

CHAPTER XXVI

COTTON MANUFACTURE AND ALLIED INDUSTRIES

The Cotton Industry—Cotton Mills—Machinery in Cotton Mills—Skilled Operatives and Child Labor—Cotton Ginning—Cotton Seed Products

THE COTTON INDUSTRY

AMONG the textile industries, cotton holds the rank to which it was once entitled in agriculture. Cotton is king. It stands first in the amount of capital, in the number of operatives employed, in amount of wages paid, and in value of product. The number of employés is double the number engaged in wool manufacture, and four times that in silk manufacture—the average number in the cotton industry exceeding 300,000. Altogether, this industry, as conducted in the United States, typifies the factory system in its highest form and on the largest scale. Fall River, Massachusetts, may be called the capital of the world of cotton manufacture. Another great Northern centre is New Bedford, Massachusetts, which claims superiority as a cotton goods town because of the humidity of its atmosphere. The advantages offered by Fall River, on the other hand, are its nearness to market and its water communications. In New Bedford all the finer grades of cotton goods are made; no finishing is done there, however, operations being confined to spinning and weaving. In Fall River, while a variety of cotton goods are manufactured, the city is noted chiefly for its print cloths, which are turned out in the unfinished state. A large proportion of the output is sold through brokers to converters in all parts of the country. Finished cloths for domestic consumption are sold through commission houses. At New Bedford a different sales method prevails. The bulk of the goods there manufactured are sold direct to purchasers, and goods for export are sold to such local houses in New York as engage in foreign trade.

Another noticeable fact is that the system of industrial combination has not entered seriously into the cotton industry. In 1900 there were only three combinations in this field—one in cotton yarn, one in cotton duck, and one in sewing thread.

Though the manufacture of cotton goods in this country has reached a high state of development, we still import cotton goods in quantities and value twice that of our exports. In 1900 over \$40,000,000 worth of

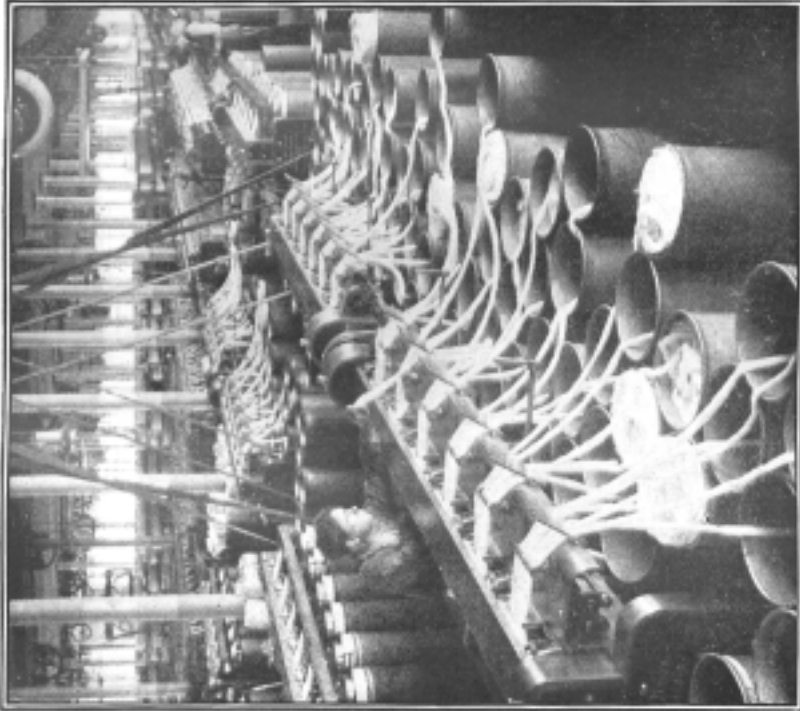
cotton goods were imported, while in the same year our exports amounted to only \$24,000,000. We import chiefly goods of the finer grades, the labor cost of which in this country would be very high. Competition from China and Japan may in time become a serious matter, as the cost of labor in the Orient is so much lower than in the United States, and yet one of the principal foreign markets for our cotton goods is China. Thus far the cotton goods manufactured in the "Celestial Kingdom" have not interfered with the sale of well-made American goods, for the Chinese manufactures are sold principally in sections of the country in which the people are willing to use an inferior article. As the trade stands at present, only a small proportion of the product of Southern cotton mills is consumed in the United States, many of the mills sending their entire output to China. The next best foreign markets are South America and Africa. Printed cottons are also sold in Great Britain, Australia, Canada, and Continental Europe at the same prices charged for similar goods here.

