

Indian Patents.

(Continued from page 303, Vol. VI.)

The full names and addresses of any of the applicants in the following list or particulars regarding their inventions may be had from the Manager, Patents Department, *Indian Textile Journal*, Bombay.

APPLICATIONS FILED.

(During the week ended 5th September, 1896.)

No. 305 of 1896.—F. J. Maden, Bombay, for a further improved fibre extracting machine.

No. 306 of 1896.—Ralph Ouseley, Colonel, Western Dehra Dùn, for a contrivance for the damming of water permanently or temporarily.

No. 307 of 1896.—Pettibone, Mulliken & Co., Chicago, Illinois, for an improvement in gas generators.

No. 308 of 1896.—E. Greenshields, general foreman, I. M. R. Jhansi, for an improved trap cash-safe, principally intended for use on railways.

No. 309 of 1896.—J. P. Wright, New Haven, Connecticut, for improvements in and relating to machines for making matches.

No. 310 of 1896.—P. C. Chatterjee, E. C. Railway, Waltair, for improvements to facilitate the working of tri-colour hand signal lamps.

(During the week ended 12th September 1896.)

No. 311 of 1896.—A. G. Christiansen, Bombay, for a machine for desiccating excrementitious matter, blood, or other materials or compounds, leaving no residuum, to be called "Christiansen's desiccator."

No. 312 of 1896.—W. Martin, Agra, for a compound lever portable hand press, intended for packing and baling cotton, wool, jute, hay, fodder, and other articles.

No. 313 of 1896.—J. Stockhausen, Crefeld, Prussia, for improvements in the manufacture of acid, neutral, and basic gelatinous soaps.

No. 314 of 1896.—J. Woolford, London, for a process for extracting precious metals from refractory ores.

No. 315 of 1896.—J. H. Haycraft, Adelaide, South Australia, for an improved process for the treatment of auriferous and argentiferous ores

No. 316 of 1896.—S. H. Sharp, Leeds, York, for improvements in the manufacture of printing compositions, suitable for printing upon textile and other material.

No. 317 of 1896.—E. Claviez, Leipzig, for improvements in, and appertaining to, the change box mechanism of power looms.

No. 318 of 1896.—D. Rickie, Darjeeling, for an improved method of drying tea by electricity.

(During the week ended 19th eptember, 1896.)

No. 319 of 1896.—A. T. Rogers, Howrah, for automatically locking, protecting, and proclaiming the state of Railway points to the station officers—to be called "Rogers' combined safety swivel points locker and protector."

No. 320 of 1896.—A. Gross, Sydney, for improvements in boots and shoes.

No. 321 of 1896.—E. L. Cantwell, Calcutta, for an improved aermotor (wind-mill) for raising water and for other general purposes.

No. 322 of 1896.—J. Thompson and C. Everard, Peterborough, Northampton, for improvements in and relating to, bicycles.

No. 323 of 1896.—Pennington Motor Foreign Patents Syndicate, Limited, of London, for improvements in self-propelling road-vehicles.

No. 324 of 1896.—Colonel C. H. Peregrine Christie, R. E. Allahabad, for improvements in punkahs.

No. 325 of 1896.—Murli Dhur, Umballa, for whitening articles of buff or buck-skin leather.

(During the week ended 26th September, 1896.)

No. 326 of 1896.—Professor S. A. Bhise, Bombay, for a safety trunk to be called "Professor Bhise's safety travelling trunk and bed."

No. 327 of 1896.—J. Ghatak, Calcutta, for a punkah-pulling regulator.

No. 328 of 1896.—E. M. De Monte, Sitarampore, Bengal, for the electrical locking of doors attached to railway waggons, store rooms, or elsewhere.

No. 329 of 1896.—J. D. Hannah and W. C. Clement Peele, both of Shrewsbury, for improvements in or relating to fire grates, stoves, furnaces, and the like.

No. 330 of 1896.—J. D. Hannah and W. C. Clement Peele, both of Shrewsbury, for apparatus for registering the quantity of liquid drawn from a beer engine.

No. 331 of 1896.—S. H. Sharp, Leeds, for improvements in machinery or apparatus for producing patterns or designs on textile and felted fabrics and the like.

No. 332 of 1896.—A. G. Browning, of Flexton, and W. W. Churchill, of Manchester, for improvements in spraying apparatus for humidifying air.

