STUKENBORG
MECHANICAL
COTTON PICKING MACHINE

THE KEY TO
SOUTHERN PROGRESS

By L. F. WEGERLY

COTTON PICKER CO. OF AMERICA
INDIANAPOLIS CHICAGO ATLANTA

Stukenborg Mechanical Cotton Picking Machine

The key to
Southern Progress

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Indianapolis Chicago Atlanta

PRINTED BY
R. B. HORWICH & CO.
CHICAGO

PREFACE

In preparing this little pamphlet relative to the cotton industry the statistics were gathered from the writings of the best writers and authorities that the subject affords.

For much of the data pertaining to cotton and its fiber, the writer is greatly indebted to F. W. Stukenborg, president of the Cotton Picker Company of America, and his brother, L. C. Stukenborg, inventor of the MECHANICAL COTTON PICKING MACHINE bearing his name. The many years devoted by these two brothers to growing and handling cotton, together with fifteen years or more given by them to the study of mechanical devices for picking cotton from the boll, the manufacture and exploitation thereof, has fitted them pre-eminently to be classed among the highest authorities on this particular branch of the cotton industry.

The object in compiling this pamphlet is for the purpose of educating the planters of cotton how the wasteful and inefficient systems now used in producing, harvesting, handling and marketing the cotton crop may be corrected; the necessity of improving the quality of the cotton as well as increasing the yield per acre; to point out the annual estimated monetary losses resulting therefrom; the means whereby these losses may be materially reduced, and to encourage a closer co-operation between the several factors of each branch of the cotton industry to the end that the wants and needs of each other may be satisfactorily met, and thereby, develop higher economic and industrial efficiency.

In treating the various subjects repetition is made use of freely, partly because they are so closely related to each other, and partly because of our desire to keep certain things before the reader at all times.

We trust that those whose eyes pursue these pages shall gain some useful information relative to the cotton industry, and take advantage of every opportunity as herein reflected to correct the evil and abusive systems now prevalent throughout the cotton producing sections of the United States of America.

L. F. Wegerly

Chicago, Illinois, March 1, 1920.

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CHAPTER I

EARLY HISTORY AND GROWTH OF COTTON INDUSTRY

The cotton plant is of prehistoric origin. Its early history is mingled with the traditions of the inhabitants of exceedingly remote periods. Even archaeologists fail to give anything definite as to the beginning of its culture and use. However, there is an abundance of evidence that cotton has been cultivated in various portions of the earth for many centuries past. In India in the year 800, B. C., and history tells us that cotton fabrics were famous in Egypt during the zenith of her glory. It was grown at a very early date in South America and parts of North America. The cotton plant seems to be native to Southern Asia, Africa, South America and the West Indies. Our forefathers commenced to grow it over 250 years ago.

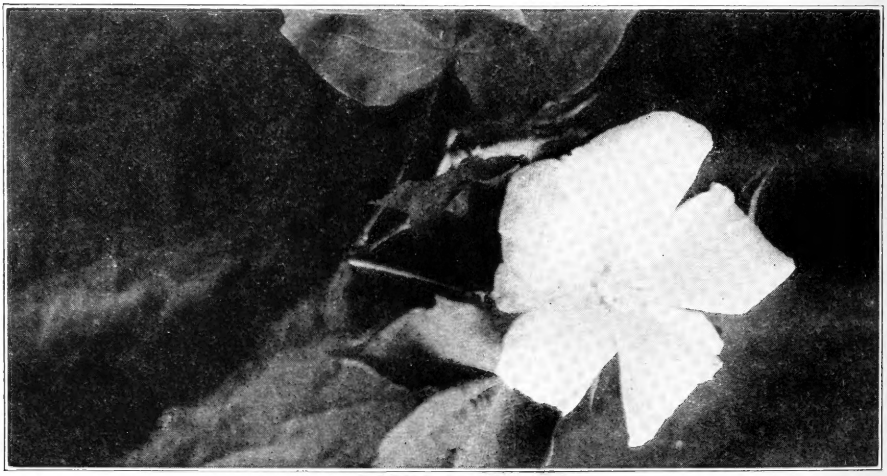
Today, it is a world crop. Every nation depends largely upon the cotton industry and upon the southern part of the United States for cotton. All classes of people, rich and poor, high and low, make use of it, and the world is continually calling for more. Foreign countries send more gold into the United States in payment for our cotton than for any other American crop. It constitutes the trade balance of the United States.

The United States raises something like three-fifths of the world's commercial supply of cotton. The next largest producer is India; however, it is of poorer quality, and sells at a lower price than American cotton. Egypt stands third as a cotton producing country. Its chief product has a very long staple and commands a higher price than the average American cotton. Long staple (Sea Island) cotton is grown in the United States to some extent; especially, in the southeastern part along the sea coast, and is the finest and most valuable in the world, being noted for the length of its fiber and silky appearance. Long staple (Egyptian) cotton is grown in Egypt and in certain parts of the southwestern part of the United States where irrigation is possible and the soil and climatic conditions ideal. China raises a considerable amount, but greatly inferior, and the crop uncertain. Likewise, parts of Russia, and small patches of cotton may be seen in Japan. Several of the South American countries are now growing cotton with so much commercial success that they are increasing the acreage each year. It is recorded that

Megellan found the Brazilians using cotton in 1519, and Columbus found it used by the natives in 1492. The annual production of Brazil is over 1,500,000 bales (176 lbs. to a bale) annually, and it is said that Brazil alone has approximately 20,000,000 acres of land suitable for cotton culture. Cotton fiber grown in all of the tropical countries is coarse and stiff, and, therefore, cannot compete with American grown cotton. In all countries except the United States the cultivation of cotton is rather crude and primitive, hand labor being employed almost exclusively.

The cotton plant is annual, biennial and perennial. In all tropical countries small quantities of cotton are grown from perennial plants that often grow wild and tree-like in appearance. Even in Southern Texas cotton plants spring from roots that live over winter; however, it is best to plant a good selection of cotton seed each season, the cotton produced from the annual plant being far superior in quality.

There are many varieties of cotton plants, each of which differ greatly in their stalks, leaves, bloom and fiber, and also in their adaptability to certain soils and climatic conditions. As to length of fibers, there are but three principle kinds, long, medium and short staples, and of these there are different qualities and lengths. The chief commercial long stapled fibers are Sea Island, Brown Egyptian and Peruvian. The medium staples comprise Benders, Peelers, Allans, etc., while the short stapled fibers embrace American Upland cotton, Indian and all other cotton fibers not classed as long staple cotton, and under $1\frac{1}{8}$ inches in length.