The particular goods which American manufacturers have never attempted to produce on a large scale include certain bleached and unbleached cloths, the finer painted and printed cloths, embroideries, laces, insertings, trimmings, and lace curtains. American manufacturers, meantime, supply the entire demand for plain cloth woven from coarse or medium yarns, the tariff being such that foreign manufacturers are not able to compete successfully in this market.

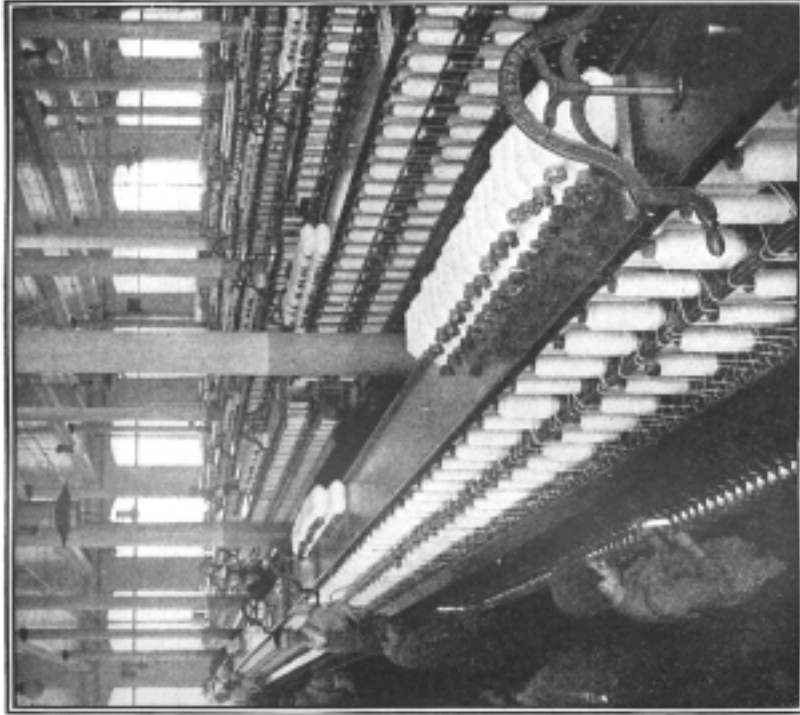
Before leaving the subject of foreign trade in cotton goods, it should be noted that very lately American manufacturers have placed some of the finer grades of goods on the market, in some instances in large quantities. Within the last five years especially the process of development here has led to the manufacture of lace curtains, the industry having centred in Philadelphia. Nottingham lace is used, and the manufacturers of the Quaker City are supplying lace curtains equal in every respect, grade for grade, to curtains made in England. The finest grades of gingham and calicoes have also been produced here, but purchasers still have such a deep-rooted preference for the foreign make that it is not safe to produce large quantities of these goods.

COTTON MILLS

When cotton mills are well managed, they invariably make money. The earnings of the New England mills, though not so large as those of the Southern mills, are yet, in many instances, stupendous. Dividends as high as one hundred per cent have been declared. Special dividends are frequent; but in the majority of the mills the earnings remain normally at six per cent. It is claimed that many of the New England mills are undercapitalized, and hence the apparently large earnings. In the Southern mills the profits are oftentimes phenomenally large. One mill, in 1898, paid a dividend of forty-five per cent, and in 1899 one of ninety-three per cent. Another, in 1899, paid a dividend of sixty-two per cent. And yet



IN A COTTON MILL



CHILD LABOR IN A SPINNING ROOM

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the Southern mills have to pay not only a higher rate of interest for money than do Northern mills, but also higher freight rates on manufactured goods. The secret of profits in the South lies probably in the lower cost of labor.

