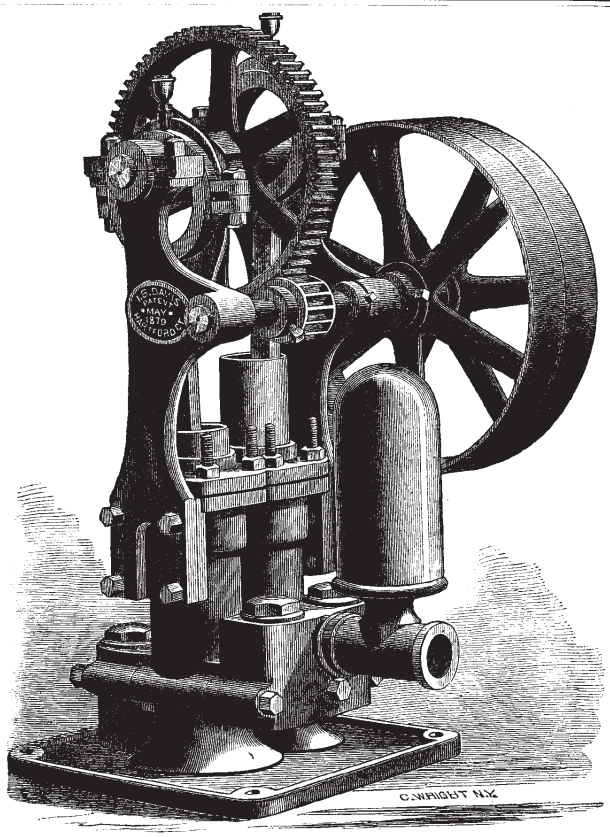
ECONOMIC DUPLEX BOILER FEED AND TANK PUMP.

THE accompanying cut represents an improved pump, patented May 29th, 1879. It is an established fact that the most economic of all methods of supplying boilers with feed water is by the use of a pump driven by a belt. The economy is much greater than is generally supposed.

The "Economic," as the inventor calls it, is designed to supply a cheap, durable pump, economical in its workings, and not liable to get out of repair. As will be seen by the cut, it is a double pump, driven by a single set of gears. All the parts are made heavy and well finished. The valves, the only part that can get out of repair, are made separate and distinct from the pump, and are attached to it by bolts. They can be got at by unscrewing a brass cap, and in case of an accident a duplicate can be put in its place without disturbing any other part of the pump, as they are made interchangeable in all their parts. It is complete, ready to run by attaching the water pipe to and from it, and putting on driving belt. The gears being made from cut iron patterns, and the pump being double-acting, makes its action much smoother and quieter than any other geared pumps. It is especially valuable in sandy water. It is stated that the cost of the pump is below others of equal capacity and workmanship. Further information may be had of H. T. Brewster, 97 Liberty street, New York; 32 North Fifth street, Philadelphia, Pa.



ECONOMIC DUPLEX BOILER FEED AND TANK PUMP.

CRAIG'S HYDRAULIC GOVERNOR.

THE action of this governor is derived from a positive delivering force-pump, pumping a fluid under a weighted piston, and through a given opening, which may be increased or diminished to change the speed of the engine, the weighted piston rising and falling by the action of the pump to regulate the supply of steam to the cylinder.

By reference to the sectional cut, the operation will be readily understood by the following brief description:—

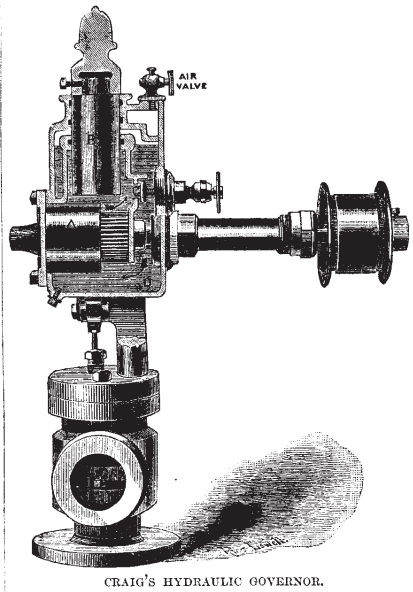
The pump, A, consists of two pistons and two operative gears attached to them and enclosed in a closely-fitting case. The oil (with which the governor is filled) is drawn by the pump from the reservoir D, and forced up against the piston B, and through the valve C into the reservoir, to be used over again.

Any increase of speed produces more oil in the piston-chamber than can be forced through the valve C by the weight of the piston B and its immediate connections to the steam valve or valves. Therefore piston B is forced upward, cutting off the supply of steam, and the engine is brought to the same speed as before. Any decrease in the speed would produce a reverse action of piston B, the settling down of which supplies more steam to the engine. By opening valve C, the engine will run fast; by closing, slower.

The air-valve is opened or closed to prevent over-action or jumping, so common among other governors. It is also removed to fill the governor with oil.

The advantages gained by this pump are:—

1. Perfect regulation under all conditions of labor so long as there is any surplus steam.
2. The admission of full steam pressure, if necessary to do the work.
3. Twice the durability of any other governor, therefore making it the cheapest in use.
4. This governor is perfectly balanced, and no springs used in its construction.
5. Almost unlimited power.
6. Perfect lubrication of the working parts, insuring the greatest possible durability.
7. Has not one-fourth the friction of any other governor, making it very sensitive to the slightest change of speed.
8. The engine will run the same speed with a load as without, giving a larger product of work, and making a direct saving of fuel.
9. Has a perfect, adjustable speed, giving the widest range either way from the regular speed of any known device.
10. Does not compress any springs or close the steam passage to change the speed, but will admit full steam pressure with one speed as well as another, if necessary to do the work.
11. Has a positive automatic stop or check, in case of the breaking or slipping off of the belt, if required.
12. Requires less care than any other governor, and is not liable to stick.



CRAIG'S HYDRAULIC GOVERNOR.

DEPRESSION IN THE WORSTED TRADE.

THE revival in trade that has taken place generally throughout the country has not extended to the worsted district of the West Riding of Yorkshire to any appreciable extent. It is true that there is more business being done than there was twelve months ago, and this is due to the results that follow upon a good harvest. But the chief articles of manufacture are in as little demand as they have been for a long time, nor does there appear to be any indication of a different state of things. The condition of the Bradford trade excites very gloomy apprehensions in the minds of thinking men, and unless the causes of the present depression are clearly understood, and effectual steps are taken to remove them, it certainly appears inevitable that trade will become worse and worse. Many and various are the reasons assigned by manufacturers and merchants for the present torpid state of trade. There can not be any doubt that hostile tariffs have much to do with the depression that exists, and a retrograde policy is advocated by some persons, who, while they shrink from the adoption of protection, yet urge its principles in the form of reciprocity. It may be granted that much can be truly said in favor of these views, but against them is the stubborn fact that the manufacturer, merchant, and retail dealer all unite in the opinion that the imposition of a protective duty would give relief to a very limited extent, if any at all, and that, to use a familiar expression, the game would not be worth the candle; while to close our markets to foreign buyers who would not reciprocate our free-trade action would be simply suicidal. Other persons contend that the difference in the hours of labor and rates of wages here and abroad unduly handicap our manufacturers; but, while the existence of this evil may be readily acknowledged, and its ill effects fully recognized, it is not sufficient to account for the dullness of trade. Neither can the assertion that the present race of manufacturers are behind their fathers in the indomitable perseverance that overcame obstacles, and the never-failing industry with which they carried on their business, be admitted as accounting for the falling-off in business. It is not seldom that the remark is heard that trade is going to the dogs because young men will not stick to business, but when the charge is examined it is at once seen to be baseless. The mere fact of a manufacturer being at his work at early dawn, and remaining till dewy eve, while it may be evidence of his devotion to business, is no evidence that the business is better conducted by mere plodding on with work in an unintelligent, ignorant way, working in the old grooves, and being suspicious of all changes, which are the characteristic of the majority of the old school of early and late manufacturers. As there has been a revolution in the material machinery of production, so has there been a revolution in the mental machinery that is the soul of the factory, and the use of mind necessitates shorter periods of actual presence within the walls of the mill, and periods of relaxation unnecessary to men whose brains were unracked by the study of new inventions and processes, which no manufacturer can now neglect. But these and other alleged causes we must pass by at present, though it may be desirable to examine them more closely before long. In the present article we desire to direct attention to one cause which everyone admits, but whose importance is not generally recognized—we mean the supplanting of Bradford stuffs by French dress goods.

We start with the assertion that French goods are now in general demand, to the exclusion of the stuff goods of Bradford and the surrounding district. No one can dispute this statement, for it is patent to every observer, whether in the trade or not. How has this arisen? The shallow thinker at once replies that it is owing to the vagaries of fashion. "But who (it has been pertinently asked) controls the fashions? Is the wife of the manufacturer who has acquired wealth by the orthodox Bradford trade proof against the allurements offered in a tempting display of French 'soft goods,' or, descending lower in the social scale, is the mill girl, who has 'felled' her last piece for the present of bright-hued mohair, disposed to forego the desire to emulate her superiors in order that she may get her loom back again?" Fashions ever vary, and the French goods may have to give way to their Bradford rivals, which may once more become the rage. Yet it must not be overlooked that this almost complete change in the demand has not been sudden or unforeseen, and a return to the use of stuffs would not bring about a corresponding demand for Bradford goods. Let us examine the matter a little closer, and then we may possibly approach the true cause and discern the only remedy; at the same time we disown mere dogmatism, and recognize that other influences are in operation, although we are inclined to place them in a subordinate position.

It is only by the aid of figures that we can realize the inroads of French manufacturers. For our present

purpose our statistics need not be numerous, and the following will suffice:—In 1878 the value of the imports of worsted and woolen goods from France into this country amounted to £1,447,608, the next year to £2,172,643, and this year to £3,039,617. These figures tell their own tale of the effect of the French importations upon the Bradford trade. For many years the Bradford manufacturers almost stood alone in the manufacture of plain and fancy stuff goods, and for alpaca and mohair they were without rivals. These goods were used chiefly by the masses, but rich ladies, even when the Bradford trade was at the height of its prosperity and popularity, continued to prefer French merinos and German mixed goods; and although this preference was seen to be a source of danger, yet trade continued to be so good that it was overlooked and neglected. In course of time the purchase of French goods began to be made by classes lower and lower in the social scale, and Bradford men now admit that they have themselves contributed to bring about the change to their own injury. There is much to be laid to the charge of the dyers and finishers generally. We are not making an offensive remark when we say that a great deal of the dyeing operations in Bradford, even now, are carried on in a thoroughly unscientific manner, and the result is seen in their productions. When the British Association last met at Bradford, the members were not invited to inspect some of the principal dye-works; their owners declined on the ground that they did not wish to disclose their processes, but specialists affirmed that the doors were closed because the processes were behind those of other countries. This point we do not attempt to decide, but this we know, that there are many persons who, much against their will, prefer to buy French goods rather than Bradford grays, and have the onus of their being spoiled by the dyers. But we must take our subject a step further. No sooner does a particular fabric come into fashion than there is a desire to reproduce it in a cheaper form, for the use of the public at large, according to their means of purchase. Now mohair and alpaca goods are peculiarly suitable for this treatment. At the outset they were most attractive, from their lightness and brightness. It was not long before a common class of goods came into use for wider consumption, and then, as is always the case, the rulers of fashion turned their attention to other materials, and gave their allegiance entirely to French all-wool goods. Still the Bradford trade continued to progress, until manufacturers themselves retarded its progress and hastened its downfall. Cheaper and cheaper were the goods manufactured, and the attractiveness of their appearance was increased by the introduction of new colors. Herein was the cause of failure. Not only were the goods brought within the reach of the humblest purchaser, which by itself would have destroyed the manufacture of higher class goods, but the colors were unwearable. The various shades so attractive in the shop window were found to fly after a few days' exposure, and the entire trade became neglected. Meanwhile, what have the French manufacturers been doing? They have not interfered with their world-renowned merinos and cashmeres, but they have produced an all-wool material, pleasing in design, enduring in texture, and low in price, which, admitting of many variations, will continue to be a formidable rival under any circumstances, and despite the vagaries of fashion, to the alpacas, mohairs, and worsteds of Bradford.

What is the remedy? Is it necessary that Bradford should continue to manufacture an unmarketable commodity? The reply seems to turn upon the use of machinery. At the present time the Bradford mills are fitted with the "throstle," while the French spinners use the "mule-jenny," and, as every one knows, the latter is best adapted for spinning the finer sorts of yarn. The introduction of new plant on a large scale is at all times a considerable expense, and it is not surprising that manufacturers in times of depression are loth to bring about a revolution in their business, and take a departure in unknown ventures. But there seems no other help for them. A few firms have already taken a middle course, and have adapted their machinery to the manufacture of all-wool goods, but the outcome is not satisfactory. In many ways the work produced is far below that obtained by the French machinery. It is true that our machinists have overcome greater difficulties than those involved in the problem of adapting the present machinery to produce the goods required, and with sufficient capital to support them the work may be accomplished. And, after all, it is a question of cost, whether the old machinery is altered or new substituted. The Bradford manufacturer who resolutely faces the facts that are staring at him, and no longer waits for the returning tide of fashion to set in, but with the like intelligence and perseverance that has overthrown foreign competition in other departments of trade, meets the Frenchman on his own ground, with his own weapons, will reap results whose brightness will not pale even when placed aside of the giant successes of his fellow-towns men in untrodden paths as difficult and wearisome as those he has now to tread.—*The English Textile Manufacturer.*

Textile Designs.

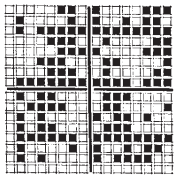
FROM the outside to the inside of the wool fibre is not a very long distance, measured as the crow flies. That there is an inside, or that the fibre is tubular, is as certain as it is a fibre at all, and that it contains a liquid, having important chemical attributes, is as indisputable as that which affixes itself to the outside.

Our remarks hitherto have had regard to the *outward* natural grease, so as to form a basis as to the best means of dissolving and removing it to fit it for its purpose in the process of manufacture. There are means which can be used to effect this, all more or less violent, the extremes of which result in destroying the elasticity of the fibre, rendering it dry, crisp, and unwelcome to the hand, which goes to prove the fact that the inside liquid has been disturbed, and partially or wholly destroyed in its essential properties. We will call this central fluid, "vital oil," which will suggest the course of our remarks.

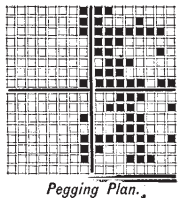
We may reasonably ask what becomes of anything when its vitality is impaired or destroyed? In plain language we say that it is decayed; and that it has lost the power of asserting its individuality, and becomes mere passive, inert matter. We have not by us just now any chemical analysis of the vital oil, and therefore we must look at the subject from a common-sense point of view. Let any one take a simple human hair, for instance, which is also tubular, and examine it with reference to this matter of oil. By the aid of the microscope we find a natural grease without, and also a natural oil within, that is, on healthy hair. Now, when these liquids are dried up and the canal of the hair is inoperative, the oil not passing through it, from some physiological derangement, it becomes dry and unpliable, and in the end bleached. Compare this with one where all the forces are at work, and which perform their functions healthily and properly, and it will be seen that these oils are essential to proper development, growth, and luxuriance. So with that of the wool fibre, the retention of this interior oil is necessary, absolutely so, to its best development and manipulation, and its destruction is nothing less than the annihilation of a force on which we rely for the accomplishment of certain results.

Take "slipe wool," that which is taken from the animal after death, by means of lime, this is not improperly called "dead wool," and most manufacturers know of what little use this class of wool is as a leading factor in the "blends." Like other dead matter it is buried, that is, if properly used in proportion to its value, it is buried beneath the superabundant weight of well-grown and healthy wool, and other combinations of materials, where it gives nothing of itself to the strength, elasticity, or brilliance of the yarn and cloth, but it certainly adds its "dead weight" as some compensation for its presence, and as a reward for its "handicapping" proclivities. It will appear from this that the wool is dead, because not only are the outward fatty matters destroyed but the inward oil has also been withdrawn, or stagnated in dissolution. True, this dead wool is taken from the defunct animal, but what we are contending for is that it is quite possible to bring living wool to the same state, more or less according to the means used, if the vital oil be destroyed in its essential elements. That this interior oil is necessary to the growth and perfection of the wool fibre may be demonstrated by the fact of its canal being filled with it, and that its absence has such an exhaustive effect on its character. This vital oil is to the fibre of wool what sap is to the twig, the branch, the tree, and its utility for commercial purposes. There can be no doubt of the sympathy which exists between the outward and inward greases, and that they are reciprocal in their action upon each other, and upon the treatment of the former depends in an important degree the state of the latter, and the character of the wool in view of ultimate requirements. The experiment can easily be tried as to the effect produced on the fibres of wool by the extraction of the interior oil, which will not be unprofitable to the student in his acquirement of knowledge in this direction. Suppose, first, that we take any given weight of good, sound, healthy wool, and subject it to a "scour," or cleansing, consisting simply of ammonia (stale urine), assuming that it is treated in a manner which can not be improved upon. After being perfectly dried it is again weighed, and we find that it has lost certain proportions of its original weight; this must be carefully noted, even to the dram. Now let it remain in some cool place, *away from damp*, say for a day or two, after which weigh again, when it will be found to have gained somewhat in weight, or what is commonly understood as "coming back again." This means, that it again fills itself to its normal state, minus the outside grease, showing health, soundness, and giving some resistance to the hand, it is prepared for its subsequent operations. Take a similar quantity again, from the same wool, and subject it to the most violent treatment possible, say, with an overdose of a strong solution of alkali, and pursue precisely the same course as to drying, weighing, rest, and re-weighing, and note its appearance, handle, and elastic features, and it will be found that all these particulars are the reverse in quantity and quality to those of the former sample. The wool will be clammy, heavy, lifeless, and without spring, indicating the "outrage" it has been subjected to at the hands of some ignorant operator, who relies more upon force than he does upon reason for the accomplishment of his object.

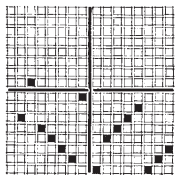
What is it that causes this all-important difference but the abstraction or the destruction of the vital oil we have been speaking of? We have suggested this extreme experiment for the purpose of showing that this oil exists, and what is possible to be done with wool in disregarding it, by the means used to cleanse it, and how we may so treat it as to conduce to the wisest and most advantageous application of the wool fibre.



Design.



Pegging Plan.



Draft.

Description of the Threads.

A, 2-fold worsted, at the length of 20,000 yards per lb., twisted for warp.

B, 2-fold worsted, at the length of 25,000 yards per lb., soft twist for weft.

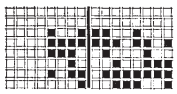
C, clean carded woolen, at the length of 2100 yards per lb., for the back weft.

Number of threads in the warp, 6476.
66 inches wide in the loom.
Reed 19, 6 dents an inch, 5 threads in a reed.
Shrinkage at the fulling, 5 per cent.
Shaved finish, 56 inches wide.

Take A for the Warp.
Weaving.

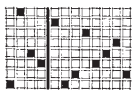
2 Picks of B, face.
1 " " C, back.
2 " " B, face.

5 Picks in the pattern.
138 Picks per inch.



Design.

Pegging Plan.



Draft.

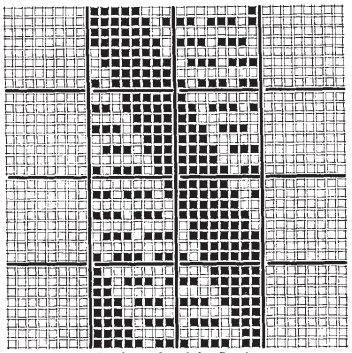
Description of the Threads.

