

THE WORLD'S WORK.

THE ATLANTA COTTON EXPOSITION.

THE Exhibition of raw materials and machinery connected with the production of cotton and its manufacture into threads and fabrics, recently held at Atlanta, Georgia, was, in many respects, the most interesting exhibition ever held in this country. It was of value, first, to the planter and the maker of tools and fabrics; and secondly, in a more general way, to all the people. It showed, on the one hand, the sources of raw materials, and on the other, the wants and limitations of those who use these materials. In cotton spinning and weaving, invention has been active for years, and the business is in a measure fixed and settled. Cotton raising and shipping has, on the other hand, been for generations conducted in a simple and rather inefficient manner, and by the aid of tools that were badly designed or built upon unbusiness-like principles. It is

best, therefore, to consider here only those new tools and methods, shown at the Exhibition, that appeared to be of most promise to the cotton producer.

The Exhibition was practically divided into two parts. There was a display of appliances used in the production of cotton, from the actual plants growing in the fields to the finished bale ready for market, and a display of textile machinery used in all the processes, from the opening of the bale up to the finished cloth. It has been supposed that these two classes of men, the planter and the manufacturer, were sharply divided, and that the bale was the dividing mark between them. The Atlanta Exhibition plainly showed that this is not so. The planter's field of work extends far beyond the bale. He is grower and manufacturer, too, and has as much interest in machinery as the mill-

owner. Moreover, the dealer who buys the bales of the planter to sell to the mill has much to learn. His ways are unbusiness-like and wasteful, and his machinery imperfect. If the planter is wise, he will consider also the new ways and tools that may help him to save something of the ruinous loss that follows his beautiful product while it is in the hands of the factor and shipper.

Improved Cotton Planter.

COTTON is commonly planted by hand or horsepower machines in drills, and when the plants are up, a portion in each row is destroyed, leaving the rest to stand at regular distances apart from each other. This system involves a loss of seeds, young plants, and much labor. A horse-power planter, first used in planting corn in the hill, was shown at the Exhibition as adapted to planting cotton-seed at certain fixed distances in a row, thus saving the labor of removing the plants not needed. The machine consists essentially of a box or hopper for holding the seed, a simple device for opening the ground, and a simple mechanism for counting the seeds and dropping one or more at fixed distances in the furrow. In the hopper containing the seed is a small wheel, intended to revolve on a horizontal axis in such a position that it will be about half-buried in the loose seeds. On the rim of the wheel are a number of buckets or cups, each intended to hold one seed. In connection with each cup is a grip, or pawl, that by its weight drops over the cup and keeps the seed in place. As this wheel is turned, by suitable connections with the wheels of the machine as it moves over the ground, each seed is carried over the top and dropped into a spout. The grip lets go its hold at the right instant, and thus the seeds are dropped one at a time, each revolution of the wheel delivering a fixed number of seeds over a known space of ground.

The spout delivers the seed to the drill just behind the cutter that opens the ground, and it is then covered by the broad tread of one of the wheels of the machine. In this spout there is also a valve, that may be controlled by a boy riding on the machine, or by a simple mechanical device that opens and closes the valve at regular intervals. It is easy to see that in such a machine it is possible to both count the seeds and to place one or any number in a hill, at any desired distance. A change in the gearing alters the spacing in the drill, and once fixed, it drops the seeds at regular distances apart, whatever the pace of the horse. Two styles of this machine were shown—one intended to be guided like a plow, and a larger machine, that plants two rows of seeds at the same time, on which the boy who tends the dropping device and the driver may ride. We would suggest that the machine should be automatic, to get rid of the work of the boy. The measuring device sometimes used should not be separate. In other words, the planter should be automatic and self-contained.

Insect-destroying Apparatus.