In the North the mills manufacturing cotton yarns entered into a combination which in 1900 controlled nine plants and had a capital of eleven and one-half million dollars. Since the combination was formed wages have increased fifteen per cent. The combination sells its entire output through its own salesmen direct to the customers, thus eliminating the middleman.

The business organization of a cotton mill is not different from that of any other large factory. The largest mill of this kind in New England, which is perhaps the largest in the world, is managed by a board of directors elected by the stockholders. The directors appoint the necessary officers, of whom a treasurer and an agent are the most important. The treasurer's duties are obvious; the agent is the practical man, the one who manages the mill. The agent divides the work into many departments—carding, weaving, spinning, bleaching, printing, and packing—and places a superintendent in charge of each. The superintendents in turn employ foremen, according to the number of hands and character of the work. Operatives working by the piece usually require less supervision than those who toil by the day.

It has been demonstrated beyond a doubt that the Southern States are by nature best suited to the manufacture of cotton goods. They are near the raw material, fuel is cheaper, and labor costs less than in the North. For these reasons more cotton machinery has been sold in the South within the last few years than in the North. Many Northern manufacturers are opening mills, and cotton manufacture is increasing far more rapidly in Georgia, for instance, than in Massachusetts. Thus equipped with the newest and most improved machinery, the Southern mills are making the lower and medium grades of cotton goods. Wages in these mills, however, are thirty per cent lower than in the North, and a week's work in Georgia is eight hours longer than in Massachusetts.

One of the largest cotton mills in the South is at Pelzer, South Carolina. The owners employ 2,800 operatives, and conduct their business and look after the interests of their employes in such manner as to conserve the highest and best development of both. The town has a population of about 6,000, all directly or indirectly dependent upon the mills. Every dwelling house and building, of which there are about one thousand, belongs to the company. The town is not incorporated, but is held as private property, and is governed entirely by the rules and regulations of the mill corporation. The dwelling houses, which contain an average of four rooms each, and which are rented to the mill hands at fifty cents per room per month, are tasteful and convenient in construction. Each house is provided with about fifteen thousand square feet of ground, utilized by the

tenants for gardening purposes. The town has two well-equipped schools, attended by eight hundred children, and maintained entirely by the company for ten months in the year without expense to the residents of the place.

A more patriarchal relation exists between the managers and the employés of the Southern mills than can be found in New England. The sanitary conditions of some of the mills, however, are declared to be bad. Naturally, the mill operatives, as a class, are not as healthy as country people who work in the open air. Where company stores and tenements exist, the employés are, as a rule, under no compulsion to patronize the stores, or to live in the houses. The rents charged by some employers are forty-two and one-half cents a room for two weeks, fifty cents a room for a month, and two dollars a month for a four-room house. In some cases country cotton mills furnish houses without any charge for rent.

In respect to the general progress made in cotton manufacturing, it is interesting to note that single establishments in Massachusetts now pay annually a larger sum in wages than the entire cost of labor in Southern cotton mills twenty years ago. In the South, the rapid development of the industry dates from the year 1881, when the Cotton Exposition was held in Atlanta. At this fair the Governor of Georgia appeared in a suit of clothes made of cotton and manufactured on the grounds from cotton which had been picked from the stalk that morning—the entire process taking place in sight of the visitors. It was this episode that brought to the minds of Southerners the facts that the product of cotton could be worked up into finished cloth without transportation to a distant manufacturing town, and that the South had abundance of unemployed labor for mills such as those operated in Waltham, Lowell and Manchester, in the North. To-day, the cotton mills of Georgia, Alabama and the Carolinas consume about one-third of the cotton crops of those States.