A, 3-fold worsted, at the length of 10,000 yards per lb.
B, 2-fold worsted, at the length of 14,000 yards per lb.
C, 2-fold worsted, at the length of 12,500 yards per lb., soft twist.

D, clean carded woolen, at the length of 6300 yards per lb.

Number of threads in the warp, 4482.
66 inches wide in the loom, 6 threads in a dent.
Reed 11, 3 dents an inch.
Shrinkage at the fulling, 5 per cent.
Shaved, or gas finish, 56 inches wide.

Order of Warping.	*Order of Weaving.*
1 Thread of A.	1 Pick of C, for face.
1 " " B.	1 " " D, for back.
1 " " A.	1 " " C, for face.
3 Threads in the pattern.	3 Picks in the pattern.
	260 Picks per inch.



Design—Straight Draft.

Description of the Threads.

A, composed of two threads, at the length of 8100 yards per lb. (when joined), an intermediate shade, twisted on untwisted, 16 runs an inch.

B, at the same length as A, two threads of another intermediate shade, twisted on untwisted, 16 runs an inch.

C, composed of three threads, one dark and one intermediate, at 8100 yards per lb., and one of a lively shade, at 14,400 yards per lb., twisted on untwisted, 12 runs an inch.

D, composed of three threads, one dark and one intermediate, at 8100 yards per lb., and one light shade at 14,400 yards per lb., twisted on untwisted, 12 runs an inch.

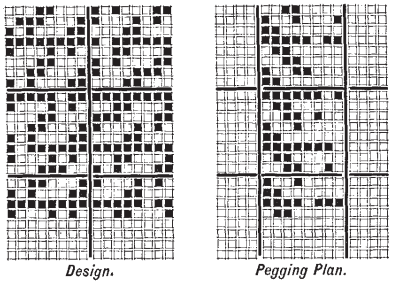
E, dark shade, at the length of 2250 yards per lb.
F, dark shade for the back, at 4050 yards per lb.
Number of threads in the warp, 1996.
70 inches wide in the loom, four threads in a reed.
Reed 7, 1 dents an inch.
Shrinkage at the fulling, 15 per cent.
Dressed finish, 56 inches wide.

Order of Warping.

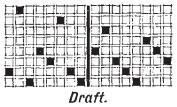
1 Thread of C, twist.
1 " " A, intermediate shade.
1 " " B, another intermediate shade.
1 " " D, twist.
1 " " A, intermediate shade.
1 " " B, another intermediate shade.
6 Threads in the pattern.

Order of Weaving.

1 Pick of F, for back.
1 " " E, for face.
2 Picks in the pattern.
50 Picks per inch.



Design. *Pegging Plan.*



Draft.

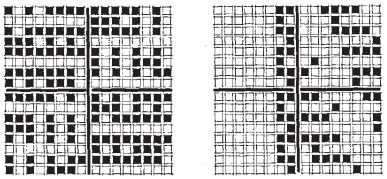
Description of the Threads.

A, 2-fold worsted, at the length of 20,000 yards per lb., twisted for warp.

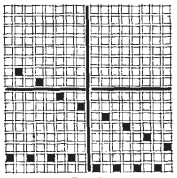
B, 2-fold worsted, at the length of 25,000 yards per lb., soft twist weft.

C, clean carded woolen, at the length of 2100 yards per lb., for the back weft.
A, for the warp.
Number of threads in the warp, 7480.
66 inches wide in the loom.
Reed 21, 4 dents an inch.
Shrinkage at the fulling, 5 per cent.
Shaved finish, 56 inches wide.

Drawing in the Reed.	*Weaving.*
1 Dent, 6 threads.	1 Pick of B, face.
2 " 5 "	1 " " C, back.
3 Dents for 16 threads.	3 " " B, face.
	5 Picks in the pattern.
	138 Picks per inch.



Design. *Pegging Plan.*



Draft.

Description of the Threads.

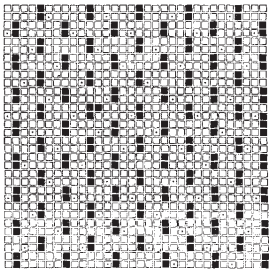
A, composed of two threads, at the length of 6300 yards (when joined), twisted on untwisted, 16 runs an inch.

B, composed of two threads, at the length of 6300 yards (when joined), twisted on untwisted, 3 runs an inch.

Number of threads in the warp, 3200.
68 inches wide in the loom, four threads in a reed.
Reed 11, 8 dents an inch.
Shrinkage at the fulling, 10 per cent.
Rough finish, 56 inches wide.
A, for the warp.
B, for the weft.
46 picks per inch.—*The English Textile Manufacturer.*

TISSUES WITH DOUBLE FACES.

(From Le Moniteur des Soies, November 20th.)



DOUBLE-FACED tissues, of which satin is a part, are those which have no apparent reverse side, and which are employed for purposes where they will be seen on both sides. There are two kinds of double-faced tissues, those that are produced by two warps, and those that are executed with two and three warps working alternately in the same step. These tissues are again subdivided into two classes: First, those that have the same pattern on the right as on the reverse side; and second, those of which the pattern differs on one side from the other—that is to say, having, for example, the right side of satin and the reverse of *faille*, as those to which we give attention in the above pattern.

This tissue requires two warps, and often two woofs, according as it is desired to obtain more or less intensity in the respective colors. It is evident that by employing double warps of different colors greater strength of color will be obtained for each in the pattern. To preserve to satin a uniform brilliancy it is necessary to pass it under a comb prepared to admit its easy passage, and on its side the *faille* should be passed to the comb in such proportion as to sufficiently cover the figures and form a pure gloss of color—that is to say, by preventing the *liages* of the satin threads from clouding or marring the gloss with their contrasting colors.

The combination of the work figured on the chart contributes much to conceal reciprocally the *liages* of the two patterns; thus, in combing a satin having five warps upon the first strokes of the gloss we obtain a satisfactory result, because the second stroke of the woof comes on to cover the *liages* of the satin, and prevents it from being seen on the side of the *faille*.

The only remarkable peculiarity to point out is that the satin seems to float nine strokes and bind the tenth, but this fabric being a little more beaten down than a plain *faille*, the overshot is balanced in a manner to resemble an ordinary satin of eight warps, and it is upon the second movement that the woof, driven back by the beating, comes to be superposed upon the face of the satin, and completely conceals it.

The count of the comb of a satin *faille*:—Comb, 21 teeth to the centimeter, passing five double threads for the *faille* and ten simple threads for the satin. Allowance for the woof, 36 strokes to the centimeter.

J. SEILLON.

The Markets.

THE general tone of the markets for fabrics and materials continues to improve, with a reasonable degree of advance in both materials and products of every class. It is apparent that the long delay of buyers in supplying themselves with finished goods is now compelling larger buying than is usual at this season. All reports from the centres of distribution since this month came in are of the same general tenor, and they continue to indicate advances of 5 to 10 per cent. on standard goods at frequent intervals. The only caution necessary is that there should be no unreasonable haste, and no undue increase of prices. The experience of 1879, a year ago, is still so fresh in the minds of all manufacturers that it is not likely to be repeated again, or not very soon.

In Wool the advance is slight on the usual grades, but it is more decisive on carpet wools on one side and the best combing wools on the other. These qualities are better by one to two cents per pound.

Cotton is also firmer, with the large export movement continued, and a report that quite inferior qualities are coming in from the later pickings. Very wet and cold weather has prevailed generally in the South, driving the hands from the cotton fields, and causing much of the later ripening bolls to be abandoned. There is much apprehension as to the final product, the weather at this time being so much more severe than last year.

W. C. HOUSTON, JR. & Co., under date of December 11th, quote:—

The improvement in general business noted in our issue of November 11th has continued throughout the month, and all branches are now marked by unusual activity for this season of the year. This increase in the volume of business has been accompanied in most instances by a proportionate advance in prices, so that trade may be pronounced in a very satisfactory condition. So far, this improvement seems to be entirely legitimate, and there is every prospect of its continuance, providing the speculative mania does not again make its appearance, and by advancing values too rapidly bring about a reaction such as followed the collapse of last year's "boom."

The wool market has been buoyant, and under a very large demand most grades have advanced fully 2 cents per pound. That present quotations will hold we think beyond question, and we are inclined to believe that there may even be a still further appreciation, but that there will be any scarcity is altogether improbable, and if manufacturers are forced to resort to foreign markets it will simply be due to the course followed by farmers in holding their wools back. As prices throughout the West are now fair to the grower, our advice is to let the wool come forward and be placed on the market.

Medium Combing and Delaine is in very light supply, and choice parcels can be readily placed at 55c. Fine Delaine has sold freely at 49 @ 50c., and the best wool can not now be had at less than the latter price, while some choice lots are held higher. Medium

clothing has met with better request, and no good wool can now be had at less than 50c. Fine fleece has justified the predictions made by us in our circulars of August 2d, and is now in active request. Sales, however, are limited somewhat by the difference in the views of buyers and sellers; the former maintain that 48c. is full value for XX, but the latter are disinclined to sell choice wool for less than 50c.

Good unwashed wool is now very scarce, and there is an increased demand for it, owing to the fact that the stock of washed is low, and is held at high figures both here and in the interior. In our circular of the 11th we intimated that unwashed would be likely to do better, and our conjectures are being verified. For medium grades out of choice wools, 40c. could very probably be obtained. Low grades are also in fair request. The supply of tub is light, but only parcels of even grade are inquired for; low wools and lots of wide grade are not in demand. Super and fine super sell well, but low sorts do not move promptly.

Colorado fleece is in such small supply that it is difficult to make reliable quotations. If shippers of this wool would forward to us now they would find a very satisfactory market on account of this scarcity. The movement in New-Mexican has been disappointing to holders and shippers. Until within two weeks ago manufacturers bought freely, but since then they have been decidedly indifferent about purchasing, and any attempt to secure an advance from the few parties buying has been singularly unsuccessful. If the present activity in other grades continues we feel confident of eventually obtaining better prices for New-Mexican, but up to this time we can quote but little material improvement.

Ohio, Pennsylvania, and West Virginia. Washed Fleece.

XX and above,	48 @50
X,	47 " 48
Medium,	50 " 51
Quarter-blood,	43 " 45
Common, Cots and Burry,	30 " 32
Medium Combing and Delaine,	55 —
Fine Delaine,	50 —
Low Combing,	45 " 46

New York, Michigan, Wisconsin, Indiana, and Western.

XX,	44 @46
X,	44 " 46
Medium,	48 " 50
Quarter-blood,	43 " 44
Common, Cots and Burry,	30 " 32
Medium Combing and Delaine,	53 " 55
Fine Delaine,	48 " 50
Low Combing,	43 " 45

Tub Washed.

Choice Medium,	52 @55
Average,	47 " 50
Low and Inferior,	35 " 40

Choice Unwashed.

Fine,	28 @32
Medium,	38 " 40
Quarter-blood,	34 " 35
Common, Cots and Burry,	23 " 25
Medium Combing,	38 " 40
Low,	35 " 36

Black, from 5c. to 10c. below the above quotations.

Average Unwashed.

Fine,	24 @27
Medium,	35 " 36
Quarter-blood,	32 " 34
Common, Cots and Burry,	22 " 25
Medium Combing,	35 " 37
Low,	32 " 34

Kansas and Far Western wools from 2 to 5c. lower than average unwashed, according to condition.

Pulled.

Extra,	38 @42
Fine Super,	45 " 50
Super,	35 " 40
Coarse,	20 " 25
Black,	20 " 30

Colorado and Western Kansas.

	CHOICE.	AVERAGE.
Medium and Fine,	32@34	30@32
Quarter-blood,	27 " 30	25 " 27
Common,	22 " 23	20 " 21
Black,	22 " 23	20 " 21

New-Mexican.

Improved in bags, if light and bright,	26@30
" " " average condition,	24 " 25
Part improved, in bags, if light and bright,	23 " 24
" " " average condition,	22 " 23
Carpet, in bags,	20 " 21
Black, in bags,	17 " 18
Fall wool improved, light and bright,	28 " 30
" " " average condition,	24 " 26
" " part improved, light and bright,	22 " 23
" " " average condition,	20 " 21

IMPORTS OF DRY GOODS AT NEW YORK FOR ELEVEN MONTHS FROM JANUARY 1ST.

ENTERED FOR CONSUMPTION.

	1878.	1879.	1880.
Manufactures of wool,	$10,786,450	$13,820,054	$17,748,914
" cotton,	11,478,740	14,305,023	19,920,396
" silk,	17,130,952	23,119,204	27,584,341
" flax,	8,317,545	10,194,499	12,243,545
Miscellaneous dry goods,	4,924,758	5,862,747	8,029,794
Total,	$52,638,445	$67,301,527	$85,527,030

WITHDRAWN FROM WAREHOUSE.

Manufactures of wool,	$6,073,082	$5,662,191	$7,563,736
" cotton,	2,788,311	2,540,391	3,746,400
" silk,	3,745,350	3,745,977	5,654,198
" flax,	3,299,960	3,067,653	4,169,674
Miscellaneous dry goods,	1,528,146	1,502,663	1,920,717
Total,	$17,434,858	$16,578,875	$23,054,725
Add entered for consumption,	52,638,445	67,301,527	85,527,030
Total thrown upon market,	$70,073,303	$83,880,402	$108,581,755

ENTERED FOR WAREHOUSING.

Manufactures of wool,	$6,089,759	$5,627,601	$9,617,184
" cotton,	2,630,988	2,699,077	4,438,428
" silk,	3,287,206	4,073,474	6,420,120
" flax,	2,978,254	3,148,758	5,756,652
Miscellaneous dry goods,	1,752,489	1,515,520	2,578,437
Total,	$16,738,696	$17,064,430	$28,810,221
Add entered for consumption,	52,638,445	67,301,527	85,527,030
Total entered at port,	$69,377,141	$84,365,957	$114,337,251

The total imports since January 1st amount to $114,337,251, in comparison with $84,365,957 the same period of 1879—an increase of $29,971,294, or 36 per cent. The entries direct for consumption during this time were only $85,527,030, and the goods placed in warehouse exceeded those taken out by over five and one-half millions. Where the increase in imports has occurred is best indicated in the following:—

	1879.	1880.
Manufactures of wool,	$19,447,655	$27,356,098
" cotton,	17,004,100	24,358,824
" silk,	27,192,678	34,004,501
" flax	13,343,257	17,999,597
Miscellaneous dry goods,	7,378,267	10,608,231
Total,	$84,365,957	$114,337,251

This gives a gain of about $8,000,000 in manufactures of wool, over $7,000,000 in cottons, $7,000,000 in silk, $4,500,000 in flax goods, and $3,250,000 in miscellaneous articles.

THE NET RECEIPTS AT COTTON PORTS to December 7th are reported at 2,655,638 bales, as compared with 2,483,958 bales in 1879, an increase of 171,680 bales; and the exports at all ports for the same time are 1,426,580 bales, as compared with 1,346,107 bales in 1879, an increase of 80,473 bales. Stocks are reported at 922,660 bales, as compared with 720,029 bales last year, an increase of 202,631 bales.

From this it appears that nearly half of the crop has been marketed, and that the commercial movement is about 200,000 bales in advance of last year.

The latest reports to the Agricultural Department confirm the increase in North Carolina and Georgia over last year, and state that three-fourths to seven-eighths of the crop has been gathered, and that remaining in the field is in poor condition. In Florida the crop is about as last year. In Louisiana three-fourths of the crop is gathered, and the whole is 33 per cent. short of last year. In Mississippi the decrease is 12 per cent., and in Arkansas 29 per cent. Texas is more favorable, with a crop equal to that of last year. In Alabama the decrease is 17 per cent. The Agricultural Department report of cotton received at all the ports to December 4th is 2,628,914 bales, an excess over last year of 208,835 bales. Canada has taken overland direct 8731 bales, against 6928 bales last year.

EXPORT OF COTTON MANUFACTURES.—The following, prepared by the Bureau of Statistics of the Treasury Department, gives the values of the American cotton goods reported during each of the last ten fiscal years, ending June 30th:—

	Values Exported.
1871,	$3,558,186
1872,	2,304,330
1873,	2,947,528
1874,	3,095,840
1875,	4,072,882
1876,	7,723,978
1877,	10,235,843
1878,	11,438,660
1879,	10,853,950
1880,	9,981,413

In 1879-80 the values of the exports were less than in the previous years, owing to the sharp demand for home consumption, showing a more prosperous condition of the general industries of the country.

IMPORTATIONS OF SILK GOODS AT NEW YORK.—The official report of the values of silk goods imported at New York for the month of November gives the aggregate at $1,443,976, against $1,359,904 in 1879, and $1,302,678 in 1878. The increase of $100,000 over last year is wholly in "silk and cotton" goods, which are $288,171 against $183,709 in November, 1879.

COTTON TAKEN BY SPINNERS IN THE UNITED STATES.—The reported sales of cotton to spinners up to December 1st, two months of the new crop year, show as follows, according to the *Financial Chronicle*:—

Takings of Northern spinners, two months of 1880,	598,284 bales.
Takings of Southern spinners, same time,	28,000 "
Total for 1880,	626,284 "
Takings of Northern spinners for 1879, same time,	638,271 "

Which shows a decrease of 39,986 bales received by Northern spinners, a presumption scarcely sustained by the general condition of activity prevailing, and the large amount of new machinery in operation. There has undoubtedly been a larger consumption of cotton in the United States this year than last year, as well as a larger commercial movement from the cotton-growing districts both for home and export.

NATIONAL COTTON EXCHANGE REPORT.—NEW ORLEANS, December 9.—The statement of the National Cotton Exchange, issued on the 10th inst., shows that the mills have taken overland direct 178,119 bales during the past quarter, against 192,776 last year. The total takings of Northern spinners were 554,355 bales, a gain over the same period last year of 11,521 bales. The total amount of this year's crop received at ports and shipped from overland points of crossing is 2,628,914 bales, an excess over last year of 208,835 bales. Canada has taken overland direct 8731 bales, against 6928 bales last year.

GERMAN EXPORTS TO THE UNITED STATES.—A correspondent of the Manchester *Examiner* writes that the export of certain German manufactures is constantly increasing. The trade of Chemnitz, consisting chiefly "of gloves and hosiery to the United States, increased from $5,070,478 in 1878-9 to $9,357,906 in 1879-80. The exports of Chemnitz, Bannen, Berlin, and Hamburg, taken together, increased in the same period from $21,945,454 to $35,694,222."

Foreign Notes.

THE *Salut Public*, of Lyons, says:—"Although some English, American, and Parisian buyers have been in the market this week, very little business was transacted. The news from the English market was not encouraging. There is no doubt that our mills are suffering from over-production, and this, more than the uncertainty of fashion, is the cause of the evil."

THE ZURICH SILK MARKET.—A letter from Zurich, November 20th, says:—"The situation is becoming more and more critical, and does not seem yet to have reached its climax. The manufacturers are still altogether uncertain as to the articles which will be in demand, and there is therefore a general discouragement. There are reports of large shipments of Asiatic silks to Lyons, and this would not be at all surprising, considering the heavy importation at the beginning of the season. Orders for manufactured stuffs are almost completely wanting, except for comforters, which have been largely inquired for."

BRADFORD ITEMS.—A new fabric called the "Cowl" cloth has sprung up, and is being ordered freely in London.

Invention is rife in preparing and spinning short wools. One new process produces a thread soft as "fluff," and almost equally cheap.

Lastings, serge de berris, and camlets, continue in good demand for China and the East.