No. 333 of 1896.—N. W. H. Sharpe, London, for improvements in machines for breaking balls of rolled tea leaf and sifting the same.

No. 334 of 1896.—A. D. Ezekiel, Poona, for an improved rotatory oil mill.

No. 335 of 1896.—F. Raymond, Calcutta, for protecting the contents of wine or other bottles—the invention to be called " Raymond's fraud-proof bottle."

No. 336 of 1896.—W. Owen, Brixton, for an improved manufacture of artificial stone, marble, and the like.

SPECIFICATIONS FILED.

No. 280 of 1893.—G. Betchelder, for a combined traffic and dump car. (Filed 20th August, 1895.)

No. 260 of 1895.—J. E. Whiting, Poona, for improvements of self-acting gates for water ways. (Filed 1st September, 1896.)

No. 409 of 1895.—David Smith, Bombay, for fire-bars of furnaces for use in steam boilers, heating furnaces, and elsewhere. (Filed 6th June, 1896.)

No. 114 of 1896.—A. Seigle, Paris, for improvements in apparatus for treating liquids by means of heat. (Filed 2nd September, 1896.)

No. 115 of 1896.—A. Seigle, Paris, for improvements in apparatus for treating heavy hydrocarbons by means of heat, especially applicable for distillation and the manufacture of oil gas. (Filed 2nd September, 1896.)

No. 219 of 1896.—A. L. Brumfield and William Hose, both of Strand, London, for improvements in illuminating signs. (Filed 28th August, 1896)

No. 241 of 1895.—W. D Grimshaw, Accrington, for improvements in or applicable to mechanical stokers. (Filed 3rd June, 1896.)

No. 322 of 1895.—E. L. Cantwell, Calcutta, for a machine for cleaning *simul* cotton and other fibres. (Filed 8th September, 1896.)

No. 379 of 1895.—F. J. Maden, Bombay, for an improved fibre extracting machine. (Filed 3rd September, 1896.)

No. 380 of 1895.—J. Takamine, Chicago, for improvements in and in the production of diastatic and alcoholic ferments, and the utilization of the bye-products. (Filed 1st September, 1896.)

No. 46 of 1896.—H. J. Hands, of Jubbulpore, for an improvements of arm racks for barrack rooms, armouries, etc. (Filed 3rd September, 1896.)

No. 186 of 1896.—F. Albrecht, Melbourne, for improvements in connecting devices, especially adapted for securing tubes or rods to mains, plates, or other articles. (Filed 3rd September, 1896.)

No. 211 of 1896.—E. Anderson, Lieutenant-Colonel, Bangalore, for improved commode pans to admit of the dry-earth system of conservancy being practised. (Filed 7th September, 1896.)

No. 340 of 1895.—A. Gordon, Tasmania, and the Trustees Excutors and Agency Co., Ld. Melbourne, for improvements in diving apparatus. (Filed 9th July, 1896.)

No. 60 of 1896.—T. F. Doyer, Java, for a process and machine for husking coffee. (Filed 9th September, 1896.)

No 82 of 1896.—Otto Hurschmann, Barmen, Germany, for improvements in spirit cooking stoves. (Filed 9th September, 1896.)

No. 94 of 1896.—B. Hawkins, Madras, for an improved method of packing crockery and glassware. (Filed 10th September, 1896.)

No. 140 of 1896.—J. M. Boustead, Colombo, for improved apparatus for desiccating. (Filed 9th September, 1896.)

No. 195 of 1896.—H. Arzt, London, for a new or improved construction or arrangement for the generation of electricity. (Filed 12th September, 1896.)

No. 196 of 1896.—W. F. Harnett, Kanchrapara, E. B. S. Railway, for a bottlelock clasp. (Filed 12th September, 1896.)

No. 198 of 1896.—T. Gare, Stockport, and T. S. Hardeman, merchant, Manchester, for an improvement in the manufacture of coiled lock nuts. (Filed 9th September, 1896.)

No. 254 of 1896.—J. C. W. Stanley, London, for improvements in or relating to the treatment of fish, and other, offal, or similar refuge. (Filed 15th September, 1896.)

No. 260 of 1896.—R. Sinclair, for the perfect and constant circulation of the water in marine steam boilers—to be called "the circulator attachment to marine steam boilers." (Filed 11th September, 1896.)