THE cotton-worm, Colorado beetle, and other insects injurious to the cotton-plant, may be destroyed either by sprinkling solutions of various chemicals, such as London purple, over the plant, or by dusting the foliage with various poisons in the form of dry powders. A

number of appliances for showering the plants with the solutions or powders have been introduced, but none have been constructed upon so large and complete a scale as some new machines, shown at Atlanta for the first time. The largest of these sprinklers is automatic in action, may be easily moved by one horse or mule, and will thoroughly drench every plant in twenty rows at the same time. It consists of a horizontal triangular frame of wood and iron, supported on three wheels,—one guiding-wheel in front and two trailing-wheels behind,—a tank for the liquid, and a sprinkling device of novel form. On top of the frame is erected a wooden tripod, or derrick, and from the center is suspended, near the top, a barrel for holding the solution. A rope, pulley, and small windlass are also provided for lifting the barrel to its place. A rubber pipe extends from the bottom of the barrel to the rear of the machine, where it divides into branches—each branch hanging down behind the machine and between every second row of plants. Thus, if there are twenty rows of plants to be sprinkled, there are ten branch pipes. The elevated position of the barrel gives a good head to the streams, and the motion of the apparatus over the ground keeps the solution agitated and prevents the mixture from clogging the pipes.

The delivery-pipes that hang between the rows of plants at the back of the apparatus divide just above the ground into two branches. Inside the two branches are coiled springs that tend to keep the pipes spread apart, and at the end of each is a brass nozzle, designed to trail along the ground as the machine moves forward. The distance between the rows of plants is greater than the spread of these branch pipes, and as they are dragged over the ground, they strike the stems of the plants on each side. The spring allows them to pass and then spreads them out again, so that each nozzle must pass close under every plant in its row. It has been found that, to destroy the insects, the spray must be driven upward from below the plant. This arrangement of the delivery-pipes, and the fact that the jets are all delivered upward, accomplishes the purpose admirably, and is a most ingenious application of means to ends. The jarring of the elastic pipes against the plants also tends to scatter the shower of spray in every direction, and every plant and leaf is reached by the liquid poison. The nozzles used in this apparatus are of a new form, that may prove of value in other hydraulic machines. They consist of brass cups fitted with tight covers, having a small hole at the center. The delivery-pipe enters this cup at the side next the bottom, and the water is carried round and round the inside of the cup till it is filled, when the excess escapes upward in spiral or rifled jet. The machine examined was in operation, and of a small size, and thoroughly drenched every plant in twelve rows at one time. In practice, the barrels, filled with the poison in solution, are placed at convenient distances in the field, and when one is empty it is lowered from the machine, and either refilled and hung on the machine, or a fresh barrel is taken. In moving the machine on roads, the horizontal frame is shut up by sliding the parts of the frame one over the other and clamping them in this position. The wheels and the upright tripod remain fixed, but the wheels are sufficiently near together to enable the apparatus to

pass through any ordinary farm-gate. All the materials are of the cheapest and most common character consistent with strength, and the apparatus can be readily made in any wagon-shop for a moderate sum of money.

The apparatus for blowing dry powders over cotton-plants consists of a horizontal triangle of wood, mounted on three wheels and intended to be drawn by one horse. Over the forward wheel is a hopper for holding the dry powder, and closed by a tight-fitting cover. Under the hopper is a small fan-blower, that may be connected by a crossed belt with the axle of the leading wheel. At the top of this blower is an opening into the hopper, with a second opening on the opposite side, so that the blast of the blower enters the hopper at the bottom on one side and passes out at the other. The motion of the machine over the ground drives the blower, and the blast of air it sends through the hopper takes up a portion of the powder and carries it to the discharge-pipes at the rear of the machine. These pipes are of sheet-iron, and hang down between the rows of plants, so that three pipes cover six rows of plants. When the machine is driven over the field, the pipes discharge clouds of the dry powder that completely cover every plant in reach. In a strong wind, when the machine is moved side to the wind, the number of rows covered may be much larger, as the wind blows the powder over the plants for some distance. Another and cheaper form of the same machine, and designed to discharge only one jet of powder, employs a common hand-bellows attached to the hopper. In this case, the machine is fastened to the handle of a plow or cultivator, and the bellows is operated by the foot of the plowman as he walks behind. These two machines—the automatic sprinkler and the rotary dust-blower—are the largest and most complete tools of their class yet brought out. They are admirably designed and, at the same time, cheap and easily managed—rather unusual merits in large agricultural implements.