Some very coarse flake mixture effects for spring are being sold by French manufacturers in London.—*Yorkshire Inventor and Manufacturer.*

THE NOVELTIES IN CARPET DESIGNS for the present season are stated to be taking the shape of rather larger patterns than have been in vogue hitherto. These small patterns are very well for small rooms, but they do not give sufficient scope for the designer, and a persistent effort is now being made to return to rather larger styles, allowing more room for decorative filling and expansive treatment.

It is suggested that a trial should be made to spin woolen warps in the Bidsey Company's Mills with the view of opening up another branch of employment for the poorly-employed spinning mules of that immediate locality, and in order to enable Bradford manufacturers to compete with the Continental wools in the manufacture of the now fashionable "soft goods."—*Ibid.*

THE well-known Neuilly Manufactory, which has been famous for some thirty years for a special style of work, known in France as "*tapisserie de Neuilly*," has,

of late, in the course of its manufacture of special tapestry, been imitating the products of the Aubusson factory. What is known as "*tapisserie de Neuilly*" is simply embroidery by a Jacquard loom on a plain surface. It was first tried at Aubusson in 1830, and was only attempted in three colors. It was increased and developed in Paris during successive years, and, finally, in 1832, M. Wallmer opened a factory at Neuilly, where he carried on the work which has become one of the staple productions of France, and has been largely used for furnishing purposes, and is extremely effective. Of late, however, M. Walmer has not been content with the simple designs for which his wares are renowned, but has launched into wider fields, and has been attempting to reproduce the old tapestry, in which we do not think he has been very successful.—*English Textile Manufacturer.*

NEW ELECTRIC DRILL.—Under the name of an "electric hammer," Messrs. Siemens & Halske, of Berlin, have lately patented an arrangement which consists essentially of three coils and a hollow rod of iron or soft steel, which can move to and fro within the coils in the direction of their axis. By means of a constant current, of unvarying direction, sent through the middle coil, the rod is magnetized; and through the other coils a machine or battery sends alternating currents, by virtue of which the rod is alternately drawn in and thrust out with great rapidity. The motion on one side is limited by a spiral spring working an elastic cushion. With a screw arrangement the rod can be worked with the necessary step-by-step rotation in boring rock. When the boring in rock has gone so far that the borer no longer reaches the rock, one of the rod-guiding projections on the upper coil is struck, and this has the effect of displacing all three coils in their stand, wherein they are held fast only by friction. —*Yorkshire Inventor and Manufacturer.*

ENGLISH GOODS AT PARIS.—Just suppose some half dozen of our principal manufacturers were to make, each of them, say four or five sample pieces of the smartest-looking cloths—of course with some novelty either in design or construction about them—that could be produced by Bradford machinery, allowing these same fabrics to be possessed of one or two of the chief characteristics tempting to purchasers of French goods, such as lightness and thickness of handle or springiness of feel; then suppose these goods to be exhibited as English manufactures in the Magasin de Louvre in Paris, would this plan not be likely to bear some little fruit in the shape of increased orders? I think it would be possible so to construct these cloths that French manufacturers would find it difficult to cut us out in price. Perhaps it is not generally known that every article which appears in the fashion depot at the Louvre, is eagerly conned and watched over by scores of industrious scribes for English and American journals, whose reports find their way into hundreds of trade magazines and newspapers. Publicity is thus given and demand created for the articles the world is taught to believe are coming into vogue. We can not try this experiment in London. Why? Because *tout le monde* and his wife go to Paris when they have money in their pockets. It is therefore at Paris we must strike if we wish to succeed in creating a profitable, or, in other words, a fashionable trade.—*Ibid.*

DESIGNS IN THE TEXTILE INDUSTRIES.—The introductory lecture of the Textile Department of the Yorkshire College was delivered in the new buildings, College road, by Mr. Beaumont, the instructor. Mr. O. Mersey presided. Mr. Beaumont said that design might be considered in a two-fold relation—first, as an article of utility only, and secondly, as ornamenting and beautifying and making more attractive an article of general utility. The word *design*, however, had, with some persons, become identified with its secondary rather than with its complete signification—with ornament as apart from, and in some instances as opposed to, utility. With such persons pleasing the eye, as it was termed, was about everything; and strength, quality, and the suitability of goods were sacrificed to this one object. In looking over the large assortment of goods to be seen in the warehouses of some of their merchant princes, one could not but observe that a fair percentage of these goods were almost, if not entirely, without what may be considered ornament; and this remark was equally applicable to goods manufactured for both male and female garments, in wool, worsted, silk, and cotton. What was essential to their manufactures in order to keep ahead of their foreign competitors in the future as in the past, was a knowledge of all the methods of obtaining woven results. If this were obtained, the textile productions of Great Britain would quickly surpass in beauty and ornament those of other nations. It was for this purpose that the Worshipful Company of Cloth Workers of the city of London had erected that splendid edifice, which had the necessary appliances for teaching designs in weaving and dyeing.—*Ibid.*

The Colorist.

CONDUCTED BY DR. A. L. KENNEDY, POLYTECHNIC COLLEGE.

NOTE.—Improved methods of dyeing, and general news relative to colors and their applications, will be briefly treated under this head.

CINNAMIC ACID AND ARTIFICIAL INDIGO.

THE obstacles which stand in the way of the cheap production of artificial indigo are gradually yielding to chemical research. For the cinnamic acid used in the process we have had to depend upon the valuable balsams, storax, tolu, and Peru, especially the first. The acid is obtained by mixing the balsam with water, distilling off the more volatile product, and exhausting the residue with the carbonate of soda. The solution of cinnamic acid in carbonate of soda is then concentrated, and, while boiling, decomposed by an excess of hydrochloric acid. Upon cooling, the cinnamic acid is deposited in the form of oil, which congeals when its temperature is lowered by ice. The mass, which is partially crystallized, is washed in ice water, dried, and subjected to distillation, when nearly pure cinnamic acid is obtained.

The *Textile de Lyon* says that a patent has been taken out for a process for preparing cinnamic acid by means of benzoic acid. This acid formerly obtained from the resin benzoin is now cheaply prepared from the urine of herbiverous animals, especially cows. This is collected in large quantities and boiled with hydrochloric acid, by which the hippuric acid it contains is converted into benzoic acid and glycocol. The benzoic acid crystallizes on cooling, and is purified by sublimation.

The specific gravity of the colorless crystallized cinnamic acid $C_9H_8O_2$ is 1.195; it melts at 129° C., boils at 293° C., and distils over without change. It is quite insoluble in cold water, sparingly soluble in hot water, and very soluble in alcohol. The readiness with which it can be converted into benzoic acid, led to the discovery of the reverse process, viz., the conversion of benzoic acid ($C_7H_8O_2$) into cinnamic $C_9H_8O_2$, of which we shall speak in a future article, it being sufficient for our present purpose to treat of some of the transformations of cinnamic acid, including its conversion into indigo.

Fused with an excess of caustic potassa, cinnamic acid disengages hydrogen; the residue, consisting of a mixture of benzoate, acetate, and salicylate of potassa.

When cinnamic acid is heated with peroxide of lead the odor of bitter almonds is perceived, and the benzoate of lead remains in the vessel. The distillation of cinnamic acid in a solution of chlorinated lime (bleaching powder) is attended with a lively effervescence, and a chlorinated oil comes over. This oil is also produced by the action of a mixture of chlorate of potassa and hydrochloric acid on cinnamic acid. If a boiling solution of cinnamic acid be subjected to a current of chlorine the oil is obtained. This last reaction is a characteristic test for cinnamic acid. The formation of the chlorinated oil is attended with the production of, first, benzoic acid and then of chlorinated benzoic acid. Nitric acid converts the oil into nitrobenzoic acid, pungent, volatile matters being given off.

Cinnamic acid is converted into nitro-cinnamic acid by the action of pure nitric acid, free from nitrous, keeping the mixture cold, on no account allowing it to reach 60° C. On diluting the mixture with water the impure nitro-cinnamic acid falls to the bottom. It is purified by dissolving it in boiling alcohol and decanting the clear solution, from which it precipitates on cooling in small white or yellowish crystals. It fuses at about 270° C., and on cooling becomes a crystalline mass. Heated slightly above 270° C., it is decomposed. It is almost insoluble in cold water, and sparingly soluble in hot water, but is readily taken up by boiling alcohol. Its composition is $C_9H_7O_2NO_2$ the cinnamic acid $C_9H_8O_2$ having given off in the process one part of hydrogen, and takes up one part of NO_2 from the nitric acid.

If nitro-cinnamic acid be now subjected to the action of bromine, it loses one atom of hydrogen, which is substituted by one of bromine, giving bromated nitro-cinnamic acid. $C_9H_6O_2NO_2$ Br. Upon boiling this acid with a solution of carbonate of soda, we obtain at first yellowish, afterwards blue, indigo C_8H_5NO.

ANILINE PRIMARY COLORS.

THE dyer needs a good memory in these days of new and fashionable aniline colors; and even if it is very good he is often obliged to assist it by dividing the tints into groups, and then associating each group with some general process by which its more important members are produced. He always finds it convenient to put the blacks in a group by themselves, and then to make a group of each of the primary colors, red, yellow, and blue, knowing that from them other gay tints can be obtained, as green from the union of blue and yellow, orange from red and yellow, purple from blue and red, &c. Now, if he will associate each of the primary colors with the base of which it is the hydrochlorate, he will find his further progress in the science of his difficult art greatly facilitated. Each of the primary aniline colors, as generally prepared, is a compound of hydrochloric acid, with what may be called an aniline base, which base for the red is rosaniline, for the yellow chrysaniline, and for the blue azuaniline. Each of these bases can be derived from aniline by a process which, however it may be varied in practice, has for its object the production of a definite chemical change.

Into the base of the red, rosaniline $C_{20}H_{19}N_3$, aniline C_6H_7N, may be converted by oxidizing a portion of its hydrogen, which is thus converted into water, and in that form removed, and, as oxidizing agents are numerous, so are the processes. Impure aniline, containing toluidine, is used, and the changes may be thus represented:—

Aniline. Toluidine. Rosaniline. Water.
$$C_6H_7N + 2C_7H_9N + O_2 = C_{20}H_{19}N_3 + 3H_2O.$$

Manufacturers have generally used arsenic acid to oxidize the hydrogen, of which they wished to deprive the impure aniline; but more recently nitrobenzol $C_6H_5NO_2$ has been employed, the peroxide of nitrogen NO_2 being decomposed and yielding up its oxygen to the aniline and toluidine. Rosaniline, which is itself colorless, when combined with hydrochloric acid, gives us the beautiful fuchsine, as well as the other aniline reds, mauve, magenta, solferino, roseine, &c.

The base of the yellow aniline dyes is chrysaniline $C_{20}H_{17}N_3$, the carbon and the nitrogen being the same as in rosaniline, but the hydrogen having two atoms less. If nitrous acid be added to an alcoholic solution of rosaniline the latter is converted into chrysaniline, but the reaction is obscure, and the process seldom resorted to. In the manufacture of fuchsine from the mixture of benzole, toluole, &c., known as aniline oil, a resinous mass is produced as well as that dye, and from this mass the rich aurine dye and the other aniline yellows are obtained in the form of the hydrochlorate of chrysaniline.

The base of the aniline blues, azuaniline or triphenylrosaniline, $C_{20}H_{16}$ $(C_6H_3)_3$, N_3 has a less proportion of hydrogen in its composition than either of the above aniline bases. It may be obtained from the first of them, rosaniline, by heating it with three parts of aniline, when three atoms of hydrogen are given up and *substituted* by three parts of phenyl, C_6H_5, ammonia being evolved. It is almost unnecessary to repeat what has been so recently said in these columns, that some chemists prefer to represent the composition of aniline not as C_6H_7N, but as (C_6H_5) NH_2, expressing this by the name phenyl-amine. Assuming the correctness of this view, the conversion of rosaniline into azuaniline may be thus represented:—

Aniline. Rosaniline. Triphenylrosaniline. Ammonia.
$$(C_6H_5)\,NH_2 + C_{20}H_{19}N_3 = C_{20}H_{16}(C_6H_5)_3N_3 + 3NH_3.$$

Azuaniline, or triphenylrosaniline, when combined with hydrochloric acid, gives azurine, bleu de Paris, bleu de Mulhouse, bleu de nuit, and the other aniline blues. For the purpose of ready comparison we put the bases of the three aniline primary colors in the form of a table, giving the composition of each, and

some of the colors it produces when combined with hydrochloric acid:—

Aniline base.	Composition.	Colors derived.
Rosaniline,	$C_{20}H_{19}N_3$	Fuchsine, magenta, mauve, &c.
Chrysaniline,	$C_{20}H_{17}N_3$	Aurine, aniline yellow, &c.
Azuraniline,	$C_{20}H_{16}(C_6H_5)_3N_3$	Azurine, bleu de Paris, &c.

A knowledge of these facts about the three primary colors conduces to a ready understanding of the methods of producing the violets, the greens, the blacks, &c., and of the reactions which take place during their production. It furnishes a foundation upon which the whole subject of the aniline dyes may be systematically arranged.

THE COLOR OF COCOONS AND CROSS-BREEDING.

THE International Exhibition of Sheep, Wool and Wool Products, recently held in Philadelphia under the auspices of the Pennsylvania State Agricultural Society, had features which will long make it memorable. It was a congregation, under one vast roof, of the highest-bred sheep, of machinery for spinning and weaving wool, and of most elegant woolen fabrics. No sooner was the visitor out of hearing of the bleating of lambs, than his ear was assailed by the click of looms. At once his eye rested on Cotswolds and carpets, on the finest Merino sheep and the finest broadcloths. Of the woolen industry he took in at a glance what, in sporting phrase, might be called the "start" and the "finish." If of a reflective turn, he came away wondering which, in the hands of man, had undergone the greatest transformation, the sheep, the machines, or the tissues.

Another feature of the exhibition was equally suggestive. Just across the north side of the building, west of the magnificent flock of Southdowns from Lord Walsingham's estate, Oxfordshire, England, was an apartment devoted to the rival animal fibre, silk, and there by a timely procrastination—for the season was over—silk-worms were at work. Cocoons were there in profusion, and from some in steaming pails of water the tiny strands were being reeled. Within the same building, almost beside each other, were the sheep and the silk-worm. There is a great difference between them, to be sure, but thus to associate them was a happy conceit. By long-continued and carefully-conducted selection of the best specimens, and breeding from them only, under conditions ascertained to be favorable, sheep have been so improved that they yield thrice the quantity of fibre, of a quality, too, quite as much enhanced. Would not a similar course, if pursued with the silk-worm, result in an equal improvement in the quantity and quality of its fibre?

The question, although suggested and brought home to us by the joint exhibition here, is not a new one in Italy. There the practicability of improving the insect by judicious crossing is recognized, and a beginning has been made by mating the Japanese variety with the "native" stock. In due time it is presumable that modifications in the insect will result. Perhaps the horn on the caudal extremity of the caterpillar may be reduced, perhaps enlarged; the brown band upon the moth be narrowed or widened. In that event we may expect the long horns and short horns, and narrow and broad banded will each, as with cattle, have their advocates. However that may be, Italian sericulturists, in the absence of a "scale of points," have agreed upon the importance of "general robustness" and the "color of the cocoon." Cocoons, as is well known, may be either white, yellow, or green, or of intermediate tints. In crossing, moths from cocoons which are decidedly white or yellow are taken, the others being rejected. By such a cross it is hoped to produce cocoons of those two colors only, but from causes not yet understood other colors have resulted.

The *Moniteur des Soies* contains an article by Prof. G. Soncini, of the Agricultural School of Grumello del Monte, in the Italian province of Bergamo, in which he states that experiments made there in 1877, with moths of the Japanese variety from yellow cocoons, gave splendid results, all the worms hatched out spinning fine yellow cocoons, uniform in size and in color equaling the originals. One of the females was crossed with male from a white cocoon of the race known in Italy as the Novi Ligure. In 1878, of the 271 cocoons produced by worms from these eggs, 23 were yellow, 173 green, and 75 white. The disparity between the two races appears here to have been too great, the result being as unsatisfactory as that obtained in crossing Silesian Merino sheep with Spanish Merinos, and seemingly for a similar reason.

Prof. Soncini further says:—"In 1878 I crossed the race Novi Ligure with a yellow, which upon examination appeared to be a pure yellow, not too deep. It was, so to speak, a little obscure, but as it was quite a fine cocoon in quality I used it in crossing, in order to get a whitish yellow suitable for production on a large scale. The cocoons which worms from the above cross gave me, were not all white and yellow, as I anticipated. Few were yellow, very few green, and most were white. The object was therefore not reached, nevertheless I used the white cross for another reproduction." Eight pair of the moths obtained were mated, and an attempt was made to determine the point of "robustness" by the longevity. The result, although interesting, was unsuccessful, as the following table will show:—

Days of Life.		Number of Cocoons.			Total No.
Females.	Males.	White.	Green.	Yellow.	of Cocoons.
6	8	71	181	78	333
12	12	78	200	63	341
13	2	56	161	65	282
8	15	59	224	96	379
8	10	62	174	66	302
13	9	90	275	95	360
10	5	87	177	113	377
11	5	64	224	81	369

Prof. Sonconi recommends the infusion of "new blood," if we may use the expression. He favors the bringing of yellow cocoons grown in Upper Italy into Central Italy, and pairing the moths; and anticipates success from crossing the Japanese white with the "native" Italian yellow, and these last with the Japanese; robust insects being selected in all cases.

Worms the progeny of a Japanese white female by a yellow Italian male are said to have proved remarkably vigorous as compared with worms of the original stock.

In Italy, in order to avoid the injury to the eggs which frequently results from want of care in families, public storehouses are provided with ventilated apartments of the proper temperature, where the eggs can be stored until the hatching season.

LATE CONTINENTAL EUROPEAN DYEING RECIPES.

THE soluble glass processes for preparing cotton goods for dyeing and printing by steam, according to the method of Kurrer, are as follows:—The white bleached cloth is impregnated with silicate of soda, then immediately mordanted in a solution of alum, or chloride of tin, well rinsed and dried. Very lively colors are obtained, which stand light, air, and soap.

Kurrer impregnated cotton goods with dissolved silicate of soda (free of sulphate) of 3° Bé., and immediately applied the tin salt (stannate of soda), after which followed the thorough rinsing in flowing water, and drying. Stuffs thus prepared furnish, after steaming, the nicest results. The black, brown, blue, green, yellow, and orange colors were livelier, more intense and stronger than those prepared with chloride of tin. Only in the case of the red dye-wood (Brazil wood), the manipulations here given are less suitable, and more particularly for pink colors not applicable.

For producing beautiful and durable colors on half wool and wool stuffs by steam printing, the silicate of soda is also very efficacious.

Olive on Cotton (100 *lbs.*).

1. Boil with water only.
2. Work one hour in a decoction of 10 lbs. of sumac, and wring.
3. Enter new bath containing 10 lbs. of copperas. Work quarter of an hour, then wring.
4. Prepare new bath of acetate of alumina red liquor, at 1½° Twaddle; at 140° F. give ten turns, lift, and wring.
5. Enter fresh bath at 120° F., containing 2 lbs. quercitron (bark), work one hour, and wring.

Dyeing New Scarlets on Wool (100 *lbs., pieces or yarn*).

1. Wet the goods with boiling water.
2. Dissolve 4 lbs. of phosphate of soda and necessary quantity of colors, 2 lbs. to 3 lbs. (or more for very deep shades), and place in wooden vat previously filled with water of about 90° F. Enter wool turned around and rolled up.
3. Add solution of 6 lbs. of alum, stir, and enter goods again; turn fifteen minutes, roll up again, and add 2 lbs. to 4 lbs. of alum previously dissolved; re-enter goods, and work fifteen minutes.

Heat gradually by steam up to boiling point in half an hour, and boil ten to fifteen minutes; or take out as soon as it begins to boil. Wash and dry.