No. 324 of 1895.—M. Gallagher, N.-W. R., Lahore, for a billiard-table automatic game recorder. (Filed 17th September, 1896.)

No. 4 of 1896.—T. Quinlivan, Rangoon, for an invention to be called " Quinlivan's simple and unique machine for hulling paddy into clean or cargo rice by steam, cattle, or hand-power. (Filed 29th July, 1896.)

No. 51 of 1896.—W. Geipel, Kent, for improvements in steam traps. (Filed 7th September, 1896.)

No. 55 of 1896.—J. P. Rundlett, Calcutta, for automatically actuating or pulling-punkahs to be called " Rundlett's punkah motor"(Filed 14th September, 1896.)

Weaving Design.

(Specially Prepared for this Journal.)

FOR BED SHEETS OR *CHARSAS.*

56's Reed; 56 picks; 16s' warp; 16's weft (black); 50 p. c. size, drawn 1 to a heald 2 to a dent; single pick. Pattern V, i. e. to be taken half and drawn in a V form.

A Self-Feeding Loom Attachment.—In a recent issue we gave an illustrated description of the Northrop Weft Replenishing Device for Looms, which enabled the loom to be worked without stopping for putting in a new weft when the old one was finished or broken. In this case, a shuttle was used, but more recently, one Mr. R. Hunt, of San Francisco, is said to have patented a device which does away with the shuttle altogether. The improvement consists of a carrier, by means of which the machine obtains its supply of yarn from both sides of the loom, thus doing away with the necessity of the bobbin, the use of which involves the waste of time and of a certain amount of yarn. The carrier is armed at each end with pincers to hold the thread, and which takes the place of the shuttle. As the carrier flies to and fro across the piece, it draws with it the thread, which is automatically measured and cut off to the proper width, and deftly fastens it on the salvage. So well is this done that cloth made with Mr. Hunt's patent is said to be much more difficult to unravel than that made with the shuttle and bobbin. The new apparatus can be attached to any loom, works automatically, and, in the case of a thread breaking or any other mishap occurring, the loom at once stops, and a bell rings. "As far as we can judge," says the *Leeds Mercury*, "this arrangement is very similiar to one which was invented by a Mr. Bedford, of Birstall, some years ago, and applied at that time to a loom made by Messrs. Sowden & Sons, of Shipley. The English patent did not, however, meet with any apparent success, and while it does not necessarily follow that Mr. Hunt has not overcome all difficulties and objections, we must wait for more precise information before accepting finally the confident statements made in America that the old-fashioned shuttle is doomed to extinction. The Hunt Loom and Fabric Company inform us that they intend bringing one of their machines over to England before the year is out."

The Indian Factories Act.

THE following are extracts from the Government Inspectors' Reports on the working of the above Act during 1895.

MADRAS PRESIDENCY.

The gradual increase in the number of factories at work noticed in the Review for 1894 continued, the total reaching 75, as against 69 in 1894, 67 in 1893, 46 in 1892, and 32 in 1891. The daily average number of operatives fell from 28,609 in the previous year to 28,280 during the year under review, the slight decrease being probably due to the fact that some of the factories were not at work throughout the year. The Reports of the Inspecting Officers continued to be very generally satisfactory. In almost all cases the sanitary condition of the factories was favourably reported upon and the general health of the operatives stated to have been good. As usual, the wages earned by factory labour compare favourably with those of ordinary agricultural labours. There were 2,543 women and 1,764 children at work in 1895, as against 3,174 and 1,751, respectively, in 1894 and 3,285 and 1,593 in 1893. The fencing of machinery is reported to have been generally satisfactorily effected, and the number of accidents fell slightly, from 236 in 1894 to 218 in 1895. According to Mr. Simpson's report the wages of operatives in the town of Madras are higher than those earned by coolies, carters and domestic servants, and that employment in factories is preferred, as it is continuous and more reliable, and there is no distinction of caste, creed, and classes. Mr. Simpson adds that the time is not far distant (as these industries develop), when some difficulty will be experienced in securing domestic servants, as the children of such classes are fast obtaining employment in the different departments of the mills.

CENTRAL PROVINCES.

During the year 1895 the number of factories working in the Central Provinces increased from 26 to 28. 20 of these were directly concerned in the preparation or manufacture of cotton. The average daily number of hands employed was 9,574, against 9,010 in the previous year, and of these only 750 were children. The operatives are evidently satisfied with their work and wages, for they readily desert agricultural labour for employment in the factories. Their health and the sanitation of the premises on which they work are in general carefully considered.