The development of cotton manufacture in the South continues to be of material benefit. Besides increasing the profits of cotton growing, the presence of local factories, by diverting labor from the fields to the factory villages, creates an increased demand for butter, eggs, and other agricultural products, and thus adds to the prosperity of the whole section. In Louisiana the newer cotton factories are organized by joint stock companies, a plan which has been successful in North Carolina. The shares are paid for in instalments of one dollar a share weekly, each person subscribing for ten shares at one hundred dollars each.

MACHINERY IN COTTON MILLS

In the machinery used in the spinning and weaving of cotton, constant improvement has been going on ever since mechanical power was first applied to the spindle. The development has seemingly reached the highest stage, yet there is still a chance for inventors in the matter of devices of the shuttle-changing variety. It should be explained that, as the capacity

of the shuttle is limited, the speed at which modern looms are run, for example, in the manufacture of print cloth, exhausts the yarn in the shuttle box in about eight minutes. This means that the shuttle must be changed several times an hour. As the cost of labor in weaving is one-half the cost of converting a pound of raw cotton into cloth, it is of the utmost importance that the time occupied in changing shuttles be reduced to the minimum. A few machines now effect the change with promising rapidity, but they are yet in the experimental stage.

The Northrup Loom is a wonderful piece of mechanism. Since its introduction in 1895 its use has been widely extended. Such is its efficacy in the weaving of plain cloth that in the first five years the output was more than 42,500 looms. There are two fundamental improvements in this loom. They are the "filling-changing" mechanisms and the "warp-stopping" devices. The time of stoppage on account of exhausted shuttles is entirely saved by the first, and by the second the machine is stopped immediately upon the breaking of a single warp thread. It is easy to see that in combination they must add enormously to the productive capacity of the weaver. A glance at his work will show this to be true. A good weaver operating plain narrow looms has a capacity of eight looms, most of his time being employed in replacing empty shuttles and in mending broken warp threads. An empty shuttle stops a loom, and the failure to repair warp breaks causes an imperfection in the weaving. The new "filling-changing" mechanism minimizes the time needed to supply looms with weft, and thus the weaver has most of his time free for repairing warp-breaks. This more than doubles his capacity over the number of plain looms which he formerly tended. Often the weaver going home to dinner, and leaving all his looms running, with the filling magazines all full, finds some of the looms still running on his return, a breakage of the warp having stopped all those looms in which it had occurred.

In the broadest sense, it may be stated in conclusion that remarkable improvements have been made in the last thirty years in spindles and looms. It is admitted that the speed of the cotton spindle of to-day is limited only by what other parts of the machinery will stand. As for the looms, the newest, as related above, are so easily operated that a single weaver can run from sixteen to twenty of them at the same time. In England, the machinery used in cotton mills is still of the old style, so that a weaver can run only three or four at a time. In Italy, the weaver can handle only one or two looms. Naturally, then, the American-made loom is in demand, and while the manufacturers turned out two thousand every month in 1900, the demand still exceeds the supply. Over one thousand of these looms are now in use in Japan, while France, Switzerland and Austria are building machines of this pattern in their own shops. As a rule, American cotton machinery, on account of the higher wages paid here, is too costly to export. Fully one-half of the cost of such machinery here is represented by the amount paid for labor. A large number of English cotton machines

are imported, not because English machinery is better, but because it is cheaper.

SKILLED OPERATIVES AND CHILD LABOR

Not another industry compares with cotton manufacture in the number of employés within the mills. Moreover, there is no other industry in which the work is so nearly divided between men and women. Another fact generally deplored is that more children under sixteen years of age are engaged in cotton goods manufacture than in any other great industry. The whole number of children employed is 40,000—the Southern States alone employing 24,000, and the New England States 10,000.

The result of recent sociological studies of the condition of affairs in Southern cotton mills, however, point to improved conditions in the near future.