Cotton Blossom

Sea Island constitutes the most valuable fiber of all the different species of cotton. Its superiority lies in its strength, fineness, uniformity of twists, length of staple and silky appearance. It is grown on the islands off the coast of Georgia and South Carolina where the staple runs from 1¾ to 2½ inches in length. That grown on the mainland in close proximity to the coast runs from 1¾ to 2 inches, and that grown in Florida while of a coarser fiber runs from 1¼ to 1¾ inches in length. It has a light cream color and is used for producing fine yarns. The average yield is 125 pounds of lint per acre, requiring from 3½ to 4¼ pounds of seed cotton to yield one pound of lint cotton.

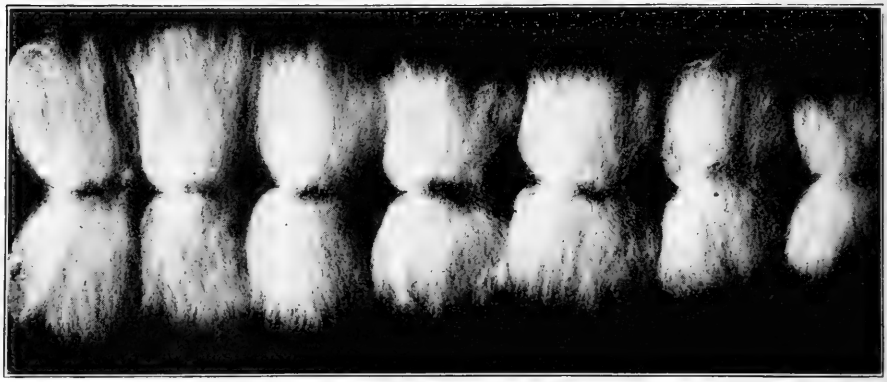
Matured Cotton in the Boll

Egyptian long stapled cotton is probably of Sea Island origin and possesses a yellowish brown color, but inferior to Sea Island cotton. Its product has a very long fiber, 1⅛ to 1½ inches, brown color, high lustre, strong and silky. It is grown under systems of irrigation in the lower part of the Nile basin. The lint is adapted for sewing thread, fine underwear, hosiery, etc.

Peruvian long stapled cotton differs from all other cotton in that the plant is perennial; the growth from the second and third year, only is utilized. Its fiber is coarse and wiry, 1¼ to 1½ inches in length, and of many color variations. It resembles wool, and nearly all of the entire crop is used for mixing with woolen fabrics. In all three of the long stapled varieties, no lint adheres to the seed, it being left smooth after ginning.

Short stapled cotton includes all kinds not classed as long staple, except linters. The American Upland cotton is the typical

cotton of the world. Its fiber is suitable for various kinds of commercial yarns, and the qualities are more uniform. The seeds after ginning are not entirely free of lint as are the long stapled varieties, and which amounts to about 10% of the total weight of the seed.



Government Samples of Staple Length of Cotton Fibers

There is a great difference in the qualities and properties of the various varieties of cotton which must be carefully considered by the manufacturer in selecting and grading his stock with reference to the nature of the yarn he is to spin. As these qualities and properties will be spoken of many times throughout the subsequent pages of this pamphlet, we deem it advisable to describe them fully in this, the first chapter, as follows:

The quality of the cotton fibers depend not only on the specie of plant from which they are derived, but also on the manner of their cultivation. Apparently, the conditions which exercise the greatest influence are seed, soil, mode of cultivation and climatic conditions. The seed must be carefully selected for the purpose. A moist sandy soil is very desirable for long and fine staples. A dry soil produces harsh and brittle fibers. A light loam is considered the best while a damp clay is the worst. Therefore, soils situated in close proximity to the sea produce the best staple. The climate should be humid with a mean average temperature around 70 degrees. All wild cotton has a rusty tint while cultivated cotton does not, and the better it is cultivated the less tint to be found. Intense cultivation increases the number of natural twists, making the fiber stronger and more elastic. Wild cotton has few if any natural twists.

QUALITIES

1. Tenstile strength means the indicated measure of the breaking point of an individual fiber, and also the elasticity of the fiber before breaking.

2. Length of staple means the length of individual fibers in relation to their average diameter. Five mm. is the shortest that can be spun. A long staple with the smallest even diameter makes the finest and strongest threads.

3. Cohesiveness means the property of individual fibers holding one on to another when twisted one around the other, and which, therefore, offer substantial resistance to being pulled apart when put under a strain. The cotton fiber possesses an irregular surface giving it resisting qualities, and in connection with the characteristic natural twists occurring in ripe cotton at certain intervals which become interlocked when the fibers are spun together causes the fibers to hold together when twisted into yarn and subjected to the breaking test. Therefore, the more natural twists a fiber has the more elastic and desirable it is.

4. Pliability means that property of fibers which permits one fiber being easily wrapped around another, as in the spinning operation. They must be elastic so as not to be easily broken. For this reason stiff and wiry fibers are less adapted to spinning. Without this quality the fiber would be harsh and brittle, and its use limited not unlike fiber made of glass. Dead or unripe cotton is without this quality. It is brittle, and shows up as white specks in the finished goods. Dead cotton is very objectionable because it develops weak and brittle fibers and lessens the strength and durability of the fabric.

5. Fineness of staple means the smallness of the average diameter of each individual fiber so that they can be spun together to produce a fine, even thread. The finer the staple the finer is the yarn produced therefrom. Coarse fibers are used for coarse products.

6. Uniformity of staple means both evenness of length and diameter of the fiber. The longer the fiber the smaller the diameter. This quality is a very important one as it affects the spinning of even, fine and strong thread.

7. Color of the fiber is also important because of maintaining an even shade of yarn when put through the dyeing process; also, if pure white yarn is to be had.

8. Cleanliness is also an important quality because it affects the amount of waste made in the mill and also lessens the value of the product materially. This quality is discussed under a separate subject.

9. Capilarity means the capability of the fiber in absorbing liquids and solutions which are so necessary in dyeing and bleaching. Therefore, the cotton must be entirely free from foreign matter and impurities if even shades of dyeing and bleaching are to be had.

10. Lustre is a desirable quality, but not essential except for beautifying effects.

11. Durability means that quality of fiber which permits of reasonable wear and tear when woven into the finished product.

12. Humidity means the influence that moisture has upon the fiber with respect to strength, elasticity, ginning, spinning and weaving. Moisture makes cotton stronger. Proper moisture conditions must be maintained in the spinning process to secure the best results in producing the finest yarns. Normally, cotton contains from 4% to 7% moisture. Different varieties of cotton differ in this respect. When cotton is real dry it is brittle and more easily torn. The increase in elasticity of moist yarn over dry yarn is about 25% with an increase of strength of about 10%.

13. Quantity means that the various grades of fiber must be produced in sufficient quantities to give them a commercial value. A few bales of a certain grade would be insufficient to command a special market value.