Use about three gallons of water for every pound of wool in dye-bath; if more water is used more alum is necessary. Even dyeings are obtained by this method if proper attention is paid to the temperature, and by slowly heating to the boil the color penetrates the fabrics completely. If only a surface dyeing is required, instead of 6 per cent. of alum, 8 to 9 per cent. are used, and the temperature is raised more quickly to the boil. The same dye-bath can be used for several operations, but for superior articles a fresh bath is required for every operation. For articles which do not require special care for giving even shades, the dye-bath is emptied by half while still warm, and filled with cold water, but less phosphate of soda and alum are used. For materials which do not stand the alumina mordants, but make them too harsh, tin solution and phosphate of soda are employed. The colors obtained are not so brilliant as those with alum, but brighter than those obtained with tin composition and argol. For 4 per cent. phosphate of soda, 3 per cent. tin solution (scarlet spirit) of 35° Bé. can be used; it is previously diluted with water, and added in two portions.

Ponceaux on Cotton (100 *lbs.*).

1. Prepare soap bath containing 6 lbs. Marseilles soap and 2 lbs. good glue, or, better, gelatine; dissolve in bath at about 120° F., enter cotton, work half an hour, stirring occasionally, and wring.
2. For tin bath dissolve chemically pure tin in mixture of one part of nitric acid, 36° Bé., with two parts commercial muriatic acid, adding tin in excess to saturate the acids completely; dilute to 5° Bé., enter yarn, leave one hour, and wring thoroughly.
3. Leave from two to three hours in alumina bath, 8° to 10° Bé., prepared as follows:—Dissolve 10 lbs. of sulphate of alumina in two gallons of boiling water, and add slowly 7 lbs. powdered soda, and stir well. Then dissolve 10 lbs. acetate of lead in boiling water, and when both solutions have cooled down to about 120° F., mix, leave to settle, and use the clear liquor. Another method of preparing acetate of alumina consists in dissolving an excess of the commercial hydrate of alumina in acetic acid of 7° Bé., at a moderate heat.
4. *Dye-bath.*—Dissolve 3 lbs. to 6 lbs. of scarlet in hot water, leave to cool, and add solution to bath; enter cotton quite cold, heat gradually to 194° F., leave for some time in bath, wring, and dry. The colors rub off a little, but to avoid this completely add a decoction of soap to the dye-bath, which is thus kept stronger. Mordants and dye-bath are kept, and can be used again by bringing them up to original strength. One to 2 lbs. of color will only be required for the next dyeing.

ON THE IDENTIFICATION OF THE COAL-TAR COLORS (Read by John Spiller, F. C. S., before the Chemical Section of British Association, Swansea meeting, 1880).—Dyers and others who are in the habit of using the coal-tar colors are familiar with a number of chemical reactions by which the members of the series may generally be classified and identified. Differences are remarked in their relative affinities for various sorts of fibres, some colors being taken up freely by silk, others fixing better upon wool, and some few, like saffranin, exhibiting a special affinity for cotton. Again, as with the yellows, great differences are observed when the operator proceeds to work with a free acid or a weak alkali in the dye-bath. Primrose (naphthaline yellow) requiring the former, but not so with phosphine (crysaniline yellow), which demands a neutral or even slightly alkaline bath.

By the study of these conditions, aided by a few characteristic tests, it is often possible to identify coloring-matters of unknown or doubtful origin, and it is with the view of extending the number of such readily available tests that I recommend a more frequent appeal to the color reactions with sulphuric acid.

For this purpose but small quantities of material are required, a few grains serving to impart a distinct color to a comparatively large bulk of sulphuric acid, and the resulting indications are in many cases both specific and permanent. Oil of vitriol, which so readily destroys nearly all organic structures, does not carbonize any of the coal-tar colors, or does so only under severe conditions, as at high degrees of heat. Even indigo and madder, although of true vegetable origin, are known to yield up their coloring-matters to sulphuric acid, the old processes of dyeing depending upon this fact. In the manufacture of garancine from madder the woody fibre and organized tissues are destroyed by the action of sulphuric acid, whilst the alizarin glucoside survives, and with it Turkey-red

goods may be dyed. Instances might be multiplied as proof that coloring-matters, both natural and artificial, resist the attack of oil of vitriol, and the large class of sulphonates (Nicholson blues, "acid roseine," &c.) may be cited as establishing the fact that coloring-matters are not so destroyed, but form combinations with sulphuric acid.

If, then, the body under examination be dissolved in strong oil of vitriol, a color-test is at hand whereby useful inferences may be derived as to the nature of the dye, and often its exact identity disclosed. A few direct confirmatory tests may then be applied. The most remarkable color reactions are the following:—

Magdala (naphthaline pink)—Blue-black.

Saffranin—Grass green, becoming indigo-blue on strongly heating.

Crysoidin—Deep orange, turning almost to scarlet on heating.

Alizarin—Ruby-red or maroon.

Eosine—Golden yellow.

Primrose (naphthaline yellow)—Difficulty soluble, first yellow, and color discharged on heating.

Crysaniline—Yellow or brown solution, of marked fluorescent character.

Aurin—Yellowish brown, non-fluorescent.

Atlas orange—Rose color, turning to scarlet on heating.

Atlas scarlet—Scarlet solution, very permanent on heating.

Biebrich scarlet, R—Blue-black or deep purple.

Biebrich scarlet, B—Bluish green.

Aniline scarlet—Golden yellow, permanent on heating.

Indulin—Slaty-blue to indigo, according to shade of the dye.

Rosaniline, regina, and all violets—Yellow or brownish yellow.

Phenyl and diphenylamine blues—Dark brown solutions.

Iodine green and Malachite green—Bright yellow solutions, the former giving off iodine on heating.

Citronine—Pale cinnamon or neutral tint.—*Druggists' Circular.*

The Preparation of Salts of Uranium and Vanadium at Joachimsthal (Northern Bohemia). By C. Lallemand.—The pitchblende of Joachimsthal was first treated as a source of uranium salts in 1853, and since 1858 the manufacture has been carried on regularly, and the ore paid for at the mines at a special rate according to its richness.

The ore is delivered to the works in powder; its specific gravity is about 7, and it contains generally 40 to 55 per cent. of oxide of uranium (U_3O_4) with smaller amounts of vanadium, arsenic, sulphur, molybdenum, tungsten, cobalt, nickel, copper, bismuth, lead, silver, iron, manganese, lime, magnesia, alumina, and silica. It is first sampled and assayed, to determine the percentage of uranium that it contains, and its consequent value. After the proportion of moisture in the sample has been ascertained, 3 grammes of it are heated with nitric acid for two hours. The uranium and most of the other metals are thus dissolved. The filtered liquid is treated with carbonate of soda in excess, which precipitates the vanadium, iron, lime, lead, copper, &c., while the uranium remains in solution. This is then thrown down as uranate of soda ($NaO\ 2U_2O_3$), mixed with excess of alkali, by neutralizing, boiling, and adding caustic soda; and after getting rid of the excess of soda, it is dried and weighed.

In treating the ore in the works, it is first roasted in a calcining furnace, heated with lignite. The temperature of the furnace is raised very gradually, in order to drive off as much as possible of the sulphur, arsenic, and molybdenum, without fritting the ore at all. At the end of eleven hours, when the temperature has been raised to dark red, the furnace is cooled a little, and a mixture of 4 per cent. of the weight of the charge of nitrate of soda and 15 per cent. of carbonate of soda is added. The roasting is continued after this addition for four hours more, the temperature being gradually raised to bright red.

The roasted ore is then washed for a day with hot water, which removes the soda salts that it contains of molybdenum, vanadium, tungsten, arsenious acid, and sulphuric acid, while the uranium, iron, cobalt, nickel, copper, and silver remain in the residue.

This is next treated with sulphuric and a little nitric acid, diluted with hot water. The solution contains uranium, copper, and some other metals, while silica, sulphate of lime, sesquioxide of iron, and silver, if present, remain undissolved. An excess of carbonate of soda is added to the clear liquid. This precipitates all the metals that it contains, except uranium. The filtered liquor is then boiled, by blowing in steam, to expel the dissolved carbonic acid, which retains in the solution traces of oxide of iron and of carbonate of lime, and finally, after the removal of these, the uranate of soda is thrown down, either by adding caustic soda to the acidified solution, to produce bright yellow (*jaune clair*) uranate ($NaO\ 2U_2O_3 + 6\ HO$) or by exactly neutralizing the original alkaline solution by sulphuric acid, to produce orange (*orangé*) uranate ($NaO\ 2U_2O_3$).

The selling price of the uranate of soda is fr. 57.50 per kilogramme. It is used in making colored glass, and in painting on porcelain. Smaller quantities of oxide of uranium and of uranates of potash and ammonia, are also made. The annual output of uranium salts in now 4500 kilogrammes.

Vanadium is extracted in small quantities at Joachimsthal from the liquor with which the roasted uranium ore has been washed, but the process by which it is obtained is still imperfect, and too complicated to be carried out by ordinary workmen. The crude ore contains by analysis about 0.1 per cent. of it. It is used in dyeing, to aid in the transformation of aniline into aniline black. The price of vanadate of soda at Joachimsthal is 90 francs per kilogramme.—*Annales des Mines.*

Easy Test for Arsenic in Fabrics.—The following plan is recommended by Dr. Henry Barnes, in the *Practitioner*, as an easy plan to detect arsenic in paper hangings or any other suspected fabric:—

Immerse the suspected paper in strong ammonia on a white plate or saucer; if the ammonia becomes blue, the presence of a salt of copper is proved; then drop a crystal of nitrate of silver into the blue liquid, and, if any arsenic be present, the crystal will become coated with yellow arseniate of silver, which will disappear on stirring. The test is not new, but appears not to be so well known as it deserves to be.

Book Reviews.

Elements of Modern Chemistry. By Adolphe Wurtz. Translated and edited, with the approbation of the author, from the fourth French edition, by William H. Greene, M. D. With 132 illustrations. Philadelphia, J. B. Lippincott & Co., 1880. 12 mo., pp. 687. Price, $2.50.

French elementary works on chemistry are generally good. Prof. Wurtz's clements is justly regarded as one of the best, and its appearance in English dress will be hailed with satisfaction by all who are familiar with it in the original. The facts of the science are packed and presented to the student in a clear and sententious style, at once attractive and impressive, and the modern doctrines are either assumed or advocated, in a way which leaves no doubt of the convictions of the learned author. He, as usual, divides his work into three sections—the non-metallic, the metallic, and the organic; but he does not, as is the habit of some English text-book authors, forget his introduction, for he devotes his first 40 pages to a presentation of general principles, and renders it the most valuable part to the learner. The metalloids, beginning with hydrogen and ending with carbon, with sulphur in its proper place, next to oxygen, occupy over 180 pages. The student will find in the *resumé*, at the close of this section, an admirable statement of the theory of atomicity. The following quotation from the article on ammonium amalgam will serve to illustrate the author's style as well as his method of treating controverted points:—

"It has recently been found that the ammonium amalgam is very compressible, and that its diminution in volume under pressure sensibly follows Mariotes' law. It has hence been concluded that the ammonium does not exist in combination with the mercury, and that the increased volume of the latter is due simply to an absorption of the gas. It is difficult to admit this, for the compressibility of the ammonium amalgam proves only that the compound has no stability, and begins to decompose almost immediately on its formation. The disengaged gases which are in the exact proportion, $N\ H_3 + H$ may be retained by the pasty amalgam remaining. They could not be absorbed by the liquid mercury." (Page 146.)

Fifty pages are given to the study of the general properties of the metals and to the salts, leaving but 117 pages to be devoted to the individual metals and their compounds, a proportion entirely too small in view of the importance of the subject. The author has, however, made the most of the restricted space he has allowed himself, and has brought his necessarily brief articles down to a recent date. For example, under nickel, he says:—

"Nickel may be deposited as a brilliant metallic layer by electrolysis of a solution of ammonium and nickel double sulphate. Adams made an application of this property in the nickel-plating of various objects by electro-metallurgy, and the process is now largely employed."

Two hundred and seventy-seven pages are devoted to organic chemistry, a branch in which Prof. Wurtz has especially distinguished himself as an explorer. He handles it with rare skill. No attempt is made to divide vegetable from animal chemistry, but the subjects are so subordinated that each has only its due prominence. Organic analysis, the organic acids and bases, sugars, fermentations, and alcohols, fats and resins, hydro-carbons and their derivatives, and the albuminous matters receive their due share of attention.

While the work is perhaps not so well suited to our medical and technical schools as some already in use, it is admirably adapted to the wants of classes in our literary colleges, and from them we hope it will receive so liberal a patronage that a second edition will soon be demanded. When that is passing through the press, we suggest that the names used in the American Pharmacopœia be applied to the alkaloids, and that the proof-reader avoid using hydrosulphite for hyposulphite, and caoutchouc for catechu, errors pardonable in a first edition, but not to be repeated. It has been so frequently the practice of American publishers to await the appearance of translations of Continental books in England before publishing them here, that the enterprise of Messrs. J. B. Lippincott & Co., in anticipating the action of English houses by translating and issuing the book, is exceptionally noteworthy and gratifying. The volume is got out—paper, press-work, illustrations, and binding—in elegant style.

General Science and Art.

Another Use for the Telephone.—A modification of the telephone has been utilized by Professor Roberts, of the London Mint, to detect spurious coin. Two equally strong and very rapid intermittent currents of electricity are passed over two coils connected by a wire. A coin, known to be good, is placed in one coil, and the current being disturbed, the telephone registers that fact. Another coin is placed in the second coil. If good, the equilibrium is restored, and the indicator is silent; if counterfeit, consequent disturbance is noted. The currents are affected similarly only by equal volumes of metal and alloy.—*Druggists' Circular.*

Suggested Woolen Fabric.—If it were possible by some skillful process of twisting or doubling to run a single thread of mixture made from the natural gray, brown, or black shades of coarse domestic wool, I think the effect produced would be novel, cheap, and effective. It would also possess some of the softness of handle necessary in modern fabrics. The above notion is, of course, intended for warp. Soft spun weft in addition would be pretty certain to produce a nicely handling cloth. The warp might easily be woven with very little sizing in a coarse reed. The idea is to procure a tolerably thick tweed mixture, more characteristic than the beige, and more clothy in feel.—*The Yorkshire Inventor and Manufacturer.*

Parkinson's Improved Temple.—Protection has been taken out for an improvement in temples for weaving, by Mr. J. Parkinson, Chester street, Bradford. The object of the new arrangement is to overcome the friction of the cloth on the temple and assist the passage of the piece through the temple. It deals also with slack edges in such a manner as to obviate the necessity of any supplementary hooks and weights. The temple is mounted so as to compensate for oscillation or vibration of the piece while weaving. The main features in the improved temple are its remarkable simplicity of construction and the handiness with which it is disengaged from the loom when not required. The temple is applicable to any kind of loom, wide or narrow, between the lay and the breast-beam. After a complete specification has been filed we intend giving an illustrated description in detail of Mr. Parkinson's improvement.—*Ibid.*

ON THE CAUSES OF THE INTERNAL CORROSION OF STEAM BOILERS.—Experimenting on iron wire, with various solutions in water, M. Lodin ascertained that the dominant action upon iron, in ordinary waters, was that of the oxygen of the air dissolved in water; and that that action was little greater in contact with heated distilled water than with calcareous waters. In presence of distilled water, the oxygen absorbed at 68° Fahrenheit was about 0.258 grain per square foot of surface per hour, and at 212° Farenheit about 2.364 grains. In presence of calcareous water, the oxygen absorbed was 0.330 grain and 2.579 grains, respectively.

The decomposition of water by iron is, to a less extent, a cause of oxidation. The disengagement of hydrogen was constant for all the waters tested. It was lowest with distilled water, for which, at about 260° Farenheit, it corresponded to an absorpion of 0.01 grain per square foot per hour; for calcareous water, 0.0129 grain; for sea-water, 0.067 grain; for water saturated with chloride of sodium, 0.05 grain; and for water containing one-fifth part of crystallized chloride of magnesium, 0.182 grain. These results of oxidation are of much less magnitude than those of oxidation by dissolved air.

As the calcareous deposits only take place on surfaces whereon oxidation has begun, the action of empirical remedies, it was supposed, was due to the prevention of oxidation. Zinc, for instance, decomposes water at 212° Farenheit much more energetically than iron does. Samples of iron and zinc were sealed up in a tube, with water at above 212° Fahrenheit. The iron preserved its polish, though when it was enclosed alone with the water it became rapidly oxidized.

Logwood has frequently been employed as an anti-incrustant. The principle of logwood, hematoxyline, absorbes oxygen above 212° Farenheit, in the presence of water, though it appears to stimulate the disengagement of hydrogen instead of reducing it. The resulting liquid holds in suspension a solution of iron. Potatoes do not absorb the oxygen of air; but they appear to cause the decomposition of water, and the resulting liquid holds iron in solution. The compounds which are formed by logwood and by potatoes with iron oxide are very slightly adhesive to iron plate, and they readily admit of the separation of calcareous deposits. —*Comptes Rendus de l'Académie des Sciences.*

CLIP CALLIPER FOR LIFTING WASTE WEIR PLANKING. —A calliper has been designed to facilitate the frequent operation of raising and lowering the planks on the canal calingulahs during the irrigation season, and to obviate the necessity of sending men into the water to attach lifting-ropes to the wooden pins driven for that purpose through each end of the planks. The caliper is provided with two sockets, by means of which it slides on a guide-rod, and its two jaws have cylindrical lead weights fastened to their upper extremities. The pin connecting the two jaws is fastened to the lower socket, and the upper ends of the jaws are each connected with the upper socket by a bar, which can turn, at its extremities, on a pin at the centre of the lead weight, and on a pin in the centre of the upper socket. A rope, fastened to a ring on the top of the upper socket, serves to raise or lower the calliper. When the rope is pulled up it raises the upper socket, which, by means of the bars, pulls together the upper part of the calliper and closes the jaws. On releasing the rope the lead weights fall, and the jaws open and are kept extended by a bent hook catch curving down slightly below the roof of the jaws. For raising a plank, the guide-rod is dropped ahead of the planking, and fits vertically against it by means of an elbow-jointed end; the calliper is then lowered with its jaws opened out, and as soon as the convex part of the catch comes in contact with the top of the planking it is forced up, the catch is set free, and the calliper grips the plank, and the plank can be raised by hauling up the callipers gripping it at each end. In replacing a plank the callipers holding it are lowered, and when it has reached its place the ropes are slackened, and the jaws of the callipers open and are retained in that position by a catch, above the pivot of the jaws, fastened to one jaw and falling into a notch in the other. The calingulah planks are 5 feet long by 1 inch thick by 2½ inches wide; but stop-lock planks 20 feet long by 6 inches thick and 4 inches wide can also be lifted by a pair of callipers.—*Hayes' Professional Papers on Indian Engineering.*

NOVEL DOMESTIC MOTOR.—This motor, invented by Capt. John Ericsson, depends for its action upon the alternate expansion and contraction of a given volume of air confined in a cylinder and subjected to rapid alternations of high and low temperature. The cylinder, cast in a single piece, is mounted vertically, and is heated at the bottom either by a small coal fire or from several gas jets (by preference from three burners consuming 5 cubic feet per hour). A length of one-third of the cylinder at the top is provided with a water-jacket for cooling the expanded and heated air. The top of the cylinder is open, and into it is fitted a piston whose stroke is confined to the space surrounded by the water-jacket. There is also provided a solid plunger, of slightly smaller diameter than that of the cylinder, and which is operated by a rod passing through the piston and its rod. The mechanism controlling the relative motions of the piston and the plunger consists of a walking-beam, to which the piston-rod is attached by suitable links, and which converts the rectilinear motion into circular motion by means of a connecting-rod and crank acting on a fly-wheel. The plunger is operated by a bell-crank and link from the connecting-rod; its motion is the reverse of that of the piston; as the latter rises the plunger falls, and *vice versa*. Its function is the displacing of the confined air from direct contact with the heated bottom of the cylinder at each stroke. A feed pump keeps up a regular supply of cold water. The action of the machine is as follows:—The confined air being heated forces the piston to the top of the cylinder. As this occurs the expanded air is exposed to the continually-increasing cooling surface of the water-jacket, and at the same time the solid plunger, actuated in the direction opposite to that of the piston, has descended, and interposes itself between the air and the source of heat. Thus the air contracts as quickly as it had previously expanded. The piston, which is exposed on the whole of its upper surface, is forced down by atmospheric pressure, thus making one complete revolution of the crank and fly-wheel. The lowest point reached by the piston is about one-third the distance from the top of the cylinder, where the water-jacket terminates, so that it is cushioned on the confined air. The descent of the piston is accompanied by the rise of the plunger; this displaces the air and again exposes it to heat, when the foregoing operations are repeated. The apparatus has therefore no valves or air-pumps, but uses a confined body of air over and over again. It occupies a floor space of about 24 inches by 30 inches, and is about 4 feet high. With a 6-inch cylinder, consuming about a scuttle of coal a day, or 15 cubic feet of gas per hour, it will pump 200 gallons of water per hour to a height of 50 feet. Once started, it requires no further attention.—*Engineering and Mining Journal.*

A NEW FORM OF CONSTANT ELECTRIC BATTERY WITHOUT ACID.—In this, a modification of the "Daniell" battery, the copper plate is surrounded by a solution of sulphate of copper, and the zinc by a solution of caustic soda, the porous diaphragm being made from parchment paper folded into the required shape so as to avoid seams, two or three thicknesses being used, according to the resistance required. The zinc and copper plates are formed from the commercial sheet metal, with two longitudinal slits extending two-thirds the length of the plate, which is bent to form three sides of a parallelopiped; the centre part between the two slits is turned back and upwards, so as to reach above the liquid and form the connections of the cell, and thus all waste in cutting out the plates, and at the same time soldered connections are avoided. As the zinc plate is not attacked when the battery is on "open circuit," it does not require to be amalgamated. Its electromotive force varies from 1.47 to 1.35 volt, the latter value being reached after the cell has been for a considerable time on short circuit, and its internal resistance, for a cell 20 centimetres (7.87 inches) high and 3 litres (2.64 quarts) capacity, is about 0.075 ohm.