Skilled operatives in the cotton manufacture include spinners and weavers. The vast majority of mule spinners are men. On the other hand, the greater number of frame spinners are women. As weavers, too, more women than men are employed. The introduction of the latest fast looms, however, as previously intimated, is leading more and more to the employment of men as weavers, upsetting the old idea that weaving is peculiarly the work of women. Southern mill operatives have not yet become sufficiently skilled to make fine fabrics, though they are said to be making rapid progress. The average earnings of spinners range from sixty to seventy-five cents a day, and those of weavers usually from ninety cents to one dollar and a quarter. The price of unskilled labor ranges from sixty-five cents to eighty-one and one-half cents a day, the majority getting from seventy to seventy-five cents. The earnings of children are included in these averages. One employer, who considers it a material advantage to be able to work sixty-six hours a week instead of fifty-eight, as in Massachusetts, declares that New England wages on the same class of goods are no more than his mill pays. Spinners, he asserts, get ten cents a side, on an average, in New England, while his company pays eleven cents. In the Northern mills, especially, there is a decided tendency not only to substitute men for women at the machines, but to do away entirely with child labor. Though these changes in labor conditions are noticeable only in the mills of New England, yet there is no doubt that the elimination of child labor, even in the South, is a question only of time, and it is equally certain that the employment of women in all the factories will gradually cease. As usual, economy is at the bottom of both changes. It is not the kind of economy which appears on the surface, but the kind which counts in the long run through a higher efficiency of service, and in the betterment of social conditions. Some years ago the looms in all the mills were managed by women; but it was soon found that the complex modern machines demanded such unremitting care and fine skill as to be beyond the physical and nervous capacity of many of the women. The disappearance of women from Northern factories is also due to the

fact that a skilled operator now earns a great deal more than formerly, and, consequently, is able to relieve the women of his family from work in the factory. Women and children would, of course, accept lower wages for the same work, but it has been found that they can not endure the strain, even if they have the requisite skill; the result being the employment of more men and an ultimate economic saving.

Conditions are entirely different in the South, where labor is not skilled in machine work, and where the cotton manufacturer has to employ whatever help he can find. The result is that a great many women and children are employed. Since 1890 the increase in the employés in the Southern cotton mills has been tremendous. Generally the number of women employed is twice as great as it was ten years ago. There are three times as many children, and a little more than three times as many men as there were in 1890. The increase has been: children 15,000, women 17,000, and men 28,000. So that even in the worst conditions, it is shown that men are gradually displacing women and children. The employment of children in the South was forced, as, otherwise, the mills could not have been worked. The system of child labor has been economically bad, and no one has understood this better than the Southern cotton manufacturer. There is, of course, an apparent saving, which tells for a short period; but in the total count the factories employing children have found that they were doing so at a serious loss in both the quality and quantity of the product.

The great majority of employers in the South state that they do not wish to have any children under twelve years of age in their mills. Sympathy for the children or for their parents, they protest, leads to the hiring of small children. In North Carolina the number of child laborers under twelve has diminished more than half during the past few years. On the other hand, it is often the case that men who seek employment are more apt to find it if they have a number of children who can be brought into the mills. Again, some of the mills will not employ the older members of a family without employing the children also. In such cases the children displace adults, and fathers often live in idleness on their children's earnings. Even the opponents of child labor admit that the work is not laborious, while asserting that the confinement during long hours, in dusty rooms, is detrimental to health and physical development.

Several mills in the South have experimented with negro labor. This has caused considerable irritation among the white operatives; but no serious trouble has resulted. It is generally believed that the negro is not capable of, or has not yet developed sufficient skill for, doing the high class work necessary. The experiment, however, has not been carried far enough for definite results, although some mills have already abandoned it.

COTTON GINNING

The most important branch of the cotton industry is that of ginning—the process of separating the seed from the lint, preparatory to placing

the cotton on the market. The three classes of gins are: (1) those operated for the public; (2) those operated only for the plantation on which the cotton is grown; (3) those operated jointly for the plantations owning them, and for the planters of the neighborhood. The latter class is by far the most numerous, as it includes 20,000 gins out of a total of 29,000 in the United States. About 10,000,000 commercial bales of cotton have been ginned annually for the last several years. One-quarter of the entire output, each year, was baled in Texas, the great marvel of the cotton belt.