LINT AND BY-PRODUCTS

The lint and the seed are the most important elements of the cotton plant. The cotton fiber is picked from the boll as and when it matures by hand labor. This primitive method is slow, crude, tiresome, expensive and wasteful. Hand pickers pull the cotton fiber from the cotton bolls, taking with it dirt, leaf, trash and foreign matter, allow it to accumulate in the hollow of the hand where it becomes thoroughly mixed with all the dirt and foreign elements, squeezed, tangled and wadded up in snow ball fashion, and then passed on into a long narrow sack which the hand picker drags along for the purpose with great inconvenience. When the sack becomes full of the snowy fiber, or too burdensome to drag, it is emptied into other receptacles, and these are in turn loaded on wagons and hauled to the storage bin or the cotton gin. The cotton gin separates the fiber from the seeds mechanically. The lint is used in the manufacture of thread, yarns, ropes, fabrics and cotton materials of all kinds. The seeds and the short fuzzy lint adhering to the seeds which the gin saws failed to remove were, not so many years ago, thrown away, burned or dumped into the rivers. This waste is now more than a $1,000,000,000 by-product. The cotton oil mills pay fancy prices per ton for cotton seeds. Four principal products are made from these seeds—linters, hulls, meal and oil. The cotton mill machinery remove the short fuzzy fiber adhering to the seeds which is called "linters." They are used in making gun cotton, high explosives, mattresses, coarse yarns, carpet linings, batting, artificial silk and other commercial purposes. The oil obtained from the cotton seed is used to make compound lard, margarin,

glycerin, flour and for other purposes. The hulls are sold as a roughage for stock, fertilizer and may be used in making high grade paper. The meal is used chiefly for feeding stock and in the preparation of high grade commercial fertilizers.

We now know that cotton furnished clothing for many, many millions of people and foodstuffs of the most nutritious value for both man and beast. Look around and you will find cotton used in some form or other almost everywhere. It effects every nation and its people. No other plant is so closely connected with the cost of living. It has become the greatest industry in the world. The textile industry, at the present time, represents a total invested capital of over thirty billion ($30,000,000,000) dollars. It gives employment to over seven million (7,000,000) people, who in turn provide for at least thirty million (30,000,000) mouths. Therefore, the cotton crop is truly a world crop, an industry so essential and of such tremendous importance that it is a most vital economic factor in every civilized country on the globe. No other crop is so influential on human affairs. Its commercial history is one of luxury, and poverty, landlords and slave owners, mansions and hovels, national and sectional strife, misery, blood and tears.

CHAPTER II

LOSSES DUE TO ABUSIVE SYSTEMS AND METHODS IN PRODUCING, HARVESTING, HANDLING AND MARKETING THE COTTON CROP

From our own personal knowledge and observation, and from the knowledge that we have gained through the experience of others, we are fully convinced that there is a greater abundance of misinformation about this great crop than any other crop known to the human race; that less care and consideration is given to it than any other crop grown by mankind; that it is the most persecuted of all other crops; that it is constantly abused, kicked and cuffed about beginning with the care and preparation of the soil for its germination bed ever onward to the selection of the seed and the planting thereof; the cultivation of the growing plants; the harvesting of its delicate fiber; the care of it after being harvested; the process of ginning it; the system of baling and housing it; the method of classifying, sampling, grading, marketing and handling it in the bale, and on and on through each successive step until it reaches its journey's end. It is said that it can stand more abuse than any other crop. The same may be said of a jackass, but in either case, the results obtained do not justify the course pursued. The theory sounds more like an apology for the abuse rather than a general rule to be wisely followed.

The annual monetary losses resulting from these abusive methods and wasteful systems in producing, harvesting, handling and marketing the most delicate of all fibers (the cotton crop) are appalling, and almost beyond one's power to fully comprehend. The greatest portion of these losses fall upon those who are least able to bear them, the producers of the crop, who pay for these losses not only in the shape of a smaller price received for their product, but also in lower yields per acre as well as the waste of time, labor and money out of which adequate returns are impossible. The following figures represent a fair estimate of the losses resulting from the established systems and methods now in use.

Country damage, baling and improper housing	$200,000,000
Improperly picked and ginned cotton	85,000,000
Inefficient marketing facilities	75,000,000
Improper grading and classification	65,000,000
Crude cultivation and soil depletion	150,000,000
Wasted and unpicked cotton	50,000,000
Boll weevil, pink boll worm and other pests	75,000,000
Estimated total annual loss	$700,000,000

The enormity of the estimated monetary loss each year would truly indicate that it is a much abused crop. However, the question most naturally arises, how are we to eliminate or even lessen these annual losses due to the wasteful and inefficient systems and methods now in use? This is really a problem of world importance. It is one which affects the welfare of almost every individual person wheresoever located. It goes right into the heart of the home where food, shelter and clothing are so necessary as articles of sustenance. It is, therefore, a question of very grave concern, and in order to bring about a satisfactory solution of this question a full measure of co-operation is necessarily required of each factor of each branch identified with the cotton industry.

CHAPTER III

INVENTIONS AND DISCOVERIES

We are not of the opinion that any appreciable change shall take place in the present established systems and methods of producing, harvesting, handling and marketing the cotton crop except through the agency of new discoveries and inventions, scientific thoroughness, improved machinery and labor saving devices. The efficiency and greatness of all modern industries is based upon invention and discovery. This is the only practical solution, in our opinion, of the question at issue. Modern inventions and improved labor saving machinery must be substituted for hand labor. Without the many inventions of the past 150 years, man would be still working singly and inefficiently. In the wake of all new inventions and discoveries other economic appliances and systems follow which either eliminate or assist hand labor in bringing about higher industrial efficiency.

Years ago, the home was the seat of industry. Here was done the work of spinning, weaving and cloth making. Whole families devoted themselves to special industries. As the population increased the wants of man multiplied. Naturally, the demand for goods became greater, and, therefore, industry required new conditions. The industry was gradually enlarged, and finally developed the "factory system." Inventions were substituted for hand labor, which increased the output and lessened the cost of production. Great manufacturing institutions sprang up everywhere, around which great towns developed providing nearby homes for hordes of workmen. The more labor saving devices invented the more efficient and progressive became the particular industry. Such was the beginning of all our great industries—agriculture, mining and manufacturing. Each of these primary industries have progressed in magnitude and efficiency in proportion to the introduction of new inventions and discoveries, improved labor saving devices and appliances, to perform tasks that could not be performed at all or not nearly so cheaply by hand labor. Of these primary industries, agriculture progressed the least. The reason for this is thought to be because the farmer was doing business on a much smaller scale, and, therefore, it was unnecessary for him to utilize modern and expensive machinery and appliances. He was satisfied with the "old way of doing things," so to speak, and could get along without as his competitors were few as compared with the keen competition of

the other industries. In the past, farmers did not take to new machinery readily. A vast amount of educational work was necessary to prove to the farmer the economic value in the use of improved machinery. However, during the past forty years, this industry has made wonderful strides with respect to utilizing new and improved machinery and labor saving devices of all kinds; especially, in motorized and electrical power.