The subjoined table gives the comparative values of the batteries in ordinary use, when employed for the production of mechanical work through an external resistance equal to that of the battery, from which it will be seen that this battery holds almost the first place, besides possessing the considerable advantage that no noxious fumes are generated therefrom.

Description of Battery.	Electrical Constants.		Useful Effect.	
	E. M. F. in Volts.	Resistance in Ohms.	Kilogram-metres.	Calories (Gramme-degrees.)
Bunsen, ordinary cylindrical form, 9 in. high,	1.80	0.24	0.344	0.796
Bunsen, Ruhmkorff's form, 9 inches high,	1.80	0.06	1.378	3.189
Daniell, large cylindrical form, 9 inches high,	1.06	2.80	0.010	0.023
Thomson's Tray, electrodes 14 x 14 inches surface,	1.06	0.20	0.143	0.331
Carré, cylindrical form, 2 feet high,	1.06	0.12	0.238	0.551
Reynier, rectangular form, 9 inches high,	1.35	0.075	0.619	1.440

At a meeting of the Physical Society of Paris, fifty of these cells were employed to light the hall by electric arc, to work a powerful induction coil, and, after being some hours in use, to raise a platinum wire to red heat. This cell seems likely to supplant the "Bunsen" for laboratory use.—*Emile Reynier* in *La Lumière Electrique.*

THE MOST SUITABLE DIAMETER FOR STEAM-PIPES.—The author commences by remarking that, as a rule, the diameters of steam-pipes are chosen in a very arbitrary manner. When great precision is required, the diameter is fixed on the basis of the known velocity of the steam, it being taken for granted that this velocity remains unchanged throughout the whole length of the pipe. This supposition is false, for the sides of pipes absorb considerable quantities of heat, causing a partial condensation of the steam. If the quantity of steam which leaves the pipe is taken as a basis of calculation, then, through every cross-section of the pipe, a greater quantity of steam must pass than the final amount, and consequently the velocity will be everywhere greater than that calculated for. On the other hand, if the quantity of steam which enters the pipe is taken as a basis, the velocity will be everywhere less than that allowed for. In the first case, the diameter of the pipe will be too small, and in the last too large.

The author next proceeds to construct an equation to represent the frictional resistance of pipes of various diameters and lengths to steam of various density; and also an equation to express the pressure of the steam at the beginning and the termination of its passage through the pipe.

On the basis of this formulæ he has computed four tables, to be used in determining the dimensions of the steam-pipes for heating purposes.

Table I. applies to unlagged pipes of various diameters, and of the uniform length of 100 metres through which 120 kilogrammes of steam pass per hour, the terminal pressure being taken as 1.2 kilogramme per square centimetre. The table gives the quantity of steam condensed in each case, together with initial pressure which it is necessary to maintain, and also the initial and terminal velocities of the steam.

Table II. gives similar data for the case of only 30 kilogrammes of steam passing hourly through the pipes, the terminal pressure being 1.08 kilogramme per square centimetre.

Tables III. and IV. give the corresponding data fo well-lagged pipes.

A comparison of the tables shows the great value to be attached to a proper covering for the pipes; for in the case of unlagged pipes, the ratios of the quantities

of steam condensed and available vary between 0.26 and 3.93, while for well-lagged pipes the corresponding ratios vary between 0.1 and 0.98. The loss of pressure in the first case varies between 2.66 and 0.0028, and in the last case between 2.41 and 0.0006 kilogrammes per square centimetre.

The author next proceeds to show how to use the tables in order to determine the most economical diameter of pipes for particular cases, and gives it as a general conclusion that, in order to avoid waste, steam of considerably higher pressure, and pipes of considerably smaller diameter, than usual, should be chosen.—*H. Fischer, in Dingler's Polytechnisches Journal.*

Dervaux's Boiler Feeder.—This contrivance is intended, besides maintaining a constant water-level in a steam-boiler, to heat the feed-water sufficiently for precipitating beforehand any deposit that would otherwise incrust the boiler plates with scale. It may be described as a large cast-iron tap or cock, the conical plug of which is vertical, with its bigger end downwards, and is continuously rotated by a worm-wheel. The plug is divided into two tiers or stories; and each story is furnished with four chambers, one in each quadrant. These communicate alternately, through ports in the body or casing of the cock, with external receptacles, of which the top pair are kept constantly supplied with the water employed for feed. As the plug rotates its top-chambers fill with feed-water, and carrying it round deliver it into an intermediate pair of receptacles, which communicate simultaneously with both the upper and the lower story of the plug, thus allowing the water to enter from them into the lower chambers in the plug. These finally carry it round to two ports, one above the other, from each of which a pipe descends into the boiler; the pipe from the lower port reaches down to low-water level, while that from the upper port stops short at the higher or normal level to be maintained in the boiler. From the bottom chambers of the plug the feed-water runs down into the boiler through the lower or feed pipe, and is replaced in the plug by steam ascending through the upper or steam pipe. The feeder being placed about 5 feet above the boiler, the down-flow is produced by the column of water of that height in the feed-pipe; through the steam-pipe the full steam-pressure reaches the upper of the two ports in the feeder, while at the lower port the pressure is less by the amount of the 5 feet head of water. The feed continues until the water-level rises high enough to seal the orifice of the upper pipe; it then ceases until the orifice becomes again uncovered. The steam that gains access to the bottom chambers in the plug of the feeder follows exactly the reverse course of that already described for the feed-water; and in ascending through the feeder it heats the descending feed-water. Should the water-level ever fall so low as to unseal the orifice of the feed-pipe through the feed being too slow, the actuating head of water in the feed pipe is lost, and the feed practically ceases, inasmuch as not more than a mere drop or two can now escape from the chamber of the plug during its rotation past the ports, because the pressure is now the same at both ports. If the feed-water is not pure, an intermediate closed settling vessel is interposed in the course of the feed-pipe, between the feeder and the boiler; in this vessel the deposit precipitated by the heating of the water becomes concentrated and subsides, while the feed passes considerably purer into the boiler.

The feeder can be arranged for feeding any number of boilers simultaneously or separately, whatever be the difference of their several water-levels, and without the aid of floats or regulators of any sort. This is accomplished by the lower story of the plug being itself further subdivided into two or more tiers, each tier serving for two boilers. A double feeder was put up in Belgium about two years ago at the Hasard colliery, Tamines, where it continues in regular work, maintaining a constant water-level in the boilers. Another has also been working nearly two years at Boubier colliery, Châtelet, supplying a group of six boilers with complete success. Here the feed-water is so bad, possessing 27° (English)* of hardness, that each boiler had previously to be laid off for cleaning after every four weeks' work, and about 300 lbs. of mud was got out each time; the boilers also primed so heavily that the engine cylinders required frequent cleaning, and the safety-valves stuck every few days. With the Dervaux feeder the boilers were kept under steam from eight to ten weeks; one that was opened after ten weeks' working contained only about 6½ lbs. of mud, and there was no scale to speak of on the plates; the priming, too, was so far diminished that the cylinders required no cleaning, and the safety-valves continued in good order. Boilers also that have not been blown off before applying the feeder are found to be speedily freed from scum by its application. This is in consequence of the natural circulation that ensues as soon as ever the water reaches its full level and seals the orifice of the steam-pipe; the dirty boiler-water then ascending through the steam-pipe to the feeder passes through a short channel that connects the upper port with the lower, and thence descending through the feed-pipe deposits its suspended impurities in the intervening settling vessel, whence it returns in a much cleaner state into the boiler. One of the Boubier boilers, that had been fired continously for nearly six weeks before the feeder was applied, was opened twenty-four hours after its application, when it was found that the scum had disappeared, and the water was clear enough to see the bottom plates, which were no longer covered with mud. The Dervaux feeder is thus completely successful, not only in maintaining the water-level constant, but also in purifying the feed-water so thoroughly as practically to do away with all scale or deposit of any kind in the boilers, even with the worst water.—*Revue Universelle des Mines.*

The Clearing of Coal Slack by an Air-Blast.—At the Rheinpreussen colliery, in the Ruhr basin, the separation of small coal from shale for cooking purposes is carried out upon the plan due to the director of the works, Herr Hochstrate, in which the use of water, as in the ordinary Berard machine, is entirely avoided, the sized coal being exposed to a blast of air of sufficient velocity to remove the coal, the heavier shale being left undisturbed. The mixed coal as drawn from the pit is thrown on a riddle with 2-inch apertures, the lumps kept back being removed by a traveling band, which delivers them to the railway wagons. The stuff passing through this is treated in a four-sieved drum classifier; the largest lumps made, from ⅞ to 2 inches, are also taken by a band carrier to the loading-place, being partially hand-picked on the way. The four smaller sizes are, ⅞–¾ inch, ¾–½ inch, ½–⅓ inch, and below ⅓ inch. Each of these is passed by a special hopper into the separating apparatus, the admission being through a rapidly vibrating horizontal sieve plate, which allows the slack to fall in a thin layer upon a traveling band forming the bottom of the wind channel, whose motion is in the opposite direction to the current of air from a fan-blower. The band is covered at intervals by laths, whose height varies in the different divisions, forming partitions within which the particles of shale deposit. In order to keep the material fully exposed to the air-current, a knocking apparatus is used to give a continuous vibratory motion to the band. The air-channel is divided by a series of horizontal sieves, placed one above the other, having alternately longitudinal and transverse bars. These perforated partition walls have the effect of diminishing the strength of the blast from above downwards. The coal fragments being, as a rule, more or less cubical, present a larger surface for the same volume than the heavier particles of shale, and are therefore more readily carried forward by the current, while the shale falling on the band is carried in the opposite direction to the waste delivery. The larger particles of coal are stopped by a sieve in the mouth of the air-channel, but the dust-laden air is carried into a chamber of large section common to all the divisions of the apparatus, where it is made to deposit the suspended coal by repeated changes in direction caused by numerous midfeather walls. The clearing of the air is also facilitated by the injection of a small quantity of steam. The dust so deposited is removed by a screw creeper to a bucket elevator, which delivers it into the storage tower for coking coal. The depositing chamber has an air-tight casing of asphalted roofing paper. The passage through which the air escapes is covered with straw matting to keep back suspended matter as completely as possible.

In the month of April of this year, working seven hours daily, 6585 tons were treated by this methed with the following results:—

	Tons.	Per cent.
1. Lumps from the large riddle,	1367.5	= 20.78
2. Nuts from the drum sieves,	1614.0	= 24.33
3. Waste picked from 1 and 2,	117.5	= 1.82
4. Nuts purified by air-blast,	1020.0	= 15.51
5. Coking slack,	2018.5	= 30.76
6. Waste separated,	443.0	= 6.80
		100.00

The total amount of shale separated is therefore 8.62 per cent. The cost of the operation is given as follows:—

	£	s.	d.
Wages and management,	30	9	4
Cost of steam-power,	6	8	9
Stoves and materials,	3	2	8
Interest and sinking fund, 10 per cent.,	10	8	4
	50	9	1

Equal to about 2d. per ton on clean coal obtained.

The unpurified slack below ¼ inch size contained 11 to 11½ per cent. of ash; and the dust coal from the chambers, as prepared for coking, 6 to 6.7 per cent., which, upon a 70 per cent. yield in the ovens, corresponds to a coke of 9 to 9½ per cent. ash. The ash in the different kinds of nut coal varied from 3.6 to 8.5 per cent.

In working this apparatus, it should be so arranged as to leave a little coal in the waste, in preference to recovering the whole of the coal in a less purified condition, as the mixture of coal and shale is sufficiently combustible to be used in raising steam. In the treatment of 500 tons daily, about 19 tons of waste with 50 per cent. of ash are obtained, which are burnt in the boiler furnaces.

The total cost of a plant for the treatment of 15,000 tons monthly, or 600 tons per day, is given below—

1. Coking coal stove andbrickwork,	£240
2. Buildings for machinery. Wood with asphalt paper covering,	260
3. Machinery,	700
4. Transmission,	115
5. 25-horse-power steam-engine,	165
	£1,480

—*Berg- und Hüttenmännische Zeitung.*

The following is one of the numerous testimonials received recently by the Weston Electric Light Company, Newark, N. J.:—"Superintendent's Office, Atlantic Cotton Factory Company, Atlanta, Ga., October 6th, 1880—To Weston Electric Light Company, Newark, N. J.—Gentlemen:—We have found your light so satisfactory that we have ordered another ten-lamp machine by wire. We find that the electric light is a success in more ways than we anticipated. The air in the rooms is cool and clear, while the gas loaded it with impurities and consumed the moisture. Our production increased the first night we used it. I believe we shall light our mill better and more safely for one-half what gas has cost us. Hurry along the second machine and lamps and oblige, yours, truly, George B. Harris, Superintendent." The above is an increase of over 500 per night in one room.

*In the English scale for the hardness of water, in accordance with Professor Clark's specification (No. 8875, dated 8th September, 1841), each degree represents 1 grain of chalk dissolved in 1 gallon (70,000 grains) of water. In the French scale each degree represents 0.01 gramme of chalk dissolved in 1 litre (1000 grammes) of water. Hence 1 degree English = 1.43 degree French; and one degree French = 0.7 degree English. The hardness of the Boubier feed-water given as 39 degrees French, is therefore 27 degrees English. Each French degree is also stated to represent 0.1 gramme of soap neutralized by 1 litre of water; whence chalk neutralizes just ten times its weight of soap. [See *Traité de Chimie*, par J. Pelouze et E. Fremy, Paris, 1865, tome I, page 246; Knight's English Cyclopædia, London, 1861, vol. vii., pages 637-8; Wanklyn's Water Analysis, London, 1874, pages 64-9 and 125-138.]

THE INTERNATIONAL COTTON EXPOSITION—ITS DEFINITE ORGANIZATION.

(From the Atlanta Constitution, November 28th.)

ON Friday, Mr. James W. Nagle and Mr. J. W. Ryckman, of Philadelphia, dropped into *The Constitution* office. The gentlemen are publishers of the TEXTILE RECORD, the only paper in the United States devoted to the cotton manufacturing trade. They come to Atlanta for the purpose of organizing the Cotton Exposition and getting it into shape. They have spent two or three weeks traveling through New England, and sounding manufacturers on the subject of the Exposition. They find an unusual interest taken in it on all sides, and it is at the request of leading spinners and machine men that they come South for the purpose of pushing the Exposition ahead. They bring the very highest testimonials, and come as business men and not as adventurers. They have a plan of organization which they will submit to our people. They agree to take $2000 worth of stock themselves, and to get much more taken in the North. They are gentlemen of character and position, pay their own expenses, and simply ask a fair and impartial hearing.

We present herewith an interview with Mr. Ryckman, which gives the general points of the plan they propose for the Exposition, and we ask for it a careful reading:—

"Is there much interest North in the proposed Exposition?"

"There certainly is. Since Mr. Atkinson first laid his plan before the people we have made quite a canvass of this subject in the manufacturing cities of the North-east, and I say understandingly that no enterprise of recent development has attracted such widespread and earnest attention among our people. We could not have been persuaded to come here in the interest of this event if it were not for the unmistakable evidences of favor manifested by our manufacturing and merchant classes."

"What point do Northern manufacturers prefer?"

"Well, as to location they agree with Mr. Atkinson that the Exposition should be held here in Atlanta. The choice of Atlanta is a wise one, if the people of Georgia and the South will take up the matter with the energy they usually show when fully aroused upon any subject. Cotton is the natural product and the pride of the South. All that attaches to it is your right before other claimants. We believe, in the North, that while this is in every sense a national project, and will benefit, more or less, all sections and all classes, it is a matter the people of the South should handle for themselves, assume the chief responsibilities for throughout, and from which they should derive the substantial results."

"What advantage would the Exposition be to Atlanta and the South?"

"Upon that point there can be but one conviction. The most valuable service that can possibly be conferred upon all the interests connected with cotton, at this time, will be the holding of this Exposition. The people of the United States have a great common interest in the growth, marketing, and manufacturing of cotton, and the exhibition will be the most effective agency to demonstrate this fact. It will bring the planter and manufacturer into closer union of interest; it will secure the adoption of improved machinery and appliances for cultivating and preparing the fibre; it will present the planter with methods of economy that at present he does not dream of, whereby he can largely increase the products of his lands, and market his crop at a reduced cost; it will show the folly of shipping our raw staple to Liverpool and paying import duties on the finished fabric; it will show that we make the best cotton machinery in the world, that we have every requisite facility for making superior goods, and that we can control the trade of the globe in cottons. Already, in order to hold their trade with some European and South American countries, English cotton manufacturers are counterfeiting American brands. The Exposition will awaken the Southern people to the importance of developing their material resources and securing home markets for their crops."

"Would it tend to concentrate manufacturing eastward, or cause it to drift southward?"