Gins and Seed-Cotton Cleaners.

MANY attempts have been made to construct a machine that would pick the cotton from the plants in the field. As far as can be learned, none of these experiments have been successful upon a commercial scale. The entire crop must be gathered by hand, and thus the supply of labor at the harvest limits the size of the crop. The picking is performed in haste, and the crop is always liable to injury by storms, contact with dust and dirt, and general ill-usage from the field to the gin-house. The first mechanical step beyond the field is, therefore, to clean the seed-cotton. Several machines for this purpose are already in the market. A comparatively new machine, inspected while in operation, seemed to do its work thoroughly and quickly. It consists of a suction-fan, a "whipper-wheel," or light paddle, for stirring up the cotton while exposed to the blast of air set up by the fan, and a suitable feed-box or hopper. The seed-cotton is placed in the hopper at the side of the circular chamber containing the whipper-wheel, and enters this chamber through an opening at the side near the bottom of the hopper. At the top of the chamber is an opening covered with wire netting, and through which the fan draws its blast. There is also an opening below, where

the cleaned cotton is thrown out. The fan and the whipper-wheel turn at a high speed upon the same shaft, and the action of the machine is to create a powerful blast of air through the chamber into the fan. The cotton is drawn in by the air-current or is fed to the machine by its own weight, and on entering the chamber, is driven and dashed around the chamber by the whipper-wheel in a direction opposite to the blast. All the dust and "trash" is shaken out and swept away by the blast, but the tufts of cotton carrying the seeds cannot pass the netting, and fall out below after one or more revolutions around the chamber. The blast carrying the dust and small leaves passes through the fan, and is thrown outside through a pipe leading out-of-doors. The apparatus is self-contained, and is designed to clean from ten to twenty-five bales of seed-cotton in ten hours, according to the size of the machine.

The display of gins was very large, but, with one exception, there was apparently no radical improvements over the many excellent tools of this class already in use. There were, however, several minor modifications of the saw-gin which seem to have merits. In one gin a new style of saw was exhibited. It consists of a sectional saw divided into small segments intended to be locked into the rim of the saw, each segment containing about eighteen needle-pointed and curved teeth. These sections of teeth can be easily removed for repairs or sharpening, and save the time and trouble of removing the whole saw when only a few teeth are injured. The device is simple and convenient.

Another new appliance consists of a series of wooden friction-rollers placed around the brush that feeds the cotton to the saws. The object sought is to preserve the cotton from injury by friction against the sides of the gin. It appeared to work to advantage.

The seeds of the long staple cotton may be taken out of the cotton by the roller-gin. Here the smooth seeds are pressed out as the cotton meets the leather-covered rollers. The short staple cotton, which forms the larger part of the entire crop, has seeds that retain a part of the lint, and they must be violently torn away by the sharp teeth of the saws. This injures the cotton to a greater or less degree, and it would seem that, if the roller-gin could be adapted to the short staple cotton, there would be a great gain in the quality of the finished lint. One new gin was shown in operation that appeared to do this work effectually and at a very fair speed. The gin consists of two rollers covered with rough leather, and a novel attachment for holding the seeds against the rollers while the lint is pulled off. Between the pair of rollers is a set of steel combs, designed to move one within the other at each revolution of the rollers. The seeds are caught and held by the teeth of these combs during a part or the whole of one revolution of the rollers, when they open and allow the seed to fall between the rolls. This intermittent action is controlled by suitable mechanism, and requires no attention from the operator. Tufts of cotton only partly cleaned cannot fall between the combs, and the slight nap that clings to the seed does not prevent its escape when the lint is removed. This gin is regarded by those competent to form an opinion as the most valuable machine of its class yet introduced. Its future success must, how-