We have endeavored to show the effect of new inventions and discoveries with respect to the development of the several lines of industry, and we shall now confine ourselves as much as possible to the subject of "Cotton Industry" and the effect of inventions and discoveries upon its development.

Cotton is "king" in the southern states. Its very name revives the history of our Colonial days; of the land of sunshine and flowers; of untold wealth and beautiful white-columned mansions, surrounded by stretches of green lawns and massive shade trees with hammocks hung between where the planter sipped his minted julep and journeyed on to peaceful slumbers,—the typical home of the old southern planter. Alas, how different is the cotton grower in reality. Instead of being the planter of your "pictured dream," he is just a plain ordinary farmer. His entire family, children and all, work from sunrise to sunset in order to keep the wolf from the door. He helps to feed and clothe the world, but can afford few clothes for himself and family. His food is usually corn bread, hominy and pork—the fatty kind. His home is an unpainted sun-kissed hovel without white columns, and surrounded by lawns both treeless and grassless. His drink is the juice of the land, and his hammock the "snowy fields" beyond the sky. This reminds us of the days of slavery, and in the cultivation of the cotton crop, slavery received its real impetus. The price of cotton was based upon free labor, and for this reason, it has never commanded a price favorable to its production at a profit as have the other great crops. Slavery has been the curse of the cotton crop. However, during the past few years the cotton producers have been receiving a fair price for their cotton, but the price they are receiving is not what it should be if the South is to solve the questions with which she is now confronted.

Before the invention of the cotton gin cotton was not a great article of commerce because the lint had to be removed from the seed by hand labor. This process was so slow and tedious that one pound of lint per day was considered the average work of one person. Think of removing the lint from the seed by hand

labor of our 15,000,000 bale crop of today. Why, it would take all the people in the United States from 15 to 20 years to complete the task. Therefore, the removal of the lint from the seed by hand labor was so slow and the cost of the labor so great that cotton cloth was a real luxury. None but the real rich could afford to buy it.

Original Model of Whitney's Cotton Gin

In 1793, Eli Whitney invented the cotton gin which separated the fiber from the seed mechanically. This invention revolutionized the cotton industry which immediately took on an added stimulus. Cotton cloth ceased to be expensive as the cotton gin cleaned as much cotton from the seed as had been cleaned by hundreds of slaves. Whitney's original gin did the work of ten men. It was enlarged so as to increase its capacity, and our present gins do the work of thousands and thousands of slaves, delinting the entire crop in three or four months. Hence, cotton became a very important article of commerce. It soon became the principal crop of the southern planters. They increased their production and gradually extended the cultivation of cotton until it now embraces most of the best available lands in the southern and southwestern states. Still, the demand for raw cotton is far greater than the supply. The world is calling for more and more cotton, and it shall continue to do so for many years to come. New uses for cotton are being discovered, and as the population increases, of course, more cotton will be utilized. One-third of the world is still unclothed. In passing to the next paragraph, bear in mind what the invention of the cotton gin meant to the cotton industry.

SPINNING AND WEAVING

As far back as 1750 spinning and weaving were hand processes. Evidence of spinning and weaving discovered among the unearthed ruins of the works of prehistoric man indicate that this art was in use long before history, itself, began, and among races of widely separated parts of the world. The mystery about it is that the designs in the fabrics woven by the early races of the eastern and western continents are in many respects very similar. Even today hand spinners and weavers of India can utilize inferior Indian cotton and produce as fine a yarn as is made in England and America from the finest of staples. They seem to be able to accomplish by hand that which machinery cannot perform. It is said that in the 13th century India produced the finest and most beautiful cottons that are to be found in no other part of the world; that calicoes were made so fine that one could scarcely feel them in the hand, and the thread when spun was hardly discernible, and that the poetic writers of the Orient described them as "Webs of Woven Wind." Weaving, therefore, is one of the most ancient arts. Crude devices and even rude machinery to assist the hand were not uncommon.

The early inhabitants of the earth made mats and clothing by tying, twisting, knotting and interlacing grasses, rushes, twigs and strips of skins. Even today grass garments are worn in several countries. The Navajo Indians are still weavers, and even modern machinery cannot excel the hand woven materials from the various parts of the world.

Spinning is also found among all primitive people. It is the twisting of a succession of fibers into a continuous yarn, rope, thread or cord. Weaving is the interlacing of suitable materials crossing each other at right angles. Consequently, the two processes are closely related. As far as is known, cotton spinning was carried on in India in the year 800, B. C., and perhaps many years before. For this purpose, the distaff and spindle were in use from the dawn of history to about the 14th century, when the spinning wheel was brought into play. The spinning wheel was improved upon from time to time, and finally, foot power was applied to it. Therefore, the work of spinning proved to be faster than carding, which necessitated a new carding device of greater capacity. Carding is the preparation of raw material for spinning by cleaning, opening and laying the fibers parallel. History credits John Wyatt and Lewis Paul as the first inventors of spinning machinery and this between the years 1733 and 1758. However, about the year 1750, a new carding device was invented

capable of carding sufficient material to supply the new spinning device. In 1760, John Hargreaves improved the cotton carding machine. Later, Richard Arkwright added to it further new and useful improvements. Feeding the carding machine was a hand process. In 1772, the apron feed was brought into use. Both Hargreaves and Arkwright made further improvements which, of course, necessitated better and quicker spinning and weaving methods. In this respect, various improvements were made from time to time. In the year 1738, John Wyatt invented a way to spin without use of the fingers. Other new and valuable improvements were made from time to time. Finally, Hargreaves invented the Spinning Jenny whereby a number of threads were spun at once. It is said that he named this invention after his little daughter Jenny, who, it seems, while at play accidentally overturned a one-thread spinning wheel which continued to revolve when the spindle was in an upright position, and her father thereby conceived the idea that if a number of spindles were placed upright, side by side, a number of threads might be spun at once. Then, in 1768 Arkwright invented the Water Frame involving the principle of rollers and doffer comb. It is said that Arkwright conceived the idea of roller spinning from seeing two pairs of rollers elongate red hot iron, one pair of rollers running faster than the other pair. However, Arkwright lost his patent rights to John Paul on account of priority of the idea. The invention was named "Water Frame" because it was operated by water power. Later, Samuel Crompton combined the ideas of Hargreaves and Arkwright, and thereby produced the "Mule Frame" in the year 1779. It was so named because it was a "cross" between the Spinning Jenny and the Water Frame. It followed, of course, that weaving machinery had to be improved upon in order to take care of the product supplied by the new carding and spinning devices. John Kay made valuable improvements for weaving machinery, and in 1738, invented what is known as the Fly Shuttle. It was so named because of the speed with which it could be operated. It improved the quality of the cloth, lightened the labor and doubled the output. It is said that this device increased the capacity of the loom four-fold. Kay invented numerous processes, all of which were of great value to the industry. His son John, in 1760, invented the Drop Box. This device made it possible to weave different colors of thread into the same fabric and thereby produce figured materials. These two inventions brought the capacity of weaving far ahead of the supply of weaving material. The spinning devices could not provide enough warp. Various improvements were then added to spinning ma-

chinery. In 1785, Dr. Cartwright invented the Power Loom which could be automatically stopped upon breaking a thread. This invention made practical the use of power machinery. The last of the great basic inventions was that of Joseph Jacquard who invented the loom bearing his name, and which made possible the weaving into fabrics the most intricate and beautiful designs. This invention embraces the best parts of the older devices combined with the improvements of the inventor. This loom was completed in 1824. However, in the year 1830, a man by the name of Roberts improved upon the power loom and developed what is now the modern loom, or Self-Acting Mule.