"I was just coming to that point. I maintain that above everything else the Exposition will show to the capitalists of the country that here in Georgia and throughout the South is the place to build cotton factories. Everything points to the soundness of this conclusion. The most prosperous mills in the country are here. The staple is right at your doors, while the manufacturer of New England is paying high freightage upon it. You have numerous rivers and streams furnishing excellent power and an abundance of clear water for manufacturing purposes. Good mill privileges, I am told, can be had for almost nothing. Fuel is in good supply for large steam factories, and the construction of your Georgia Western Road will furnish it in inexhaustible quantities. Skilled labor is to be obtained at fair wages—in fine, you have all the advantages of New England with the staple which she has not. By all means the South should modify its interest in cotton through the growth of manufactures. So long as the sale of raw cotton is the only or principal method of realizing money from its cultivation, the planter can not afford to do much in aid of domestic interests. Show these things to the moneyed men of the North; attract them hither to investigate for themselves; only let them see the splendid chances for investment here in industrial pursuits—and in a few years Atlanta will be the Manchester of America; the loom will weave a fabric of indissoluble interest and brotherhood between the South and North."

"What plan of organization do you suggest?"

"It is my opinion that a stock company should be organized, headed by such representative and spirited men as Joseph E. Brown, H. I. Kimball, Governor Colquitt, Samuel M. Inman, Major J. F. Cummings, and others. I would not place the stock at an excessive figure. I think $100,000 would be large enough. If the business men of Atlanta take liberally of this stock, the balance of it can be readily placed in the North. Mr. Nagle and myself will gladly subscribe our names to a portion of it."

"What amount of money would it take to carry out the project?"

"As to that point I have no positive facts. I am informed that your fair ground buildings, with some additions, alterations, and improvements, would answer every purpose. The expense of the necessary repairs, the rentage of the grounds, &c., would, therefore, call for the greatest outlay. I think that fifty thousand dollars would be ample."

"What amount would likely be returned?"

"Well, sir, I believe the stock would pay a hundred per cent. I speak what I know when I say that there is scarcely a manufacturer of cotton machinery in the country, or of appliances used in cotton mills, who will not send machines and other exhibits here. Such admirable improvements as the little Deidrick press, and a long list that I might mention, will be brought here and set to work. What more novel, instructive, or interesting sight could you witness anywhere than the carding, spinning, and weaving of the cotton from the crude bale to the finished fabric. That department will be of greater interest, perhaps, to the people of the South, while the department devoted to the exhibits of the planter and cotton factor will especially delight visitors from the North. It will be interesting to see what the Southern manufacturer has accomplished in the shape of fabrics. I believe that spaces to exhibit will be at a premium, and will net handsomely. I would not be surprised if there were demands for space from the cotton-machinery makers of Great Britain, who are always anxious to display the workings of their cards and mules and looms, &c., in comparison with those of American make. The greatest source of revenue would be the admissions, and I do not think I exaggerate when I say that the Exposition will attract to Atlanta at least a hundred thousand people."

"What sort of crowd will it bring?"

"As I have intimated, it will bring the capitalist, the manufacturer, machinist, and merchant from the North; and as for the South, there are few people not interested in such an event. It will particularly attract the capitalists of the North, who are now looking southward for industrial investments. Naturally these men are timid, and you should show them plainly what you have got."

"When should the exhibition be held?"

"I should say from October 15th to December 15th, next. Northern and foreign visitors will then escape the heated term, and have a chance to view a cotton-field in all its glory. I want to say right here that I notice your fair association has disbanded, and will not give an exposition next year. The cotton exhibition can take the place of it and give a ten times bigger show, and accomplish more good than a decade of agricultural fairs. There is, of course, no time to be lost, and we hope to leave here next week for the North prepared to say to the people that the organization is complete, and they must do their share, which, you may depend upon it, they will do."

(From the Atlanta Constitution, November 30th.)

THE Cotton Exposition now appears to be a fixed fact. The interview with Mr. J. W. Ryckman, of Philadelphia, published in Sunday's *Constitution*, attracted general comment in business circles yesterday, and expressions of favor were strongly manifested on all hands. Evidently our merchants are now fully aroused to the great national importance of this event, and intend to carry it through. A number of gentlemen were called upon during the day, including Senator Joseph E. Brown, Governor Colquitt, Samuel M. Inman, H. I. Kimball, Mayor Calhoun, Major J. F. Cummings, Maddox, Rucker & Co., M. C. & J. F. Kiser, John Keely, and others, all of whom stated their unqualified approval of the enterprise and promised the most hearty support. It is understood that from some of these and other business men nearly half the necessary funds are already pledged. Several have agreed to take $1000, $2000, and $3000.

Mr. James W. Nagle, one of the publishers of the TEXTILE RECORD, who is familiar with the feeling in the North on the subject, and is well known in the financial circles of Philadelphia and New York, informs *The Constitution* that at least $20,000 will be readily subscribed in the North, if that amount is asked for. He will take $2000 for his firm. With these assurances it would be more than folly to delay the culmination of the scheme. The business men of Atlanta would not be true to their own interests, the interests of the South and of the country, if they allow this opportunity to escape them. The statement was made some weeks ago that Louisville was willing to put up all the money necessary to establish the exposition at that point, but the people of the North prefer Atlanta. Let us therefore organize at once and show how substantially we believe in this great project which promises so much good to the industrial and commercial interests of Georgia and the South.

The plan suggested by Mr. Ryckman and Mr. Nagle, of a stock company, meets with general favor and will doubtless be adopted. Under that plan no donations are asked for. The subscribers simply take an ordinary business risk, and under proper management a very safe one.

A meeting of the citzens will be held to-night at the Kimball House to take some definite action, and we earnestly hope all those interested in the prosperity of Atlanta and the South will be in attendance. The purpose is to effect a temporary organization and adjourn to a subsequent evening, when permanent officers will be chosen and the work begun at once.

(From the Atlanta Constitution, December 1st.)

LAST evening there was a meeting of prominent citizens in the breakfast-room of the Kimball House, to consider the matter of the Cotton Exposition and Atlanta's prospects of obtaining it.

The meeting was called to order by Mr. H. I. Kimball, who nominated Mayor Calhoun as chairman, and Mr. F. H. Richardson secretary.

Mayor Calhoun spoke briefly of the importance of

the objects which the meeting was to consider. The present meeting was merely initiatory.

On motion of Mr. Sidney Root, the meeting requested Mr. J. W. Nagle, of THE TEXTILE RECORD, to say something to the meeting.

Mr. Nagle said speech-making was not his forte, but he earnestly desired to go to work and help in the matter as much as he could. He was anxious to go to work, and hoped the enterprise would take definite shape as soon as possible. He referred to his partner, Mr. J. W. Ryckman, who made a few pertinent remarks. He said all had read Mr. Atkinson's able address, and understood fully the objects of this enterprise. There is a strong feeling at the North in favor of Atlanta as the place of holding the exposition, and the North would give large financial aid to such an enterprise here. The plan generally is to have a stock company, which would raise the necessary funds and control the management of the exposition. It would be well to put the stock on the market, for the people of the North would be glad to obtain some of it.

Mr. Kimball explained that the general plan of the organization was to be modeled after the Centennial, which was a stock association. It would be well to have the arrangements made, as Mr. Atkinson had suggested, perfected in Atlanta, but full consultation could be had with the leading men in the country who are best informed and most interested in the subject.

He moved that a committee of five on permanent organization be appointed, with Mr. Nagle as the chairman.

Mr. Cummings seconded the motion, and said that he was thoroughly in sympathy with this movement and would aid it in any manner he possibly could. His office, he said, was at the disposal of the committee for any meeting it might desire to call. The motion was agreed to, and the chair appointed as the committee on permanent organization, Governor Colquitt, Captain John Keely, Mr. N. P. T. Finch, Major J. F. Cummings, and ex-Governor R. B. Bullock.

These gentlemen are to act in co-operation with Messrs. Nagle and Ryckman, who are thoroughly active and will render most efficient service.

The meeting adjourned to meet at four o'clock, Thursday, at the Cotton Exchange.

(From the Atlanta Constitution, December 3d.)

THE second meeting of citizens to establish the proposed International Cotton Exposition, was called to order at four o'clock, on Thursday evening, by Mayor Calhoun, temporary chairman, who, in the absence of the Secretary, stated the action of the former meeting.

Mr. E. C. Bruffey was requested to act as secretary *pro tem.*

The chairman called upon the Committee on Permanent Organization to report. Gov. Colquitt, chairman of the committee, then read a report, as follows:—

MR. CHAIRMAN:—I am instructed by the Committee on Permanent Organization to report the following Constitution and By-Laws as a basis of organization:—

SECTION 1. The name of this association shall be the International Cotton Exposition Association, chartered by the Government of the United States, and its object shall be the holding of one or more expositions of the appliances and machinery used in the cultivation, preparation, and manufacture of cotton, together with exhibitions of cotton fibres and fabrics, and whatever else is directly or indirectly connected with or beneficial to the cotton interests of the United States.

SEC. 2. The stock of this Association shall consist of $200,000, divided into 20,000 shares, of ten dollars each, which shall bear the signatures of the President, Treasurer, chairman of Finance Committee, and Secretary.

SEC. 3. The officers of this Association shall consist of a President, twenty-five Vice-Presidents to be chosen from the leading commercial depots of the United States, a Treasurer, a Secretary, an Executive Committee of thirteen members, and a Finance Committee of eleven members, and the terms of such officers shall continue during the existence of the Association. Whenever a vacancy occurs, from resignation or otherwise, it may be filled by the Executive Committee.

SEC. 4. It shall be the duty of the President to preside at all meetings, and to act in conjunction with the Executive Committee in the management of the affairs of the Association. In the absence of the President, any one of the Vice-Presidents may act in his place and stead.

The Treasurer shall be the custodian of the stock-books, and all the funds of the Association. He shall receive all moneys derived from the sale of shares, from the exhibitions, and from every other source whatsoever, and shall under no circumstances pay from the amounts in his possession any debt of any kind that may be incurred by the Association until it has been duly and properly audited by the Finance Committee. After the closing of said exhibition or exhibitions, and the cancellation of all debts regularly incurred, he shall make a full report of the condition of the treasury, and from the surplus money in his possession pay such a dividend to the shareholders as the circumstances warrant, and when at any time it may seem advisable to disband the Association, he shall pay over to the shareholders the whole amount of money remaining in his hands in just proportion, share for share, according as they have subscribed to the stock of the Association.

It shall be the duty of the Secretary to keep a complete record of all meetings and all transactions of the Association, to attend to all correspondence, to act with and carry out the instructions of the Executive Committee in all matters of advertising, sales of space to exhibitors, transportation, tickets, and everything else of a clerical and routine nature belonging to the business of the Association. He shall keep an office in a central location at the place of exhibition.

The Executive Committee shall, in conjunction with the President and Treasurer, constitute the board of management of this Association. They shall designate a site upon which to exhibit, shall decide all matters relating to the purchase or lease of lands or buildings, make all contracts, agree upon time and place of holding such exhibition, arrange schedules of rates for spaces to exhibit, for tickets, &c., and in every matter of whatsoever kind or character necessary to the consummation of the objects of this Association, except the payment of moneys, they shall have unqualified power to act. They may appoint a sub-committee of five members residing at the place of exhibition, to act in the absence of the whole committee.

It shall be the duty of the Finance Committee to examine and audit all bills of whatever nature or kind presented for payment against this Association, and in no case shall any amount be paid out of the treasury until it has been so examined and audited, and receives the signatures of the committee. They may at their pleasure select a sub-committee of three members, residing at the place of exhibition to act for the whole.

SEC. 5. Privileges of exhibition shall be confined strictly within the objects of the Association as stated in section 1, but they shall be open to the producers of the world.

SEC. 6. Prizes shall be offered to induce friendly competition between inventors and makers of improved methods, appliances, and machines calculated to aid the planter and manufacturer in placing American cottons upon the highest plane of perfection. Also for superior exhibits of the cotton plant. The amounts and classification of said prizes shall be arranged by the Executive Committee, and special prizes may at any time be added.

SEC. 7. The Executive Committee shall have the power to disband this Association whenever it shall seem advisable so to do.

Mr. Sidney Root moved the adoption of the report.

Mr. Castleman moved to amend the section relative to the number of vice-presidents, so as to allow each State in the Union an official representation.

The amendment was discussed at length, and upon a vote lost.

The adoption of the report was then considered.

Captain James W. English favored the report, and thought that a clause should be inserted which would allow the Executive Committee to make such changes in the rules of government as should be necessary. He closed his remarks by offering a resolution delegating that power to the committee.

Governor Colquitt favored the amendment.

Major J. F. Cummings thought the report was in all respects adequate as a basis upon which t effect an organization.

A vote was then taken upon Captain English's amendment, which resulted in its adoption.

The report as amended was then adopted.

Governor Colquitt, for the Committee on Permanent Organization, reported the following as the list of officers:—

President—Senator Joseph E. Brown, of Georgia.

Vice-Presidents—Baltimore, Baldwin; Norfolk, Jas. L. Harway; Charlotte, Ely McCadden; Charleston, William Trenholm; Savannah, J. F. Wheaton; Augusta, William C. Sibley; Columbus, J. Rhodes Brown, William H. Young; Macon, Thomas Hardeman; Atlanta, J. F. Cummings; Montgomery, John Durr; Mobile, Mawry; New Orleans, Samuel Boyd; Galveston, ——; St. Louis, Thomas Allen; Memphis, ——; Nashville, ——; Louisville, ——; Cincinnati, ——; Pennsylvania, Stockton Bates; New York, ——; Rhode Island, ——; Massachusetts, ——; New Hampshire, ——; Illinois, ——; California, ——.

Treasurer—Samuel M. Inman, of Georgia.

Secretary—John W. Ryckman, of Pennsylvania.

Executive Committee—Mayor of Atlanta, *ex-officio* chairman, H. I. Kimball, B. F. Maddox, W. L. Calhoun, B. E. Crane, W. H. Patterson, M. C. Kiser, Evan P. Howell, W, B. Cox, Atlanta; Edward Atkinson, Massachusetts; Richard Garsed, Pennsylvania; Cyrus Bussey, Louisiana; J. W. Paramore, Missouri; John H. Inman, New York.

Finance Committee—Robert J. Lowry, Paul Romare, D. N. Speer, Atlanta; Morris Ranger, Louisiana; Thomas Dolan, Pennsylvania; William A. Burke, William Gray, Jr., Massachusetts: J. H. McMullan, Maine.

Mr. Sidney Root moved that the completion of the list of Vice-Presidents be referred to the Executive Committee, with power to act.

Mr. Castleman suggested that the Association would be benefited by locating an assistant secretary in Atlanta.

Mr. Kimball moved the addition of three names to the Finance Committee.

The motion was carried, and W. P. Inman and Campbell Wallace, of Atlanta, were added, as also was A. D. Lockwood, of Providence, Rhode Island.

Mr. Castleman's motion to increase the Finance Committee by the addition of two more names was lost.

Mr. S. M. Inman asked from whence the money to defray the expenses was to come, and asked to hear from Mr. Nagle regarding the feeling manifested toward the project in the North.

Messrs. J. W. Nagle and H. I. Kimball then addressed the meeting at length, setting forth the probable cost incurred in erecting buildings, &c., and the prospect of placing the stock.

A motion by Mr. Kimball, authorizing the Secretary and Treasurer to solicit and receive subscriptions, was carried.

Upon motion the meeting adjourned.

(From Atlanta Constitution, December 4th.)

SUGGESTIONS of great public importance are often allowed to go for naught because no energetic spirit stimulates them with life and vigor. It was evident to all that Mr. Atkinson's excellent idea could only reach substantial effect by being taken up and pushed. Events of the magnitude of the proposed Exposition do not come unbidden. Some one had to move, and it must be said to the praise of Atlanta that when the decisive time arrived her business men came forward and proclaimed in no uncertain terms that the institution should be established here.

The organization of the International Cotton Exposition Association, on Thursday afternoon, was a splendid achievement. Its officers are among the best men in the country. The selection of Senator Joseph E. Brown for the presidency is most commendable. No man in the South is more thoroughly imbued with true public spirit. His name is a guarantee to the world that the plan of the Exposition will be carried out to the letter, and will redound immensely to the prosperity of the cotton interests of the whole country. Atlanta has cause to be congratulated in the choice of one of her master-spirits to direct this movement.

The treasurer, Mr. Samuel M. Inman, is exceptionally well qualified for the position. He is one of the most prosperous commercial men of the cotton States, and one of the most extensive dealers in the staple. He is known in all the cotton markets of this country and Great Britain as a gentleman of the strictest integrity. Like Senator Brown, he comes boldly to the front when the interests of Georgia and the South call for his services. The financial management of the Exposition could not have been placed in better hands.

The selection of Mr. John W. Ryckman, of Philadelphia, as secretary, was an excellent one. He is a young journalist of no mean calibre, has had much experience in the planning of similar industrial expositions; is brim-full of energy and spirit; has a wide acquaintance with the cotton manufacturers and machinery makers of the North; is one of the publishers of the TEXTILE RECORD, the organ of these trades, and brings to his aid every qualification essential to the successful prosecution of his duties. While engaged in a business in which he takes just pride, he has very generously consented to come at once to Atlanta, open his office,

and devote himself diligently to the work of the association. That he will do it thoroughly is sufficiently demonstrated by what he has accomplished here during the past week in connection with his associate and partner, Mr. James W. Nagle. These gentlemen come to Atlanta to urge upon our people the importance of immediate action in this matter, and they certainly deserve great credit for their unselfish labor in bringing about the organization.

The Executive and Finance Committees are composed of gentlemen carefully selected from the leading cities and cotton manufacturing districts of the country.

It would require a lively imagination to picture the glory of the South a decade hence under the invigorating influence of this and similar expositions, when manufactures and commerce and agriculture have acquired a legitimate footing here. The South is rich in natural resources beyond the reach of ordinary calculation. Underlying our States are inexhaustible beds of coal and minerals which have scarcely felt the miner's pick. In every branch of industry there is a world of wealth before us, but particularly in cotton, our great staple product, there are splendid opportunities open to the capitalist and skilled workman. One of the greatest values of the coming Exposition will be the demonstration of this fact. Ten years ago the man was thought insane who suggested the construction of a cotton factory in the South. The impression prevailed that skilled labor could not be brought here; that the abundant water-courses of New England were essential; in fact, that the South was unfitted for the manufacturing business altogether. Since then, however, mills have been established here, the prosperity of which has astonished everybody. It has been found that in water-courses, fuel, and other important items, the South is nearly as well fixed as New England, and in the proximity of the staple she has vastly the advantage of her sister States in the North-east. We believe, in all seriousness, that in ten, or even fifteen years, if the South fosters and encourages industry, she will equal in the annual product of her cotton-mills the more mature districts of the North. The South will, by the exercise of the proper vigilance, eventually become the seat of the cotton manufacturing interest of the country, and the building of the mills will bring a long train of other factories and shops and agencies to furnish supplies.

We have all the material elements. What we want is capital, energy, and honesty of purpose. As for capital, it only requires to be assured of reasonable support. As for labor, there are at this time in the overcrowded manufacturing districts of Great Britain, France, and Germany thousands of skilled artisans yearning for chances in America. As for markets, the cotton fabrics of the United States are in demand above those of other countries everywhere under the sun. If we had a thousand mills in the South to-day our entire output of fabrics would be marketed at good prices. This is our opportunity. This Exposition will bring all the industrial elements together, will demonstrate all these things, and will bring about a strong financial and business affiliation between the sections.

It is not too much to say that it will bring to Atlanta such a delegation of the purse and brain and muscle of the land as was never seen apart from the Centennial Exposition.

It will bring such a display of improved mechanical products as will astonish the world. It will present the planter with new methods of ginning and baling his products that will add three cents a pound to his values. It will line our water-courses with factories, stimulate our export trade, call capital to the construction of Southern railroads, open up to us the magnificent range of South American and Mexican markets, to which we are a thousand miles nearer than New England, &c.

The prospect is certainly grand enough to call forth all the energy of our people.

(From Philadelphia Public Ledger, December 3d.)