Boiler Inspection in the Bombay Presidency.

THE following Resolution has been issued by the Bombay Government on the report on the working of the Boiler Inspection Department for the year ending 31st March 1896 :—

The noticeable events of the year were the extension of the Bombay Boiler Inspection Act, 1891, to the districts of Thar and Parkar and Shikarpur in Sind, and the publication of new rules relating to certificates and examinations of Mechanical Engineers. Mr. T. Drewet, Senior Inspector of Steam Boilers and Prime Movers, was on sick leave during the entire period. With the exception of a few days, during which Mr. Shore acted as Senior Inspector, the office was held by Mr. Lewis.

The total number of boilers on the registers of the Department for the Presidency Proper and Sind was 1,830, or 102 more than in the previous year. Of these, 619 were inspected in Bombay and 650 in the Mofussil. The remaining 561 boilers were reported by their owners as either not in use, broken up, or removed from this Presidency. Forty-four boilers were inspected more than once.

Two prosecutions were instituted in Karachi for breaches of the Act. In both cases the accused were convicted and fined.

The total receipts of the Department amounted to Rs. 47,913-6-10, while the expenditure was Rs. 33,250-10-8. The total balance to the credit of the Steam Boiler Inspection Fund at the end of the year amounted to Rs. 71,551-12-9, exclusive of a sum of Rs. 30,013-12-4 representing the purchase value of Government promissory notes of the nominal value of Rs. 27,600. The Collector should be requested to communicate his remarks regarding the Inspectorial staff to Mr. Drewet, if he has not already done so.

During the year 314 candidates were examined for competency certificates under Section 21, and 28 for certificates of service under Section 23 of the Act. Twenty-one candidates were either declared ineligible or were absent from the examinations.

His Excellency the Governor-in-Council is glad to receive the assurance of the Collector of Bombay that Mr. Lewis, Acting Senior Inspector, carried out his duties with energy. The work of the other Inspectors was also satisfactory.

Indian Notes.

IT is proposed to start a Metal Manufacturing Co., at Delhi, with a capital of Rs. 1,00,000 divided into 1,000 shares of Rs. 100 each.

THE Ginning and Weaving Factory opened by Mr. Ram Saran Das, at Lahore, is expected to work in about a month's time.

MR. R. E. ENTHOVEN, I.C.S., Second Assistant Collector, Bombay, has been granted privilege leave of absence for one month.

UNDER orders from Government the Collector of Customs, Calcutta, has discontinued the Registration of Trade Marks.

MR. MUGANLAL SHROFF is appointed Weaving Master, in place of Mr. S. Parkington at the Khatau Makanji Mills.

THE 200 looms which had to be stopped working at the Jafferally Mills, Surat, will be started again from the next month.

MR. CURSETJI RUSTOMJI is appointed Engineer at the Madhowji Dharamsi Mills, *vice* Mr. Nusserwanji Dorabji Jassawalla, resigned.

A LIBRARY of Mechanical and Scientific Books will be shortly opened for the use of the students at the Victoria Jubilee Technical Institute, Bombay.

IT is reported that the Chital Ginning Factory, belonging to Messrs. Prabhashanker Venishanker & Co., of Bhownugger, has been sold for Rs. 45,000.

THE sale by auction of the Baroda Spinning and Weaving Mills has been fixed to take place on the 20th instant in the office of the Dewan Saheb, Baroda.

MR. THOMAS MILLS, Manager, Empress Mills, Bombay, has joined the Star of India Mills in the same capacity, Mr. S. Watson succeeding him at the former place.

THE new Ginning Factory now being erected at Khangaum by the Agents of the Central India Spinning & Weaving Co., Ld., is expected to work during the next season.

MR. TEMOOLJI DHANJIBHOY is appointed Manager at the Queen Mills, in place of Mr. James Cottam, deceased. Mr. Temoolji is one of the oldest Mill Managers in the country.

MR. SORABJI M. BHARUCHA, Weaving Master at the New Great Eastern Mills, Bombay, has been promoted to the post of Manager in place of Mr. Framji B. Billimoria, resigned.

MR. BEZONJI DADABHOY, the Manager of the Empress Mills, Nagpur, who returned last month from a short holiday trip to Europe, has resumed charge of his post.