Before Eli Whitney revolutionized this industry with his wonderful invention for seeding the cotton, the work of separation by hand was so slow that it would have taken one person two years to turn out the quantity of cotton contained in one standard bale. The modern ginnery yields from forty to sixty bales per day; and we have automatic ginneries, representing years of effort to combine ginning with baling plants, in which the speed attained and the labor economized comprise very remarkable features.

The picked cotton is removed from the loaded wagon by a suction pipe, which conveys it to the vacuum separator and cleaner, in order to remove all twigs, leaves and impurities; this waste being dumped into one place, the seeds being blown to suitable bins or wagons in another, without danger of impairing their vitality, and the cotton deposited on the ginnery floor, ready for baling. The cotton is conveyed from all the gins by a flue system to a condenser, and fed, as required, into the packing press; to be formed into the ordinary square bales, or into one of the modern cylindrical packages, now coming into general use.

The standard square bale measures fifty-four inches in length, twenty-four to twenty-seven inches in breadth, and twenty-eight to thirty inches in height, having an average weight of about five hundred pounds or, approximately, twenty-two pounds per cubic foot. Numerous inventors have sought to produce devices for securing an even greater density to the baled product, although none of their inventions is widely used.

The two common methods of packing lint cotton in cylindrical bales are known, respectively, as the Bessonette, or "Round Lap," system and the Lowry system. In the former process the lint, coming from the gin, is blown into a storage reservoir and bat former, and, being there converted into a continuous bat of even thickness, is wound upon a cone under the gradually increasing pressure of two rollers pressing upon opposite sides, until the bale is completed. The density thus produced gives a weight of thirty-five pounds per cubic foot in all bales, ranging from 270 to 425 pounds, and from 35 to 45 inches in length, with a diameter of 22 inches. The bales thus produced have the additional advantage of being self-containing, owing to the mutual adhesion of the successive layers of cotton bat, thus avoiding the use of the iron straps, always required for the old-style square bales.

In the Lowry system the lint cotton is fed loose from the gin into a tube, surrounded by a cap plate having a number of slots radiating from

centre to circumference. The bale is started by packing loose cotton in the tube by hand, after which the tube and cap plate are set into relative revolution, with the result that loose cotton thrown upon the top comes into contact with that inside the tube, being drawn in through the slots and building the bale up endwise. The pressure in this system is thus applied at one end only, as against the double circumferential pressure of the Bessonette process. The bales, averaging 250 pounds weight, measure 18 inches diameter, 36 inches length, and have a constant density of 45 pounds per cubic foot, as against 22.5 pounds for the square bale, and 35 pounds for the Bessonette cylinder.

COTTON SEED PRODUCTS

The cotton gin produces two pounds of seed to every pound of cotton. That two pounds of seed represents an asset, and yet any elderly person of to-day remembers when the seed was thrown away as waste or used as fuel. One day in 1855 a Rhode Island firm had a carload of cotton seed sent up from the South and made it into oil. The oil sold, and to-day the manufacture of this by-product forms a distinct industry. One company alone produces cotton-seed oil to the value of twenty-five million dollars annually. This one company employs between five and six thousand persons, and the once despised cotton seed furnishes a means of livelihood for thousands more. The American Cotton Oil Company has fifty-seven plants and a capital of thirty-five million dollars.

Cotton-seed oil can not be used to light the parlor or kitchen lamp; but it is in your lard and in your soap, salad is dressed with it, salt and paper manufacturers use it in their factories, miners burn it in their lamps, druggists sell it as a liniment, finally thousands of pounds of it are used in making butterine.

One hundred and twenty-five establishments are at work crushing cotton seed into oil, and it is a pygmy mill that does not crush ten thousand tons in a season. With a cotton crop of eight million bales, one and a half million tons of seed are crushed, producing sixty million gallons of oil, cake and meal. All this means that in the same year twenty million dollars is divided among the Southern planters and transportation companies, representing the cash payment for cotton seed and the carrying thereof. The amount of oil exported is about fifteen million gallons annually, worth about six million dollars.