ATLANTA, GEORGIA, is getting interested in the Cotton Exposition recently proposed by Mr. Atkinson. The *Constitution* of that place reports meetings of citizens to organize a company for holding the display in Atlanta. Messrs. Nagle & Ryckman, of the TEXTILE RECORD of this city, are in Atlanta, and it is at their suggestion that a stock company of Georgia merchants and planters is being formed. The purpose of the display is to bring the manufacturer and producer into closer relationship, introduce new machinery and induce capitalists to put up manufactories in the South, where the staple can be supplied at the lowest possible cost to the mills, and where water power is cheap and abundant. The *Constitution* says that one-half of the money supposed to be necessary to start the Exposition has already been pledged to the enterprise by the business men of Atlanta. Their are fair-ground buildings in the city which, with some alterations and improvements, could be used for the display, which it is proposed shall be held between October 15th and December 15th, at a season of the year when Northern visitors can escape the heated term, and see the cotton-fields in all their glory. It would certainly pay the South to hold such an Exposition, and invite capital and labor to develop the resources of States quite as rich in possibilities, agricultural and manufacturing, as some of the Western States that have more than doubled their population in the last ten years.

(From the Philadelphia Record, December 1st.)

THERE is a movement on foot among the cotton men to hold an Exposition of textiles somewhere in the South. It is engineered by Messrs. James W. Nagle and J. W. Ryckman, of this city. They are the publishers of the TEXTILE RECORD, and have been traveling through the South to impress upon that section the importance of such a show. They propose to hold it between October and December of next year. They claim that it will bring the planter and manufacturer into closer union of interest; it will secure the adoption of improved machinery and appliances for cultivating and preparing the fibre; it will present the planter with methods of economy that at present he does not dream of, whereby he can largely increase the products of his lands and market his crop at a reduced cost; it will show the folly of shipping our raw staple to Liverpool and paying import duties on the finished fabric; it will show that we make the best cotton machinery in the world; that we have every requisite facility for making superior goods, and that we can control the trade of the globe in cottons. Already, in order to hold their trade with some European and South American countries, English cotton manufacturers are counterfeiting American brands. The Exposition will awaken the Southern people to the importance of developing their material resources and securing home markets for their crops instead of paying high freightage for the transportation of their raw materials to New England mills.

(From Philadelphia Press, December 8th.)

MR. JAMES W. NAGLE and Mr. John W. Ryckman have just returned from a fortnight's tour of the seaboard Southern States, whither they went for the purpose of awakening interest in the proposed International Exposition of Cotton, its products and the machinery for cotton manufacture. Representing their TEXTILE RECORD, a new trade magazine of this city, which has no political leanings or affiliations, they had exceptional opportunity to study incidentally the temper of the planting, trading, and manufacturing residents of that section toward the nation and the ruling party. The results of their observations are of great interest, as they indicate that the same sort of an upheaval as has recently cracked the Bourbon crust of Virginia is in progress through more Southern States, with equal promise of confidence in the Government and re-awakened business enterprise.

A *Press* reporter found the gentlemen at their office in Walnut Place last evening. In answer to inquiries, Mr. Ryckman said, "The recent election has had a salutary effect in the South. A change has come over the people. The better classes look with favor upon the result. They have confidence in Mr. Garfield, and even those who most opposed him speak in friendly terms of the coming administration. With the exception of Mr. Bob Toombs and his few erratic followers, the sentiment of the South is decidedly in favor of less politics and more commerce. The people are thoroughly aroused to the immense industrial possibilities before them. They grasp with energy any project that will tend to the development of their resources and the extension of their trade. They welcome men of capital and good intentions. The day of sectionalism is past, a brighter era is dawning. The attention of business men is engrossed in the construction of mills, factories, and railroads, the opening of coal and iron mines, &c., and the political philosopher whose mischievous harangues once found heedful ears has no audience. There is even a growing sentiment toward tariff protection. Where only a few years ago that issue met with bitter antagonism there is a general awakening in its favor. So long as the principal industry of the South was the production of raw staples for export, they naturally desired the free entry of manufactured articles; but now that they see the advantage of utilizing their own water-courses, their own coal and other facilities in the manufacture of their own commodities, they want the same fostering policy which has magnified and strengthened the industries of the North exercised in the advancement of their own States. They are peering vigilantly into the future, knowing that their opportunity is before them, and they will not be slow in adopting measures of progression.

"The earnest and spirited manner in which they took up the matter of the Cotton Exposition when presented to them in a square business light, apart from all fine theory, shows a determination to put aside sectional conservatism of the past and enter heartily into commerce. This one great event will do more to enrich the cotton States than the united efforts of a million dawdling loggerheads like Toombs. It will point the capitalist to the South, where there are better chances of investment than were ever presented in the West. It will attract young men full of ambition and vigor who find it difficult to obtain footings in the overcrowded cities of the North to fields where they may exert their capabilities untrammeled to the advantage of the country and their own enrichment. Those who have formed an impression of the present States of the South from Mr. Stevens' peculiar mode of calculation should seek the views of more reliable statisticians, such, for instance, as Mr. Henry W. Grady, who has scarcely left the venerable Georgian a single point to work upon. The present feeling in the South finds its ablest exponent in Senator Joseph E. Brown, of Georgia, one of the most intelligent and conscientious of her state-men. He has a powerful following. In the new industrial *régime*, which he has in large part inaugurated, he will play a conspicuous part. He is a man eminently qualified to be a leader—aggressive, liberal, broad-minded, honest. He is in all respects the master-spirit of his State to-day.

"The choice of Atlanta as the location of the International Cotton Exposition meets with general approval. It is in the centre of the cotton belt, and at an altitude guaranteeing an agreeable temperature at all seasons. The business men are very public-spirited and liberal. It has abundant railroad and hotel facilities. Beyond question it is the most progressive Southern city at this time, and will attract a better display and larger crowd than any other place."

(From the New York Herald, December 14th.)

THE suggestions advanced by Mr. Edward Atkinson, of Boston, in the *Herald* of August 17th, in regard to the establishment of an International Cotton Exposition at some prominent city in the South, has met with warm approval throughout the entire cotton belt, particularly at Atlanta, Ga. In that city, on the 2d inst., a permanent organization was effected, and $50,000 was at once subscribed toward the general fund. The association was formed under the title of the International Cotton Exposition Company, and the capital stock was limited to $200,000. United States Senator Joseph E.

Brown, of Atlanta, was chosen president. The other officers are Samuel M. Inman, of Atlanta, treasurer, and J. W. Ryckman, of Philadelphia, secretary. The board of directors includes many of the most prominent cotton manufacturers of America. It is designed to give the Exposition at Atlanta during the months of September, October, and November next, when all the improved appliances used in the culture, preparation, and manufacture of cotton in all parts of the world will be brought together for the purpose of testing their merits. Efforts will be made to procure a charter from Congress before the holiday adjournment, and plans for the necessary buildings are already under consideration. The site selected is the City Hall square, which will afford about three acres of flooring for exhibition purposes. All kinds of cotton machinery will be constantly in operation during the days of the Exposition, including the gin, compress card, ring spinning, and looms, of both American and foreign make. The raw fibre will be taken from the bale and carried through the various processes necessary in the manufacture of the finest cloth. As this will take place under the eyes of experienced judges, it is expected that the long-disputed point as to the superiority of American or English methods will be definitely settled.

A SANGUINE SECRETARY.

The secretary of the Exposition Company, Mr. J. W. Ryckman, is at present in this city on business connected with the enterprise. In speaking to a *Herald* reporter about the proposed Exposition he said, "So far as the South and the whole cotton interest is concerned, this is felt to be the best suggestion that has ever been made in regard to an international cotton exposition. Many schemes have been talked over in a general way, but nothing practical was advanced till the *Herald* began to give the subject attention. Its editorial comments which have from time to time appeared have aroused great interest in the matter. The diversion of Southern ideas from political to commercial interests has brought about, particularly in Georgia, a desire to pay attention to the development of neglected resources, and to grasp the present opportunity to build up abused industries. All planters have long felt the need of improved methods in preparing their product for the mill, and also in the manufacture of the coarser fabrics on their own water-courses. If this Exposition is a success, it will not only present the planter with such improvements in the present gin and compress as will add at least three cents per pound to the value of his crop, but it will attract Northern capital to the construction of cotton mills all over the cotton belt. What few mills there are in Georgia and the Carolinas have demonstrated that fabrics can be manufactured cheaper in the Southern States than in any other place in America. At the meeting held in Atlanta, on December 2d, it was decided to put the shares at ten dollars each, as on that basis it was thought there would be a fair return for the investment. So great was the interest manifested that $30,000 worth of stock was pledged at once. This feeling has spread all over the South, and there seems to be a strong determination on the part of the citizens to hold as much stock as possible among themselves. Subscriptions are coming in quite rapidly from New York, Philadelphia, and New England cities, as of course aid from the North is expected and must be had to make the plan a success.

"As far as the site is concerned, no better place could have been chosen, as Atlanta is about the centre of the cotton belt, and its citizens have a keen appreciation of everything that tends to develop their territory. All classes of men interested in cotton and its manufacture have given the proposed Exposition such hearty approval that there can be no doubt as to its success. A prominent feature of the Fair will be the English annex, which will be erected by British manufacturers to show the skill of their inventors. It is in contemplation, if the results of this first experiment of holding an international cotton fair are satisfactory, to repeat the exhibition on a larger scale at the World's Fair at Inwood, in 1883. From the support which the *Herald* has given to the International Cotton Exposition proposition, a 'boom' has been started in the South which will stimulate its citizens to a greater industrial activity than they have ever before evinced."

INTERVIEWS ON THE EXCHANGE.

Among the members of the New York Cotton Exchange little is yet known about the proposed Fair. Merchants and brokers in the cotton trade, however, are apparently much interested in the matter, and have carefully read all that has been published concerning the project. There appears to be but one opinion concerning the timeliness and probably good effect of such an exhibition. A reporter talked with several members of the Exchange yesterday, and found that all substantially were of the one way of thinking, each and every one advocating the Fair, as likely to produce results of great practical and commercial value, both in the agricultural and mechanical preparation of the great staple.

Mr. John H. Inman, of Inman, Swann & Co., of this city, who is a member of the Executive Committee of the International Cotton Exposition, said that the company has not yet completed its organization, and the details of its plans have not, therefore, been agreed upon. The cost of the enterprise would be about $100,000. A vice-president is to be appointed from each of the principal cities of the country. The Fair will be of great value, in the first place, by enabling the planters to profit by all the recent improvements in the methods of planting, cultivating, and picking cotton; and in the second place by affording an opportunity for the spinners to compare the advantages of the best machinery for the manufacture of the raw material. Mr. Inman thought the Fair would be a great success.

Mr. Robert Tannahill, of Tannahill & Co., was very much interested in the project. He had at first been inclined to think that one of the Eastern manufacturing cities would be the proper place for the Fair, because of its large spinning interests. But perhaps Atlanta was a better location, because it was the centre of the cotton-growing district. The time of year chosen was that in which Atlanta becomes a fashionable resort for Northern people, on account of its delightful climate, and if the railroad companies make the reductions in fare and freightage which they made during the Centennial Exhibition, he saw every reason why the Exposition would be a great success. What the South needs is improved devices for picking cotton, and one of the most important objects of this Fair will be the competition which it will invite from inventors and manufacturers competent to give the planters their assistance in this problem. The cotton industry of the South is of growing importance. Almost every year since the war has witnessed a larger crop than was ever yielded in its most prosperous *ante-bellum* days, and each succeeding season shows an increasing yield. So far as Mr. Tannahill had conversed with members of the cotton trade and with manufacturers and spinners, he felt sure that the Exposition would be welcomed as a long-needed enterprise.

THE BLIGHT OF SLAVERY.

Another prominent merchant said, "The cotton industry almost stood still for very many years. The peculiar blight which slavery throws upon every industry with which it comes in contact is most strikingly shown in the history of the growth of cotton in the United States. There was not the same stimulus to provide improved methods that there was in other agricultural pursuits, because of the existence of slave labor. Everything in the way of improvement stood still for many years, and the fact that since the war the South has produced larger cotton crops than it ever did, because the improved agricultural appliances of the North have been used, shows the necessity of some competitive exposition which will improve still further the processes now employed."

(From Philadelphia Bulletin, December 7th.)

THE project for a great Cotton Exposition, to be held in the city of Atlanta, Georgia, is something to be hailed with pleasure by the people of the whole nation; for it shows an original idea full of importance to the cotton-growing States, which is in strong contrast to the old worn-out political ideas which have retarded the natural progress of the South. It is proposed to exhibit everything with reference to the growth and culture of cotton in all parts of the world, in its preparation for market at every stage, the various machines used in its production, the different kinds of cotton fabrics, and all that is of interest, near or remote, in the production of the most important of all known textiles. The city of Atlanta, where the exhibition is to be held, is one of the most wide-awake and progressive cities that can be found in the South, and its growth since the war, not only in population, but in energy, enterprise, and wealth, is remarkable. It is in the best geographical position for such an exhibition as is proposed, being in the heart of a vast cotton-growing country, and with railroad connections in all directions. The International Cotton Exposition Association, under whose auspices the enterprise is to be conducted, has for its President Senator Brown, of Georgia. The Treasurer, Mr. Samuel M. Inman, is also a Georgian, while the Secretary is Mr. John W. Ryckman, of Philadelphia, one of the publishers of the TEXTILE RECORD. All are gentlemen who may be relied on for carrying out the scheme to success.

(From the Philadelphia Press, December 7.)

ATLANTA, Ga., is priding itself over the fact that the Cotton Exposition to be held in that city next year is an assured success. The association which has been organized for the purpose is certainly a strong one, and includes the leading cotton manufacturers of the country, Philadelphia being well represented. The President is Senator Joseph E. Brown, and the Secretary, Mr. John W. Ryckman, of this city, who, with Mr. James W. Nagle, publishes the TEXTILE RECORD, the organ of this great trade.

CONSUL SHEPARD, of Bradford, England, writes to the State Department that "America and the East are the only sections of the globe from which Bradford has experienced an increased demand, except in the matter of yarns.

"Within the past year not a few operatives and experienced foremen have gone from Bradford to the United States, while large quantities of new and second-hand looms, also other manufacturing machinery, have found their way across the Atlantic. I look upon the increased exportation of machinery and raw material as a most pertinent comment upon the future commercial relations of the two countries. Of all rivals on neutral ground England must fear America, and proofs that the thoughts of the nation are continually upon us, lies in the fact that hardly a newspaper can be taken up which does not contain some article upon or reference to the United States."

BETWEEN protection and free trade there is one all-embracing difference, which can not be too conspicuously exhibited or too thoroughly comprehended. The mission of the former is to build up; that of the latter to break down. Protection reinforces skilled labor; free trade antagonizes it. Protection opens mines, erects furnaces, establishes foundries, builds rolling-mills, creates machine-shops, starts cotton and woolen factories, and gives employment to hundreds of thousands; free trade shuts up the mines, puts out the fires in the furnaces, silences the trip-hammers and the rolls, stops the whirling wheels, arrests the spindles, and drives the multiplied thousands into idleness or into other occupations where the pay is less and their skill is lost. Protection creates home markets; free trade destroys them. Protection increases industry; free trade diminishes it. Protection secures good wages; free trade makes them cheap. Protection eventuates in individual and national self-reliance; free trade results in individual and national dependence. And so on, to the end of the chapter.—*Inter-Ocean.*

COTTON MOVEMENT IN THE UNITED STATES, THREE MONTHS ENDING NOVEMBER.

OFFICIAL REPORT

NATIONAL COTTON EXCHANGE OF AMERICA.

NEW ORLEANS, LA., December 10th, 1880.

John B. Lafitte, Esq., President National Cotton Exchange of America,

SIR:—We have the honor to submit the following report of the secretary, with our approval. The committee have carefully examined every item and find them supported by proper vouchers. The figures of the rail movement overland have claimed their especial attention, and in every instance, except the Wabash Railroad, they find that the statements of the secretary are based upon official written reports signed by the freight agents of the railroads. The Wabash Railroad shipments from Hannibal were obtained through Mr. C. W. Simmons, secretary of the St. Louis Cotton Exchange.

THOS. H. HUNT, Chairman.
A. H. MAY,
D. A. GIVEN,
Of Committee on Crop Statements.

To the Chairman and Members of the Committee on Crop Statements, National Cotton Exchange,

GENTLEMEN:—The usual monthly figures of the general cotton movement are herewith submitted for your inspection and approval. They show an increase in port receipts during the quarter ending with the close of November of 246,706 bales compared with last year.

The aggregate movement overland from producers shows a further falling off, increasing the deficiency to 69,219, while the rail shipments to the mills direct are 14,657 bales short of the corresponding quarter of 1879. Northern spinners have increased their purchases at the outports, however, offsetting the decrease in the overland, and their total takings during the quarter are in excess of last year 11,521 bales.

The following shows the

OVERLAND MOVEMENT DIRECT TO MILLS BY MONTHS

thus far this year and for the whole of the two previous years, viz.:—

	This year.	Last year.	Year before.
September,	12,039	22,432	8,373
October,	63,260	48,430	38,705
November,	102,811	121,914	54,195
Total three months,	178,119	192,776	101,273
December,		132,147	60,952
January,		67,523	55,666
February,		40,485	64,225
March,		26,304	63,626
April,		19,874	51,797
May,		9,764	17,316
June to August,		29,367	24,987
Total year,		518,240	439,842

The details appended show that during the quarter 2,628,914 bales of the present crop came into sight at the ports and at points of crossing, *en route* from producers to Northern mills, showing an excess of 208,835 bales over last year and 757,188 over the year before.

Continuing the form of statement inaugurated in these reports last season, we have the following interesting showing:—

SUPPLY.

	1880.	1879.	1878.
Stock September 1st,	144,864	65,070	45,287
Port receipts for quarter,	2,428,890	2,182,184	1,743,340
Overland to mills,	178,119	192,776	101,273
" to Canada,	8,731	6,928	4,691
In transit overland close Nov.,	13,174	38,191	22,422
Total supply, bales,	2,773,778	2,485,149	1,917,013

DISPOSITION.

EXPORTED TO—	1880.	1879.	1878.
Great Britain,	833,788	808,423	561,134
Channel ports,	6,883	5,854	10,590
France,	179,063	117,772	85,914
Continent,	244,263	248,276	235,917
Total takings by Northern mills,	554,355	542,834	385,886
Shipped to Canada, overland,	8,731	6,928	4,691
Stocks at U. S. ports close Nov.,	907,671	669,528	594,796
At sea between ports close Nov.,	25,850	47,313	15,663
In transit overland close Nov.,	13,174	38,191	22,422
Totals,	2,773,778	2,485,149	1,917,013

THE TAKINGS OF NORTHERN MILLS

give an average per week for the thirteen weeks of 42,643 bales, against 41,756 last year, and 29,683 the year before.

The monthly figures compare with the past two years as follows:—

	1880.	1879.	1878.
September,	64,000	84,395	75,802
October,	178,341	149,305	148,709
November,	312,014	309,134	161,375
Total three months,	554,355	542,834	385,886
December,	....	372,270	155,837
January,	....	205,112	153,643
February,	....	107,880	165,695
March,	....	83,528	174,714
April,	....	65,805	155,491
May,	....	41,439	85,962
June to August, inclusive,	....	155,129	96,156
Total,	....	1,573,997	1,375,384

The general details are annexed:—

NET RECEIPTS COTTON AT UNITED STATES PORTS.