A NEW Ginning Factory is being erected in Songhad, in the Kathiawar district, where there are already over a hundred similar concerns. The increase has been nearly 50 per cent. since 1890.

THE Jamna Mill Co., Ld., has been projected at Delhi with a capital of Rs. 12,00,000 for the manufacture of jute and cotton. Lala Luxmi Narayan, the wealthy merchant of the place, is the manager and director.

AN evening party was given on the 23rd ultimo by the leading citizens of Ahmedabad to the Hon'ble Mr. Runchorlal Chotalal, C.I.E., on the occasion of his nomination for the third time as a member of the Legislative Council.

MR. SADDON, Assistant Collector of Surat, is reported to have engaged a farm in Gujerat for the cultivation of Egyptian cotton. A Parsee gentleman, named Mr. Dinshaw Dadabhoy, is also reported as carrying on experiments in the same direction in districts near Broach.

THE case in which Mr. Atmaram Soorajram sued the Agents of the Whittle Cotton Manufacturing Co. for Rs. 4,150 as salary due for wrongful dismisal during the period of his agreement, was dismised by the Sub-Judge of Broach.

MR. HORMUSJI N. VIRAJOGI is appointed Weaving Master at the Oriental Mills, Colaba, in place of Mr. Shavakshaw Sorabji Dustoor Kamdin, resigned. Mr. Kamdin's services have been engaged by the Jafferaliy Mills, Surat, from the 1st proximo.

A DESTRUCTIVE fire is reported as having taking place at the Jute Mills at Juggernathganj, near Naraingunge, belonging to Messrs. Ralli Brothers and Birkmyre Brothers. Damage to the extent of four lakhs of rupees is said to have been done.

IN view of the approching dry weather, orders have been received by Messrs. Macbeth Bros. & Co., Bombay to fit up the Vortex humidifiers at the Sholapur Mills, the Poona Cotton and Silk Mills and the Ahmedabad Manufacturing and Calico Printing Co.'s Mills.

The latest orders received by Messrs. Meldrum Bros., for their Patent Furnaces are for the Badnera and Bellary Mills. The Furnace is giving excellent results at the Gulburga Mills, the Empress Mills at Nagpur, and at Messrs. E. D. Sassoon & Co.'s Mills, Bombay, as also in Calcutta and at several of the Indian coal fields.

THE foundation stone of the Globe Mills was laid this morning at Parel, Bombay, the ceremony being performed by Mr. Jijibhoy Petit. The scheme is the outcome, to a great measure, of the untiring energy and enterprize of Mr. Ratanshaw Dadabhoy of the well-known firm of Messrs. Sorabji Shapurji & Co., engineers and machinery merchants of this city.

MR. A. M. DOWNS, Manager of the Bowreah Cotton Mills, Calcutta, whose marriage with Miss Jessie A. Kraal took place on the 12th ultimo, left that city on the 15th idem *en route* for a trip to Europe. Before their departure Mr. and Mrs. Downs were the recipients of some costly presents from Messrs. Kettlewell, Bullen & Co., the agents of the Company, and also from the assistants of the mill.

AN enterprising gentleman, with a view to improving the means of communication between Surat and the upper districts of the Tapti, has ordered a stern wheel paddle steamer to carry cargo and passengers and to tow barges. The steamer will be of very shallow draft, about 65 feet water line and 12 feet beam. Messrs. Macbeth Bros. & Co. have the contract in hand to build and launch the steamer.

THE Goolam Baba S. & W. Co., Ld., have recently ordered through Messrs. Macbeth Bros. & Co., a tandem compound condensing engine to develop 250 I. H.-P. to work in conjunction with their present tandem engine. The same firm of machinery agents have also secured orders for two boilers for the Assur Veerjee Mills, Ld., 30ft. by 7 ft. 6 ins., indicating 180 lbs. pressure), also boilers for the Swadeshi S. & W. Co.'s Ginning Factory in the C. P., also from Mr. Ishwardas Jugjivandas and the Amroli Vepar Ootyjak Ginning Co.

WITH regard to the question raised by the Government of Bengal whether card cans used in cotton mills should be charged with import duty as hardware under No. 13 of Schedule IV. of the Indian Tariff Act, or be held to be exempt under No. 14 (*a*) as component parts of machinery used in the spinning of cotton, it has been notified that these articles are not component parts of machinery; nor is the principle applicable to them which governs the exemption allowed in respect of stores used in the weaving of cotton, for these articles are not used for that purpose. They are, therefore, chargeable with duty as hardware.