To English inventors is due the credit for most of the basic inventions relative to the textile industry. Most of the machinery used in the cotton mills today involve the principles of these early inventions. However, the later improvements, and many of the most essential modifications have been the work of Americans. THESE VARIOUS INVENTIONS AND IMPROVEMENTS MADE POSSIBLE THE GREAT COTTON AND TEXTILE INDUSTRY OF TODAY. It is said that more than one-fifth of the population of the world is engaged in these industries in some form or other.

The principles of modern spinning and weaving are based upon the inventions of John Paul, Kay, Hargreaves, Arkwright, Crompton, Cartwright and Kay. One girl can spin several thousand times as much in a day as was done with the old spinning wheel. The same is true of the loom and of the cotton gin. Still, other improvements and labor saving devices were added from time to time. First, foot power, then horse power, water power, steam power, and finally, electrical power. Scientific research and development also played an important part. The cotton gin made possible an adequate supply of raw cotton. You will note particularly how each of these inventions depend upon one another. Without the one, the others would fall far short of their purpose and efficiency. To supply the present wants and needs of man these inventions must be classed as a unit. They are inseparable. They are primarily responsible for the present thirty billion ($30,000,000,000) dollar industry. They made it possible to clothe the world. Inventions move the wheels of progress.

There are certain characteristics that go hand in hand with all new inventions. First, they require much time, thought, energy and money to put the idea into mechanical form. Second, after the idea is mechanically perfected, it must be manufactured and made ready for the market which require both mechanical skill and the expenditure of large sums of money for manufacturing,

exploitation and educational work. Third, the people usually being skeptical about new and untried inventions are not ready buyers, and therefore, they must be educated to use the new invention advantageously. Again, labor is most always prejudiced. Herein lies the greatest expense, the greatest failures and the most trying period. In this respect, we shall relate the history of the inventors and their inventions of which we have spoken in this chapter.

It is said that John Kay became bankrupt protecting his patents against infringers, although he won all of the suits in which he was involved. The weavers were so enraged over Kay's inventions that he was obliged to leave the country. He went to Leeds where the same opposition was manifested on the part of the weavers, and it is said that he then consigned his inventions to the poor house where they were operated by the inmates. A mob broke in and demolished everything they could find, and Kay would have lost his life had it not been for two of his friends who secreted him to a place of safety. His spinning machine was called a "dangerous piece of furniture." He then crossed over to France, the machines being smuggled out of England, where he began working on them again. He applied to the English government for financial assistance but was refused. He died in France in obscurity and want. His inventions with modifications are actually in use today. Irrespective of the bad treatment accorded him, his name shall live on through ages. Kay was an engineer and a machinist.

Richard Arkwright was a man of considerable executive ability, very poor, no education, could scarcely read or write. He was apprenticed as a barber, and later knighted by the king. The spinners became so infuriated over his invention that they destroyed the mills built by Arkwright, and in which his inventions were operated. Infringements upon his patents sprang up on all sides and he lost every suit because it was proven that he did not conceive the original idea. However, his several mills supplied him with a steady income and the loss of the law suits did not hurt him very much financially. He added many valuable improvements to carding, drawing and spinning machinery. He died in 1792, leaving a fortune of nearly two million dollars. This is an example of what executive ability means to a successful business career.

Samuel Crompton was a farmer and a weaver by trade. He developed much musical talent and earned a few dollars playing at a theater which he used for the purpose of buying tools and

material to build and perfect his spinning process. He developed a machine which spun superior yarns. He operated this machine in his own home. The manufacturers operating in the neighborhood had one of their number secrete himself in the loft above Crompton's spinning machine where it was watched for several days through a small hole in the ceiling. His life was not only endangered, but his machine was likely to be destroyed at any time, so he hid it until he had money enough to have it patented. Many attempts were made to ascertain the mechanism of this machine. However, later he received a grant of 5000 pounds from the English government. He was not a success in business, and in his old age was kept from want through the kindness of a few of his old friends. He died in 1824.

Dr. Cartwright was a minister of the church, and knew nothing about textile machinery, never had seen a loom, or anything about its construction. This being true, another truth which now and then crops out so repeatedly in discovery and invention that men who know nothing of the particular business often produce remarkable inventions. This rule holds good in all lines of business. The manufacturers to whom he showed it gave him little encouragement, and in order to bring out his own machines built a factory of his own and equipped it with his own power looms. In this undertaking his poor business ability led him to failure. The spinners and weavers set fire to a large mill containing 400 looms which were operated by steam power. This put him in bad financial straits. He became discouraged, and together with various infringement suits brought against his patents, he turned his attention to the invention and improvement of farm implements. He was quite successful, and for his work in this respect the government granted him a reward of 10,000 pounds.

Joseph Jacquard and Hargreaves received the same kind of treatment at the hands of the spinners and weavers. Their machines were broken up and they too were obliged to flee from their homes. However, Emperor Napoleon granted Jacquard an annuity of 3,000 francs with the understanding that he should transfer his inventions to Lyons, and later, Lyons, France, became the art center of the textile industry.

Eli Whitney was a graduate of Yale, knew nothing about cotton until he was taken south as a tutor in the family of General Green. He was asked to make a machine for removing the cotton fiber from the seed, which he did, and to which the attention of the South was quickly aroused. Mobs broke in the house where

the model was stored, carried off the model and reproduced it so that thousands of planters began to use it without the consent of the inventor whose property it was. It was a small hand machine with a capacity of ten pounds per day while by-the-hand-process only one pound per day was possible. However, in 1800, Whitney did receive recognition from the southern planters of his rights and received from them the sum of $50,000.00.

Such has been the treatment of the inventors above mentioned. The experience of our present inventors is much the same except a different method is used in preventing the use of their inventions. The road of an inventor and his organization is rocky with many detours, pitfalls and washouts. It is said that it required 11 years to educate the public to use vacuum carpet cleaners. The same is true of the typewriter, adding machine, telephone, automobiles, various kinds of farm implements, electrical devices, and we may as well include all of the great labor saving devices invented since time immemorial. At first, all moved slowly upon the market, but in time, they gained momentum, and the demand became greater than the supply. Such has been the early history of nearly all inventions that are now so well established in the various industries.