ever, depend on the speed at which it will do the work. It certainly delivers the cotton in a better condition than the saw-gins, the staple being longer and less torn and shredded. It does not throw the lint out in a loose and feathery cloud that must be caught in a close and dusty "lint-room," but lets it fall in small, coherent masses, that are evidently in a good shape for spinning. On the other hand, the amount of cotton cleaned in a given time appeared to be less than with the saws. The preparation of cotton for market is almost universally too rough and hasty for the best results. The better the quality the higher the price, and the matter turns upon the question whether the improved quality of the lint delivered by this machine may not more than compensate for the loss of time.

Gin-saw Sharpener.

A SMALL self-feeding gin-saw sharpener, intended to be held in one hand, was examined, that seemed to have the merit of cheapness and simplicity. It is held on the edge of the gin-saw by the left hand, and in this position a small steel disk-shaped file cuts the front edge of one tooth, while two long, triangular-shaped files cut the sides of a tooth in the rear. The machine is operated by turning a handle, and at each revolution of the circular file a dent in the file catches in the next saw-tooth and moves the machine forward. The machine thus feeds itself to the work, and the operator has only to hold it upright and turn the crank. The two files at the rear have an alternating up and down motion, and finish off the points of the saw-teeth. The tool appeared to be compact and convenient, and to work fairly well.

New Cotton-baling Press.

IF there is any one point at which every one who has to do with cotton, from planter to mill-owner, is losing money, it is at the cotton-press. The manner in which this light and delicate material is prepared and sent to market is something that should be entirely reformed. Here is a material depending wholly for its commercial value upon its purity, cleanliness, and quality, that is thrown, like so much straw, into a press and squeezed into a heavy and unwieldy mass, half-clothed with a cheap and worthless fabric, and called a cotton bale. The loss by exposure to the weather, rough usage in transportation, frequent and wholly unnecessary samplings and resamplings, by theft, and the cost of handling so bulky a package,—all these losses fall on the planter, and amount annually to an enormous sum of money. There appears to be no uniform standard of weight, size, or shape of bale, and any process or machine that makes it possible to deliver this great crop in a safer and better package must be regarded as a very valuable invention.

The machine is a self-packing press, that works continuously, the cotton being fed at the top from a hopper, and shot out below in the form of a small, neat package, safely inclosed in a strong canvas bag. The press exhibited was arranged horizontally, the hopper being placed on top, and the pressure being applied to the mass of cotton in the machine by means of a follower moving horizontally; but this arrangement can be easily reversed, so that the press may stand upright