September 1st to close November.	1880.	1879.
New Orleans,	531,990	545,935
Galveston,	264,139	253,057
Indianola,	7,583	4,435
Mobile,	164,037	159,225
Charleston,	347,314	247,625
Port Royal,	24,179	19,993
Savannah,	467,474	407,914
Wilmington,	74,559	51,836
Norfolk,	341,638	257,657
City and West Point,	97,862	101,186
Baltimore,	12,305	3,776
Philadelphia,	11,892	10,327
New York,	35,200	41,797
Boston,	41,162	70,380
Providence,	3,125	3,463
Pensacola,	1,460	151
Brunswick,	3,764	2,427
Portland (according to railroad statements),	46	1,000
Total,	2,428,890	2,182,184

EXPORTS.

	G. Britain.	France.	Continent.	Channel.	TOTAL. 1880.	1879.
New Orleans,	215,075	114,525	65,277	1,438	396,315	345,476
Galveston,	64,418	11,385	27,286	880	103,969	114,603
Mobile,	16,398	....	1,063	..	17,461	14,192
Savannah,	108,457	7,358	64,756	..	180,571	170,659
Charleston,	77,468	26,323	38,748	1,300	143,839	120,592
Wilmington,	20,408	1,444	3,869	1,460	27,181	18,462
Norfolk,	129,391	2,850	....	1,805	134,046	92,521
Baltimore,	31,855	....	6,463	..	38,318	28,049
New York,	124,244	15,178	32,351	..	171,773	203,311
Boston,	21,007	....	....	..	21,007	51,873
Philadelphia,	14,888	....	50	..	14,938	9,586
Port Royal,	10,179	....	4,400	..	14,579	11,001
Various,	....	....	....	..	....	....
Total,	833,788	179,063	244,263	6,883	1,263,997	....
Last year,	808,423	117,772	248,276	5,854	....	1,180,325

STOCKS AT U. S. PORTS NOVEMBER 30TH.

	1880.	1879.
New Orleans,	252,476	242,891
Galveston,	93,084	77,586
Mobile,	35,467	40,354
Savannah,	149,297	97,006
Charleston,	126,313	63,733
Norfolk,	55,368	53,037
New York,	109,464	56,496
Other ports,	86,202	38,425
Total,	907,671	669,528

OVERLAND MOVEMENT.

	1880.		1879.	
Shipped from St. Louis during quarter ending close Nov.,	95,370		174,989	
Carried North across Mississippi river at Hannibal,	58,364		56,291	
Carried North from Cairo via Cairo and Vincennes Railroad,	22,103		21,828	
Carried North from Cairo via Illinois Central Railroad,	22,302		23,702	
Carried North from Evansville via Evansville and Terre Haute Railroad,	4,413		2,090	
Carried North from Louisville via Ohio and Mississippi Railroad,	12,5		27,099	
Carried North from Louisville via Jeff., Mad. and Ind. Railroad,	33,346		42,267	
Carried North from Louisville via L., N., A. and C. R. R.,	5,651		....	
Carried North from Louisville via Lou., Cin. and Lex. Railroad,	16,861		21,469	
Carried North via Cincinnati Southern Railroad,	30,555		....	
Receipts at Cincinnati by river,	7,339		11,698	
Shipped to mills adjacent to river, not included in above,	5,113		2,241	
Total carried overland,		313,979		383,665
Less—				
Receipts from New Orleans at St. Louis,	....		....	
Shipped from Cairo to St. Louis,	136		3,861	
Shipped from Cairo to Louisville,	....		....	
Shipped from St. Louis to Memphis and New Orleans by river,	3,600		1,210	
Shipped from St. Louis to New Orleans by rail via Cairo,	702		....	
Receipts at Cincinnati by river from New Orleans,	25		6	
Shipped from Cincinnati to New Orleans by river,	..		....	
Carried through Louisville from New Orleans,	23		476	
Carried through Louisville from Mobile,	9,738		13,072	
Carried through Cairo from New Orleans,	51		....	
Carried through Cairo from Mobile,	7,703		3,932	
Carried through Evansville from New Orleans,	133		....	
Shipped from St. Louis to Louisville,	..		216	
Shipped from St. Louis via Savannah,	195		....	
Shipped from Galveston via Cairo,	..		....	
		22,306		22,773
Total overland movement from producers direct,		291,673		360,892
Deduct overland receipts at—				
New York,	32,103		37,111	
Boston,	41,162		70,380	
Providence,	3,125		3,463	
Philadelphia,	11,892		10,327	
Baltimore,	3,321		716	
Portland,	46		1,000	
Points in Canada,	8,731		6,928	
		100,380		129,925
		191,293		230,967
SHIPMENTS DIRECT TO MILLS from producers during quarter, according to statements of railroads crossing the Ohio and Mississippi rivers,		178,119		192,776
Leaving in transit overland to Eastern delivery ports direct from producers at the close of November,		13,174		38,191

RECAPITULATION.

Receipts at United States ports during quarter,		2,428,890		2,182,184
Shipped overland to mills,		178,119		192,776
Shipped to Canada,		8,731		6,928
In transit from points of crossing on Ohio and Mississippi rivers to Eastern delivery ports, close November,	13,174		38,191	
Total, bales,		2,628,914		2,420,079

SPINNERS' TAKINGS.

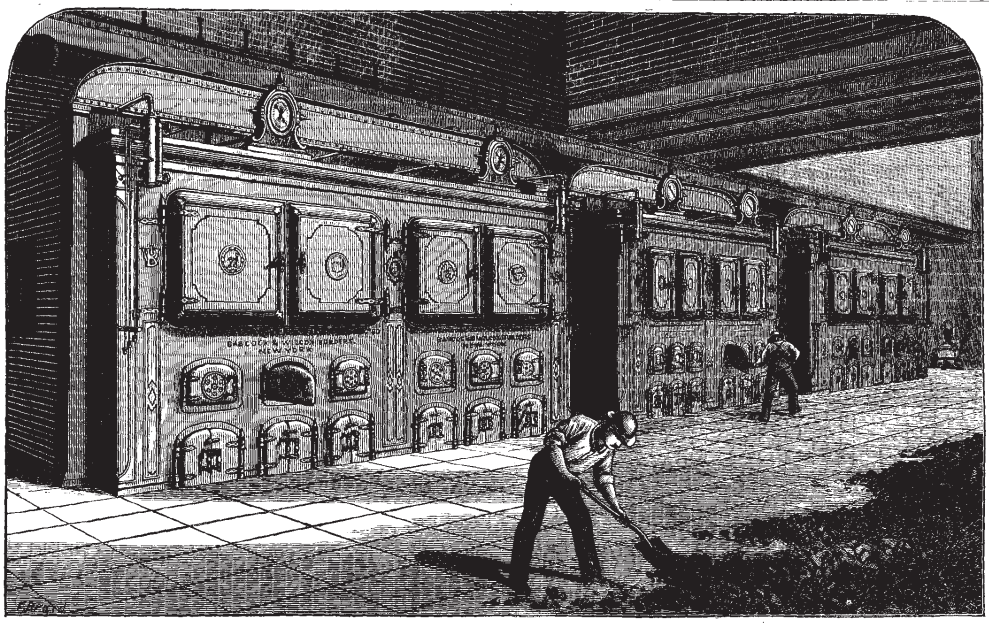
Stock at United States ports September 1st,	144,864		65,070	
Receipts at United States ports quarter ending close November,	2,428,890		2,182,184	
Total,		2,573,754		2,247,254
Foreign exports same quarter,	1,263,997		1,180,325	
Stocks at United States ports close November,	907,671		669,528	
		2,171,668		1,849,853
		402,086		397,401
DEDUCE—				
Cotton in transit between delivery ports close Nov.,		25,850		47,343
Taken by spinners from ports during September, October, and November,		376,236		350,058
Add overland shipments direct to mills North and East of the Ohio and Mississippi rivers during same time,		178,119		192,776
Total taken for Northern consumption during quarter,		554,355		542,834

HENRY G. HESTER,
Secretary National Cotton Exchange.

Business Announcements.

WANTS, FOR SALE, &c.

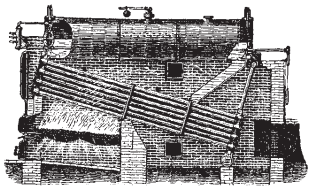
All advertisements under this heading $1.00 per line, first insertion; 50 cents each subsequent insertion.



Babcock & Wilcox Boilers, at F. O. Matthiessen & Wiechers Sugar Refining Co., Jersey City, N. J. 2d Order, 1500 H. P.

BABCOCK & WILCOX
WATER-TUBE STEAM BOILER.

Centennial Exposition Medal Awarded this Boiler



For Highest Economy and Efficiency on Test.

The following are a few of the parties having these Boilers in use in LARGE LOTS:

SINGER MANUFACTURING CO., New York, 12 orders,	*3,191*	H. P.
HARRISON, HAVEMEYER & CO., Philadelphia, 5 orders,	*3,700*	"
DECASTRO & DONNER SUGAR REFINING CO., Brooklyn, 6 orders,	*2,650*	"
MATTHIESSEN & WIECHERS, Jersey City, 4 orders,	*3,500*	"
BROOKLYN SUGAR REFINING CO., Brooklyn, 2 orders,	*1,500*	"
MILWAUKEE STEAM SUPPLY CO.,	*500*	"
M. GRAMBRILL & CO., COTTON MILLS, Wilmington, Del.,	*500*	"
BOSTON SUGAR REFINERY, Boston, Mass.,	*1,000*	"
RARITAN WOOLEN MILLS, Raritan, N. J., 2 orders,	*720*	"
THE JESSUP & MOORE PAPER CO., Wilmington, Del., 3 orders,	*850*	"
AMERICAN GRAPE SUGAR CO., Buffalo, N. Y., 4 orders,	*4,600*	"
ERIE ELEVATOR, Jersey City, 1 order,	*500*	"
STANDARD OIL REFINERY, New York, 1 order,	*400*	"
NORTH BEND PLANTATION, Louisiana, 2 orders,	*400*	"
SOUTH BEND IRON WORKS, South Bend, Ind., 2 orders,	*450*	"
CHEENEY BROS., Silk, South Manchester, Conn., 1 order,	*350*	"
JOHN BROWN'S SONS, Woolens, Philadelphia, 1 order,	*500*	"
WM. WHITTAKER & SONS, Cotton and Woolen, Philadelphia, 1 order,	*250*	"
JAMESTOWN COTTON MILL, Jamestown, N. Y., 1 order,	*160*	"
JAMESTOWN ALPACA MILL, Jamestown, N. Y., 1 order,	*100*	"
BOUND BROOK WOOLEN MILLS, Bound Brook, N. J., 3 orders,	*445*	"
FAIRMOUNT WORSTED MILLS, Philadelphia, 1 order,	*200*	"

And hundreds of others, in all kinds of business, from *50* to *1000* H. P. each.

☞ILLUSTRATED CIRCULARS, AND OTHER INFORMATION DESIRED, FURNISHED PROMPTLY.☜

BABCOCK & WILCOX, Engineers,

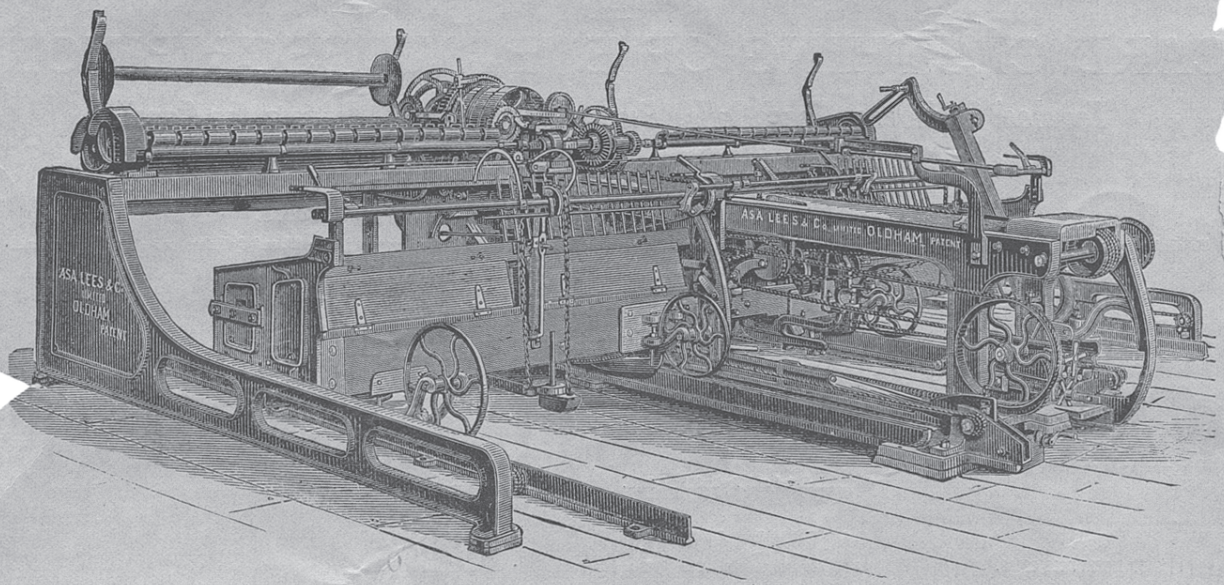
48 South Canal St., Chicago. 32 North Fifth St., Philadelphia. 30 COURTLANDT ST., NEW YORK.

ASA LEES & CO., LIMITE

SOHO IRON-WORKS, OLDHAM, ENGLAND,

MAKERS OF ALL KINDS OF

MACHINERY FOR SPINNING and TWISTING COTTON and WOOL.



PATENT SELF-ACTING WOOLEN MULE.

WILLOWS.—Ordinary kind, with Automatic Feed and Delivery; also, with Automatic Feed Regulating Motion.

SCUTCHERS, with Lap Machine, Single, Double, and Treble; also, with Improved Lord's Regulator.

CARDING ENGINES, with Rollers and Clearers, Single and Double; Wellmann's Cards; Evan Leigh's Revolving Flat Cards. **New Improved Carding Engine with Revolving Flats,** with 90 Flats for 45 inch and 100 Flats for 50 inches diameter of Main Cylinder, new construction of Flats covered on Ashworth's New Patent Method.

This Card produces 50 per cent. more than the ordinary revolving flat Card, having one-half more flats at work during a giving time, the Card Clothing being of the same width as in ordinary Cards. This Carding Engine bids fair to supplant all others.

DRAWING FRAMES with Improved Front and Back Stopping Motions.

FLY FRAMES, Slubbing, Intermediate, and Roving, made from new pattern with the most recent improvements, ordinary and long collars, division plates, &c.

OPENERS.—Ordinary kind, with Porcupine Cylinder, Taft and Edwards Opener, also combined with Lap Machine.

PATENT SELF-ACTING MULES for Coarse and Fine Counts, with A. L. & Co.'s Patent Strapping Motion, Backing-off Cam and Spring, Full Cop Stopping Motion, and all the usual extra motions.

PATENT SELF-ACTORS FOR WOOL AND WORSTED.—(*For description, see "Textile Manufacturer" of May 15th, 1880.*)

THROSTLE SPINNING AND DOUBLING FRAMES.

RING SPINNING AND DOUBLING FRAMES.

SELF-ACTING TWINERS, with Chisholm's Patent Locking Motion.

The construction and finish of all these Machines is of the highest order, and special attention is being paid to all details.

ESTIMATES AND PLANS OF COMPLETE MILLS ON APPLICATION.

ALL COMMUNICATIONS RELATING TO AMERICAN BUSINESS TO BE ADDRESSED TO

C. E. RILEY & CO., 236 Chestnut St., Philadelphia,

AGENTS FOR THE UNITED STATES.

E. JAMES SMITH WOOLEN MACHINERY CO.

WORKS, 411 to 421 Race Street, corner Crown, Philadelphia, Pa.

WOOLEN MACHINERY,

INCLUDING MACHINERY FOR THE PREPARATION OF WOOL,

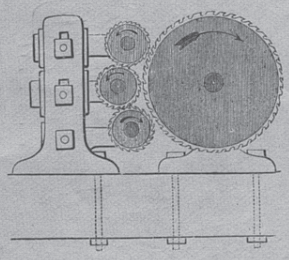
ALSO

CARD CLOTHING OF EVERY DESCRIPTION,

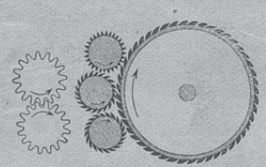
Toothed Cylinders, Feed Rolls, Burr Machines and Breasts for Cards.

BURR TOOTH. *SECTION.* *LICKERIN TOOTH.*

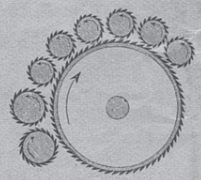
We desire to call the attention of those using Cards for either Cotton, Woolen, or other Fibrous Materials to our Improved Wire Wound Cylinders and Rolls, together with the various Attachments for Cards in which our Wire Cylinders and Rolls are used.



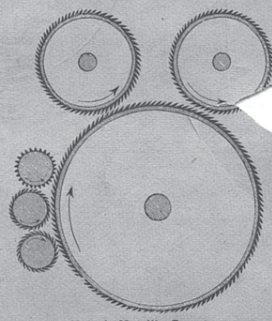
SELF-STRIPPING FEED-ROLLS.



Combined Fluted and Toothed Feed-Rolls.



Metallic Breast with 5 Workers and Feed Rolls.



12-inch Metallic Breast.

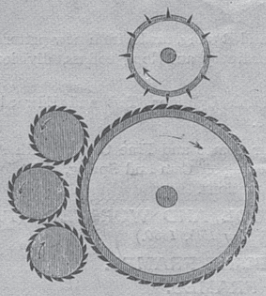
CARDING AND SPINNING MACHINERY.

Garnett or Hard Waste Card, for Reducing all kinds of Waste.

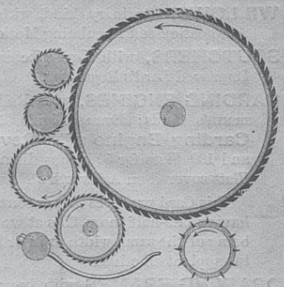
Wool-Washing Machines, 30, 36, and 46 inches.

SELF-ACTING MULES.
HAND JACKS.
RING TWISTERS.
SPOOLING AND DOUBLING MACHINES,
For making Two, Three, and Four Ply Yarn.
WARP SPOOLERS.
SIZING MACHINES AND DYE BOXES.
FULLING MILLS.

CLOTH-WASHING MACHINES.
WOOL AND COTTON DRYERS.
WOOL PICKERS.
BURRING AND MIXING PICKER.
"PARAGON" FAST-RUNNING DOFFER COMB.
CARD GRINDERS, Cylinder or Traverse.



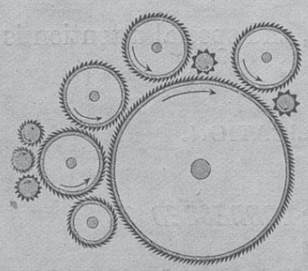
Common Burring Machine with Feed Rolls.



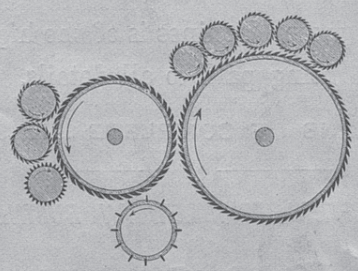
Basket Burring Machine.

SHAFTING WORK A SPECIALTY.

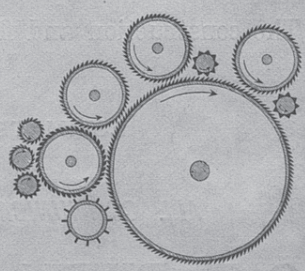
SHAFTING, HANGERS, PULLEYS, COUPLINGS, &c.



16-inch Combined Burring Machine and Breast.



10-inch Combined Burring Machine and Breast.



16-inch Compound Breast.

Further details furnished on application. Correspondence solicited.