We now have given a brief history of the cotton plant, its several kinds and its various uses. We have spoken of its early growth and its gradual rise to a crop of world importance. We have enumerated various examples of how new discoveries and inventions were primary factors in the progress of all industries, and how they made possible the great cotton industry. We have told how hand labor was gradually displaced by improved labor saving devices and the effect thereof upon the various industries and the public welfare. We endeavored to impress upon your mind how, out of necessity, one invention brings on another of equal or even greater importance, thereby increasing capacity and efficiency, and so on and on until industrial progress and efficiency meet the social and economic wants of mankind. We have called your attention to the tremendous annual monetary losses resulting from the present methods and systems used in producing, harvesting, marketing and handling the cotton crop. In no other staple crop is waste so great and efficiency so low. Therefore, something is wrong.

The following pages shall be devoted to the evils and abuses of the cotton crop and how to correct them.

CHAPTER IV

EVILS AND ABUSES OF THE COTTON CROP AND HOW TO CORRECT THEM

For the purpose of this chapter the cotton industry is divided into five great factors, as follows:

1. Cultivating.
2. Harvesting.
3. Ginning.
4. Spinning.
5. Weaving.

Elsewhere, we pointed out the various steps and processes through which the cotton fiber passes on its way to the finished product as well as the systems and methods that follow throughout its established course. With respect to the slow, wasteful and inefficient systems and methods of the past, it has been strongly impressed upon your mind how new inventions and discoveries, labor saving devices and appliances utilized in spinning and weaving the cotton fiber into yarn and cloth were primarily instrumetal in developing the great cotton and textile industry of the present day. You are also familiar with the invention of the cotton gin and the marvelous work performed by it. Mechanical ingenuity combined with scientific research and development have done much for three of the great factors (ginning, spinning and weaving), elevating them to the highest degree of industrial, social and economic efficiency. Two of these five great factors (cultivating and harvesting) have been greatly neglected for hundreds of years. This very neglect accounts for most of the evils and abuses of the cotton crop of today. Of course, other causes could be named, but they now cease to exist, and we shall not revive their memory at this time.

Were it possible for those who first grew and picked the snowy fiber, those who long ago passed on to "Whiter Fields" beyond the sky, to come back to the cotton fields of today, alive with singing and toiling negroes, they would feel very much at home as they could sing and toil with equal art and skill. The method of picking cotton is the same today as it was as far back as history runs. The absence of a mechanical device for picking cotton from the boll seems to be the "missing link" in the cotton

industry, and which accounts, to a very great extent, for the wasteful and inefficient systems and methods used in producing, harvesting, handling and marketing this great crop. The world now demands a device for picking the cotton from the boll. Such a device has been invented and is now well on the road to commercial usefulness.

We know that many devices relative to cotton picking machinery have been invented in the past. The United States patent records show that hundreds of patents have been issued for various types of cotton picking devices. None of them met with any commercial success. We also know that untold sums of money have been expended upon numerous contrivances of this kind, and that one concern alone has expended sums of money running into millions of dollars, and still commercial success is not in sight. Many have worked upon inventions pertaining to cotton picking machinery nearly a life time without achieving substantial results. To these men the world owes much, as they have devoted their time, skill and efforts for the betterment of their fellow man.

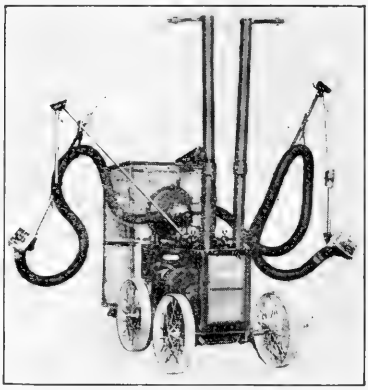
INVENTION OF THE STUKENBORG MECHANICAL COTTON PICKING DEVICE

We know a young man, the son of a merchant of Covington, Kentucky, who is now about forty years of age. In his teens this boy was inclined to be lean, weak and sickly. For this reason he was advised to go to his brother's plantation near Selma, Alabama. This he did, and remained on his brother's plantation nearly fifteen years. In a few years, he not only regained his health, but developed much talent for creating new and useful articles about the plantation. He saw the negroes pick cotton by hand. He tried it himself, but the work was too slow and tedious, and the fingers became too sore to continue long at picking cotton by hand. At once, he set out to devise some mechanical means to make the work of picking cotton easier, better and quicker. Oft times, much to his brother's disgust, he was seen driving the cows into the cotton fields instead of keeping them out of the field as was his duty at that time. For this his brother reprimanded him quite frequently, but of no avail. He was seen watching the cows for days and weeks as they licked the fleecy fiber from the bolls. The tongue of a cow is rough and hairy-like,

and by placing her tongue to the fiber it readily adhered thereto, and in drawing the tongue inwardly the boll was relieved of its fiber quicker, cleaner and more gracefully than the hand could ever hope to do it. This gave the young man his first idea. He was next seen using military hair brushes brushing the fiber out of the cotton boll much as the cows did with their tongues. He discovered that brushes would comb the cotton fiber out of the boll very nicely. He then began to mold the idea thus gained into mechanical devices of various types and shapes. This was about twenty years ago. He made device after device, and while he was able, through the means of brushes, to remove the cotton fiber from the boll perfectly, yet no means had been devised by him for removing the cotton fiber from the brushes to which it closely adhered. This was his greatest difficulty. Brushes, of themselves, will not release cotton fiber. He made many attempts to overcome this difficulty, but without much success, although in each attempt he made good progress which encouraged him to make another trial, and so on. After many models were built and tested out, he finally, in the fall of 1917, after all these years of experimental work, discovered that a take-off devise consisting of numerous teeth, working eccentric to its axis, the teeth of which protrude when in the act of combing the brushes, disappearing entirely at a point fartherest removed from the cylindrical brushes would take the cotton fiber off the brushes, and also automatically release the cotton from itself, meaning the take-off device. Therefore, the picking mechanism of his first successful model comprised two cylindrical brushes revolving inwardly at a certain speed which removed the cotton from the boll, and a take-off device as above described immediately behind these two cylindrical brushes revolving at a certain speed which removed the cotton from the brushes as well as from itself, and then conveyed by suction into a receptacle for that purpose. In other words, it embraces mechanism similar to that of the cotton gin, only reversed. Some call it a "miniature gin" reversed. The mechanism of this invention is not uncommon in principle with that of the early textile machinery, which were composed of cylinders, rollers, brushes, combing devices, eccentric motions, wheels and gears. This invention consists of gears, wheels, rollers, brushes, combing device and eccentric motions.