and occupy two floors of a gin-house. The underlying idea of this press is to pack the cotton in a compact package by placing a small portion of the bundle, say one-sixteenth, in the press, and submitting it to the whole power of the machine. Then another portion is added and pressed. More and more is added and pressed, till the right quantity is obtained for a convenient package, when a wooden shield is put in the press to separate this bale from the next. The bale is then bound with wires (not bands), and slips out of the press a small bundle, with square, sharp edges, and of a size convenient for handling. As it slides out, under the pressure of the bale that follows, it slips into a canvas bag ready to receive it. The machinery by which this is accomplished is well designed and efficient, and the power needed to operate it is moderate. The pressure is obtained by simple gearing, arranged to give a heavy horizontal thrust and a quick and light return. The pressure is made effective by placing the plunger that presses the cotton in a square tube, having a taper toward the open end. To measure off the small portions pressed at one time is a second plunger, working in a perpendicular well over the main chamber where the bale is formed. This plunger moves first, thrusting a portion of the cotton down into the press and then moving upward out of the way, while the lower horizontal plunger drives the mass along the chamber toward the narrower end. This plunger retreats and the other sends down another lot, and this in turn is pressed up against the first. When enough has been pressed to make a bale, the wooden guard is dropped into the well from the hopper and is pressed against the end of the bale. The next stroke delivers the first portion of the following bale, and this, as it is built up, drives the other forward and out of the press. Iron fingers are arranged around the discharging end, and over these is spread the bag intended to hold the bale. It will be seen the process is continuous. Two bales are always in the machine, one being formed and pressed, the other being wired and thrust into the bag. The press requires two men to operate it—one to feed the cotton to the hopper and another to wire the bales and prepare the bags. Other help will also be required, to attend to the engine and to remove the bales as they are thrown out of the press. This press must be regarded as the most promising machine connected with the preparation of cotton shown at Atlanta. It will be observed that the bale is wired inside the bag, and not outside, as in the present wasteful and almost ruinous system of packing cotton. The bag is laced up at the top and may be easily opened for examination, and at the same time it keeps the cotton safe from moisture, dirt, and theft. The bales have square corners and ends, and pack snugly in boat or car. The bags are strong and durable, and may be returned and used over again many times, at a great saving over the present system, for the cost of returning the bags would be no more than the cost of sending the bagging, which is now used once only, to the planter. The wire would also cost less than the bands and buckles used in the present system. This press is more expensive and requires more skill to handle it than the presses now used on cotton plantations, but its advantages over these presses are so obvious that it appears to be only a question of time when the entire crop will be sent to market packed in small, square-cornered, and

easily handled packages, prepared by this press or some other operating upon the same plan. It can be safely recommended to the planter and shipper, as it saves all the loss by exposure and theft to which the bales now used are subject, and all the expense of handling an unwieldy and heavy package, and the cost and injury to the lint that springs from its rough usage in the compresses at the shipping ports. It will also benefit the mill-owner, by delivering the lint in a light, clean, and healthy condition.

Direct Process for Yarns.

THE tendency of manufactures is always toward directness and simplicity. In tracing cotton from the field to the mill where it is spun into yarns for the loom, there is a long series of operations, all of them injurious to the cotton and many of them wholly unnecessary. The seed-cotton is ginned, pressed, baled, compressed, and delivered at the mill. Here it must be opened and prepared for the cards by the use of complicated machinery. It is now proposed to place the gin on the card machinery, and to feed seed-cotton directly to the card through the gin, and to do away with the baling (except in a modified form), the compress, and all the machinery needed to restore the cotton from its tangled condition in the compressed bale, and make it fit for the card. This is the sum and substance of an invention that has attracted a great deal of attention throughout the entire South. The idea must be regarded

as only second to the invention of the gin. There is in reality no new machinery, for it is only the placing of a common saw-gin on the frame of a carding machine in the place of the usual feeding apparatus. Then, in place of feeding the lint from the bale to the card, the seed-cotton is fed to the gin, and the lint passes instantly to the card. The lint is used in its best and most natural condition, directly from the seed. There is no lint-room, no baling, no compress, no transportation in a tight package, no loss from drying after the lint is separated from its seed, and no loss and injury by the machinery that must be used to repair the injury caused by the compress. This union of the gin and the card has been tried, with both failure and success. The failure, it must be observed, appears to be the result of a misunderstanding of the idea. The union of the gin and card should be in a mill and not on the plantation. The mill may be in the same town, but it cannot be expected that the planter should set up a yarn-mill, and make it a financial success. The yarn-mill must be a separate concern, owned by the planters' perhaps, and certainly in their neighborhood. The planter can hardly expect to be spinner and planter too. This does not in any way lower the value of this idea. The gin and the card may be united, and in their union must flow to both the North and South substantial benefits to the mill and farm. The machine examined was not in operation, but from an inspection of its parts, all that has been claimed for this device seemed to be just and correct.