WE have received samples of soaps manufactured by the Chiswick Soap Co., of London, for use in cotton, woollen, silk, and other textile factories. We have pleasure in testifying to the superior quality of the soap which is now being introduced for the first time in this country by Mr. A. Jas. Buncher, of Hummum Street, Bombay, who is agent for the makers. The soaps of the Chiswick Soap Co. are being very extensively used in Europe, and considering their purity and economical properties, we have no doubt they will find favour amongst weaving masters, bleachers, and others in this country.

MR. A. S. NARIELWALLA one of the largest mill store suppliers in Bombay, is introducing a new sizing wax for cotton warps and preventing mildew in cloth. Several advantages are claimed as accruing from the use of this article, the ingredients used in its preparation being guaranteed as quite harmless. From reports we have received from users of the article we can recommend it as one of the good preparations now being offered. Dr. Collis Barry, the Government Analyser, writes very favourably of "Palmin" which is the trade name Mr. Narielwalla has given to the Compound.

SUN-HEMP is found in large quantities in the Province of Burma. A sample sent to the Imperial Institute for examination has been most favourably reported on, with the remark that it would sell freely on the London Market. The fibre is strong, bold, and clear, of a somewhat dull colour, and 36 to 40 inches in height. Its value is fixed at between £16-10 and £17 a ton, or more by £2 or £3. Messrs. Puddy and Co. reported that the fibre would be quite saleable on the London Market, and stated that if they had a shipment in hand they could obtain from £16 to £16-10 per ton for it. The *hibiscus cannabinus*, which this hemp closely resembles, has been proposed as a substitute for jute in some districts of India, where the latter is not cultivated, and is found to be superior to jute of average quality. It is evident, says the *Bombay Gazette*, that the much-talked-of rhea fibre will have a good many rivals in the market.

MESSRS. SHAW, WALLACE & Co., of Calcutta, have issued the prospectus of a proposed company named the Bengal-Nagpore Cotton Mills Co. The capital is fixed at Rs. 6 lakhs, half 7 per cent. preference and half ordinary shares, and with 4 lakhs of debentures at 6 per cent. The Cotton Mills to be acquired is situated at Rajnandgaon, in the Feudatory State of that name in the Central Provinces. It has been built at a cost of 8½ lakhs, and contains 3,864 spindles and 156 looms, with buildings and power sufficient for 15,000 ring frame spindles and 230 looms. The Rajah, who built the Mill, will now sell it for 6 lakhs, subject to a royalty of 25 per cent. on all net profits in excess of 10 per cent. on the share capital; there is an octroi on all imports of yarn and goods imported, which is to be raised to 6¼ per cent., but all goods produced at the Mill will be exempt, and no other Cotton Mill will be permitted to be erected. According to *Capital*, it is possible to arrange that the land on which the mill stands shall be made British territory, while still preserving the advantages of the octroi above referred to.

WE have received a copy of the prospectus of the Khandeish Press Co., Ld., which has been started with a capital of Rs. 60,000 divided into 240 shares of Rs. 250 each. The object of the promoters is to build a cotton pressing factory, at Chopda in Khandesh, a large cotton centre, where the necessity of a Press has been long felt. Chopda is at present 40 miles from Jalgaon Station on the G. I. P. R., but when the Tapti Valley Line comes to Amalner, the distance from the railway will only be about 20 miles. The whole of the machinery will soon have left England, and it is expected that the factory will be ready in time for this season in December next. We have been informed that the shares have been nearly all subscribed at the full value. The cotton press is on the half press and finisher principle made by Messrs. Henry Berry & Co., of Leeds. The Agents of the Company are Messrs. Drewet, Chowna & Co., of Bombay, whose commission has been fixed at 10 per cent. on the nett profits, instead of on the gross income as is usual with similar concerns. The business is in experienced hands, and we wish it success.