Hand picking is crude compared with the work performed by this machine.

The cotton crop is the only great crop which is not harvested by machinery.



The only machine that ever picked a lock of cotton and withstood the test of a season's work.

Stukenborg's First Successful Model, Patented April 30, 1918

This invention may be said to be the "missing link" which has been the cause of some of the evils and abuses of the cotton industry for these many years past. This machine will revolutionize the cotton industry as did the other inventions of which we have spoken.

The name of its inventor is Louis Carrol Stukenborg. His brother, Frederick W. Stukenborg, formerly of Selma, Alabama, has been his business associate, and also assisted him in various ways. The writer, L. F. Wegerly, formerly of Circleville, Ohio, has been acting as their chief attorney, and William L. Hall, 140 S. Dearborn Street, Chicago, Illinois, their chief patent attorney. Under the corporate name of the COTTON PICKER COMPANY OF AMERICA, these four men set out to commercialize this invention which is destined to equal the importance of the cotton gin.

In our first attempt to demonstrate the merits of this new invention, we are indeed grateful to our many friends and acquaintances through the North and South for their many acts of kindness extended to us, and for assisting us to make it a commercial success as quickly as possible. Neither do we overlook the courtesy extended to us by C. C. Clay, formerly assitant to the secretary of agriculture of the State of Georgia, and his mother, Mrs. Mary B. Clay, of Americus, Georgia, upon whose plantation this invention was first tested and tried out, and may we not forget the kind treatment accorded us by the Hon. J. D. Price, formerly commissioner of agriculture of the State of Georgia, and who has been a great believer in the ulti-

mate success of this invention ever since it was demonstrated before him at Experiment, Georgia, at which point the Georgia Experiment Farm is located, and Mr. Price, its director. Mr. C. C. Clay is now general sales manager of the Samson Tractor Company, Janesville, Wisconsin. These demonstrations took place during the late fall of 1917, and since that time many valuable improvements have been added to the invention.

HARVESTING AND GINNING

The crude and primitive method of picking cotton, in our opinion, is to a very great extent responsible for the many abuses of the cotton crop, resulting in some of the enormous losses heretofore spoken of. Picking is the most expensive item in the production of the cotton crop. One man can cultivate as many acres of cotton as five or six good pickers can gather. Therefore, the labor required to gather the crop should be equalized with the labor necessary to cultivate the crop. Surplus labor, if any, would be thereby eliminated, and the expense of production greatly reduced. One man would be able to gather as much cotton as he could cultivate.

Cotton picked by hand is injurious to the fiber. In pulling it from the boll, the action of the fingers on the fiber as it accumulates in the hollow of the hand puts it through a twisting, rolling, matting and squeezing process, and when placed in the sack or receptacle it resembles snowballs. Also, the fingers take in all the dirt, leaf and trash and mix it through and through the cotton fibers so that it becomes very difficult to remove, and it must be removed before the spinning operation takes place. Hand pickers leave the cotton in a terrible condition. To make matters worse, it is again abused by being dumped here and there only to be tangled, wadded and pressed all the more compact, and therefore, it cannot cure itself properly. It is then taken to the gin to be assassinated, to destroy much of its value, durability and strength. Being in the condition that it is, there is little doubt but that the gin saws will cut and tear the fibers all to pieces, effecting materially the uniformity of staple, grade and classification. Hence, the producer pays the price of his folly in a lesser price received for his cotton. Had the proper care been taken of the cotton before ginning it, the writer would not venture to say how much more per pound the producer would have received for his cotton, but, rest assured, the amount would almost pay for the expense of picking it, and this is no small item. The gin

cannot perform good work when the cotton is in the condition described. Naturally, it will cut and break the cotton fibers so that they will grade far below the standard, and therefore, command a lesser price, a lower commercial value.

Much damage is done through inexperienced and unskilled labor in operating the gin. The operators should know how fast or how slow to run the gin depending upon the kind and condition of the cotton with respect to staple and moisture. In order for the gin to perform its work perfectly, and lessen the cutting and tearing of the lint, each seed of each lock should be fully segregated, in a feathery-fluffy condition, with the cotton fibers straightened out or parallel as nearly as possible. You remember the function performed by the carding machine, the opening, cleaning and laying the fibers parallel. If this were not done, spinning would be almost impossible. So it is with the gin. If it is to do perfect work, the cotton must be properly prepared as it is for the spinning operation. Defective ginning causes the fibers to knot, which will later interfere with spinning, and finally, as irregularities in the finished product. These knots cause what is called "neps." For this inferior yarn the manufacturer receives less money, and therefore, he cannot afford to pay the producer nearly so much for raw cotton. The fault is with the producer. Again, long and short stapled fibers may be mixed in the same bale, or fibers of uneven lengths, which is also a source of great inconvenience to the manufacturer for its makes uneven yarns as does gin cut fibers, and therefore, the product is inferior, and the producer for this negligence bears the loss. Hand pickers mix green cotton with ripe cotton which gives cause for another inconvenience to the spinner. Ripe cotton fibers consist of natural twists at intervals. The stronger and more uniform the twists, the greater the elasticity of the fiber, and the better it is for spinning. Unripe cotton fibers show little or no twist, and for this reason, very harmful to the product. Again, the seed of unripe cotton often spoils and becomes mushy, and the gin saws sever them into many particles and to each particle fibers adhere. These are a source of great annoyance to the spinner because of the difficulty in removing them. Hand pickers mix the cotton with harmful trash of all kinds; such as, boll dirt, leaf, sand, storm cotton, wet and damp cotton, dirty, injured and unripe cotton, all of which is not easy to remove and results in much injury to the product. It also causes the gin saws to cut and tear the fibers, and as it is all mixed in the same bale of cotton, the result is the loss of untold millions of dollars each year to the producers

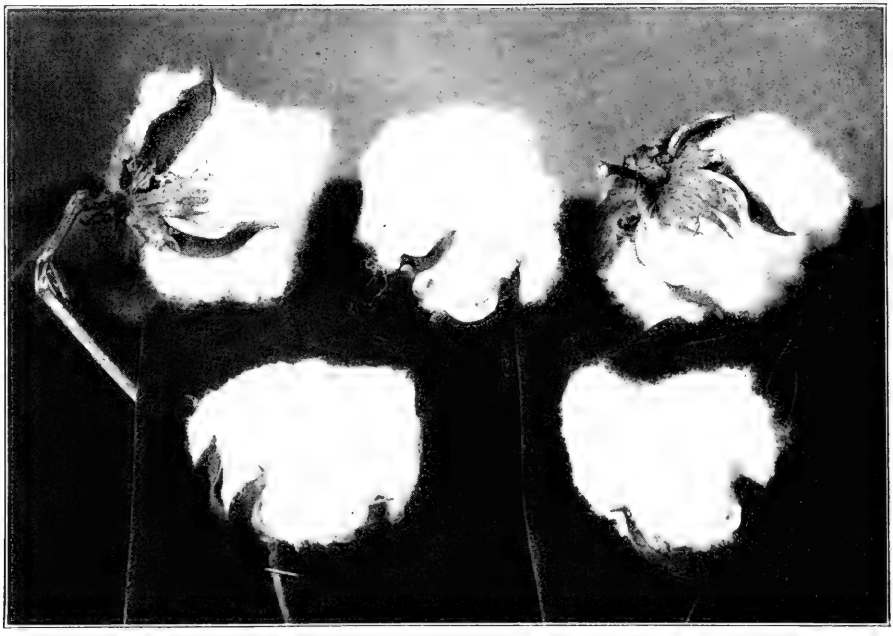
in the shape of a lesser price received for their cotton. Many other elements have a tendency to cause great loss, but we are now dealing with the subject of picking the cotton by hand, and we firmly believe that this method of harvesting the crop holds in its bosom the heart-root of many of the evils and abuses heretofore enumerated.