THE HON'BLE MR. N. N. WADIA, C.I.E., Honorary Secretary, Victoria Jubilee Technical Institute, Bombay, is inviting applications for the post of Principal, *vice* Mr. J. P. Phythian, deceased. The salary commences with Rs. 800 per mensem, rising in five years by annual increments to Rs. 1,000. The course of instruction for Engineering classes at the Institute lasts for three years and embraces working drawings of various parts of machines, and the making of patterns from them; instruction in smithy work and on all tools and machines used in engineering workshops, together with general fitting up and finishing of machines. The course of instruction in Cotton Spinning and Weaving also lasts for three years, and includes practical work on each of the machines in actual use in cotton spinning and weaving factories; fitting together and erecting of the several machines, working them, making necessary changes and practice in the selection and mixing of different cottons; the preparation for and weaving of plain and fancy cloths. In conjunction with both the departments there are separate classes for machine drawing—free-hand and to scale; lectures on steam and the steam-engine, on mechanics, sound, light, heat, electricity, and magnetism as specially applicable to students attending either of the two practical departments.

THE following dividends have been declared since the publication of our last issue :—

Name of Mill.	Dividend.	For
Alliance Cotton Mfg. Co., Ld....	Rs. 40 per share,	½ year ended June 30.
Bowreah Cotton Mills	5 per cent.	„ „
Breul's Cawnpore Cotton Press Co., Ld.	Rs. 16 per share,	year ended Aug. 31.
Hongkong S. & M. Co., Ld. ...	„ 50 „	„ ½ year ended June 30.
Indian Cotton Co., Ld.	„ 12½ „	„
Indian Mfg. Co., Ld.	„ 50 „	„ „ „
Lakhmidas Khimji S. & W. Co., Ld.	„ 50 „	„ „ „
Mahaluxmee S. & W. Co., Ld...	„ 30 „	„ year ended June 30.
Mahuva Press Co., Ld.	„ 20 „	„ „ „
New Berar Co., Ld.	„ 60 „	„ „ „
Soonderdas S. & W. Mills Co., Ld.	„ 50 „	„ ½ year ended June 30.
Sun Mills, Limited	„ 20 „ (on fully paid shares)	„ year ended June 30.

WE learn, says the *Karachi Chronicle*, that Mr. Jamsetji Tata, of Bombay, has enquired of the Karachi Municipality if they would lease him an acre of land from sewage farm for the purpose of conducting some experiments in growing Egyptian cotton, and on what terms. Mr. Strachan is of opinion that the sewage farm should not be given out to private individuals. We daresay Mr. Strachan must have sufficient reasons for holding the opinion he does, but it is a matter of public and general importance that we should be able to produce the best descriptions of cotton. One of the drawbacks to the introduction of spinning and weaving mills in Karachi is that the cotton marts are not adjacent, and that it is expensive bringing long staple cotton from distant markets.

IN our note, last month, on "Dividends Declared" at page 308, through printer's oversight, the sign of per cent. was repeated against several mill companies, whose dividends ought to have been stated as so many *rupees per share* instead of per cent. We herein give a corrected statement,—

Name of the Company	Dividend.	For
Alcock, Ashdown & Co., Ld.	10 per cent.	½ yaer ended June 30
Akote Cotton G. & P. Co.....	Rs. 55 per share	year ended June 30
Aurangabad S. & M. Co., Ld,	„ 60 „	„ ½ year ended June 30
Empress of India Cotton Mills Company, Limited...	„ 10 „	„ „
Framji Petit S. & M. Co., Ld.	„ 30 „	„ „
Jivraj Balloo S. & W. Co., Ld.	„ 20 „	„ „
Madras United S. & W. Mill Company, Limited.	„ 100 „	„ „
Maneckji Petit Mfg. Co., Ld.	„ 100 „	„ „
Mazagon S. & M. Co., Ld....	„ 5 „	„ „
Samnugger Jute Co., Ld.	4 per cent	„
Sassoon S. & W. Co., Ld. ...	Rs. 50 per share	„
Sassoon & Olliance Silk Mill Company, Limited	„ 30 „	„ „
Sassoon Pressing Co., Ld....	„ 10 „	„ „
Southern Mahratta S. & W. Company, Limited.....	„ 12½ „	„ „
Titaghur Jute Co., Ld..	3 per cent (ad interim).	
Victoria Jute Co., Ld.	4 „	„ „
Wadhwan City G., P. &. Mf. Company, Limited	Rs. 15 per share,	year ended June 30.

THE Secretary to the Government of India, Finance and Commerce Department, writing to the Secretary to the Government of Bengal, Financial Department, in a letter dated the 5th September, on the question whether the marking of Japanese copper ingots with the letters "K. S.," unaccompanied by an indication of the country of origin, should be held to constitute an infringement of section 10 (1) (*e*) of the Indian Merchandise Marks Act, 1889, says: I am to say that the ruling contained in the instructions appended to the Resolution of this Department No. 2914, dated the 6th July, 1896, that, when such articles as bars of iron or steel of other than English origin have English words stamped or marked on them, such words should be required to be accompanied by an indication of the country of origin, cannot be held to apply to such articles or to titles or ingots of other metal which have only letters marked on them. Such letters are not exclusively English being common to all nations who use the Latin alphabet, and their use by manufacturers in preference to letters of any other alphabet cannot reasonably be prohibited whatever the origin of the article. The Government of India, therefore, agree in the opinion of the Board of Revenue and the Government of Bengal that the stamping of Japanese copper with English letters is not, if unaccompanied by an indication of origin, an infringement of section 10 (1) (*e*) of the Indian Merchandise Marks Act. The case is different, of course, if the letters are so devised or arranged as to be an imitation of a trade mark.

NOTES FROM PONDICHERRY.

Mr. David Templeman, Director of the Societe Industrial de Cossepalleom, has been transfered to Tuticorin. Mr. Templeman represented the Company for nearly three years, during which period he placed the concern in the very front rank of industrial establishments in the district. Mr. Hunter, of Madura, succeeds Mr. Templeman. Definite arrangements have been made, says our correspondent for opening a professional class in the Calve College. The subjects to be taught are Carpentering, Smithy Work, Fitting, Art and Design. This new departure is the first step towards technical education in our colonial system of education, and every person who has the welfare of the colony at heart will wish the movement success. It is a very hopeful sign of better days for French India.—One of the largest Cotton Mills in Pondicherry has sustained a loss of nearly two lakhsof rupees.

The Working of the Indian Cotton Duties Act in the Bombay Presidency.

THE following is the Official Statement of Dutiable Cotton Goods produced under the Cotton Duties Act II. of 1896 in the Weaving Mills of the Bombay Presidency, and Duty realized during the months of February and March, 1896:—

Description of Goods.	Quantity Produced in February.			Quantity produced in March.			Amount received.
	lbs.	oz.	yds.	lbs.	oz.	yds.	Rs. a. p.
Chadars	134,182	0	418,221	257,685	12	703,094	.....
Dhutis	452,341	10	1,998,949	894,592	6	3,882,828	.....
Drills and Jeans...	50,428	6	195,071	75,706	14	265,933	.....
Jaconets	... ...	...	.....	8	8	44	.....
Madapollams ...	34,840	8	133,649	58,389	4	2,74,911	.....
Printers	7,702	14	35,513	46,537	10	202,059	.....
Sail Cloth ...	.....	...	.....	16,173	0	40,014	.....
Shirtings and Longcloths ...	965,832	12	3,385,390	1,849,490	15	6,689,370	0 2 6
T. Cloths, Domestics and Shirtings	489,414	2	2,147,958	1,252,456	9	5,465,703	21 10 4
Table Cloths ...	3,950	0	6,660	.....	...	.....	.....
Tent Cloths	.....	...	.....	23,522	0	42,391	.....
Towels and Napkins	6,159	1	17,693	24,673	2	58,974	.....
Khadi and Dungari	4	8	10	13,096	8	70,245	.....
Zanzibar Cloth ...	255	0	960	10,148	0	41,590	.....
Fents	3,444	5	15,498	15,583	4	70,123	.....
Total...	2,148,555	2	8,365,572	4,538,063	12	17,807,279	21 12 10
Fancy Goods ...	254,513	3	.....	566,612	15	.....	174 4 7
Hosiery (in dozs.)	300	0	.....	954	...	.....	.....
Do. (in lbs.) .	1,531	0	.....	5,200	3	.....	.....
Goods of other descriptions ...	565	14	.....	1,698	14	.....	.....

NOTE.—This statement does not include cotton goods exempted under Section 41 of Act II. of 1896.

Notice to Subscribers.

WITH the present number we begin Vol. VII. of the *Indian Textile Journal*. Subscribers who have not paid in their subscriptions for the year ended 15th September, 1896 are requested to remit the amount without delay.

A Complete Index of the Contents of Vol. VI., including Classified List of Advertisers, is issued herewith.