REMEDY

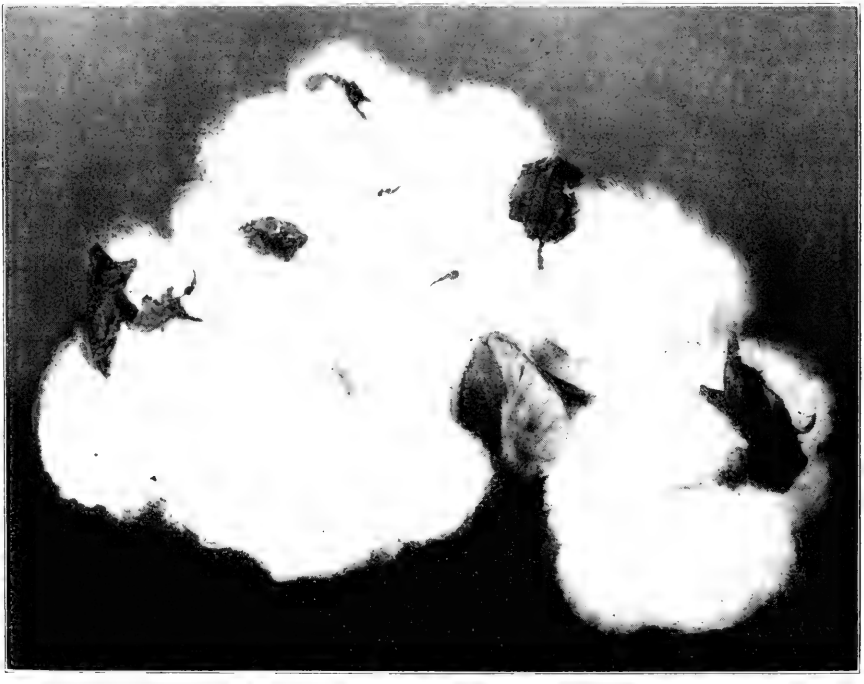
STUKENBORG MECHANICAL COTTON PICKER

Cotton is the most delicate of all fibers. So delicate and fine are the fibers that it requires 14,000 to 20,000 individual fibers to weigh one grain, and 140,000,000 to weigh one pound, and if placed end to end in a straight line would reach 2,200 miles. Some authorities claim that in one instance fibers of Sea Island cotton were spun into thread so fine that one pound of such thread extended upwards of 1,000 miles. Therefore, on account of its extreme delicacy and fineness, too much care cannot be taken in harvesting it. Any injury done to it in removing it from the boll, no matter how little it may be, can never be cured. It is not unlike the beautiful white lily, crush or injure it and its beauty is gone forever. The damage thus caused cannot be repaired. For this very reason, no mechanical cotton picking device shall ever meet with universal satisfaction unless it performs the work of picking the cotton fiber from the boll better, cleaner and more delicate than the hand can do it. Cotton should be "kissed" out of the boll, so to speak, and any mechanical device designed to "kiss" the cotton out of the boll need not be based entirely upon its capacity to give it great commercial value, but upon its initial cost to the consumer.

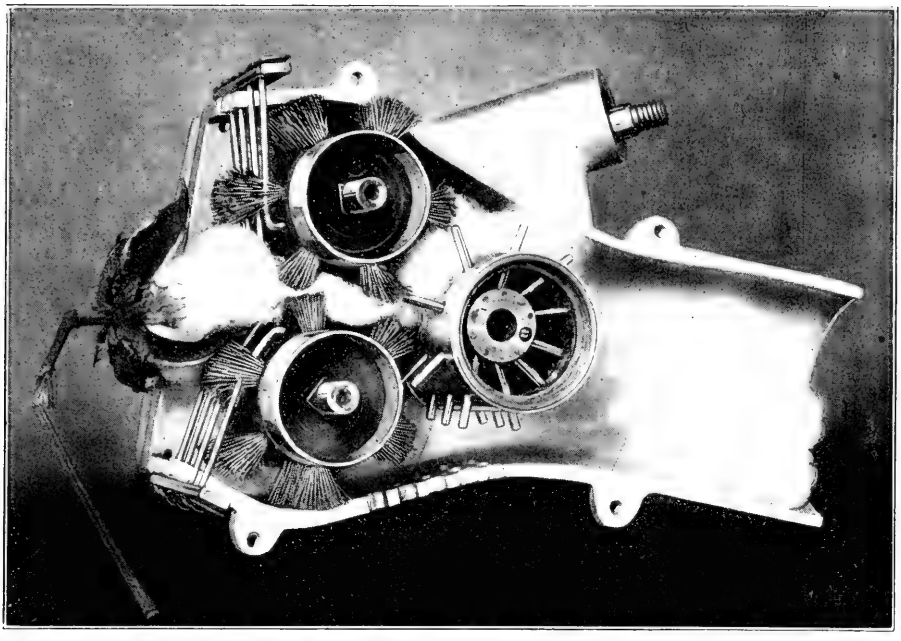
Such a machine has been invented and is known as the Stukenborg Cotton Picker. It is to be placed on the market in the very near future. It is not an experiment, but a real machine that "kisses" the cotton out of the boll. It does not injure the fiber as is done by hand picking, neither is the fiber twisted, matted, squeezed and rolled up like snowballs. Instead, each seed of each lock is completely segregated—in a feathery-fluffy condition—no tangles or bunches of cotton to interfere with the ginning process. The lint on each seed is more or less cleaned, straightened and laid parallel. This gives the cotton an opportunity to dry and cure properly, although the cotton in passing through the machine is relieved of its dampness to a very great extent. Again, the operators of the machine are not likely to pick green



MATURED COTTON BOLLS BEFORE BEING PICKED
Note the back leaves extending over the cotton. Hand pickers remove these leaves, mixing them in the cotton.

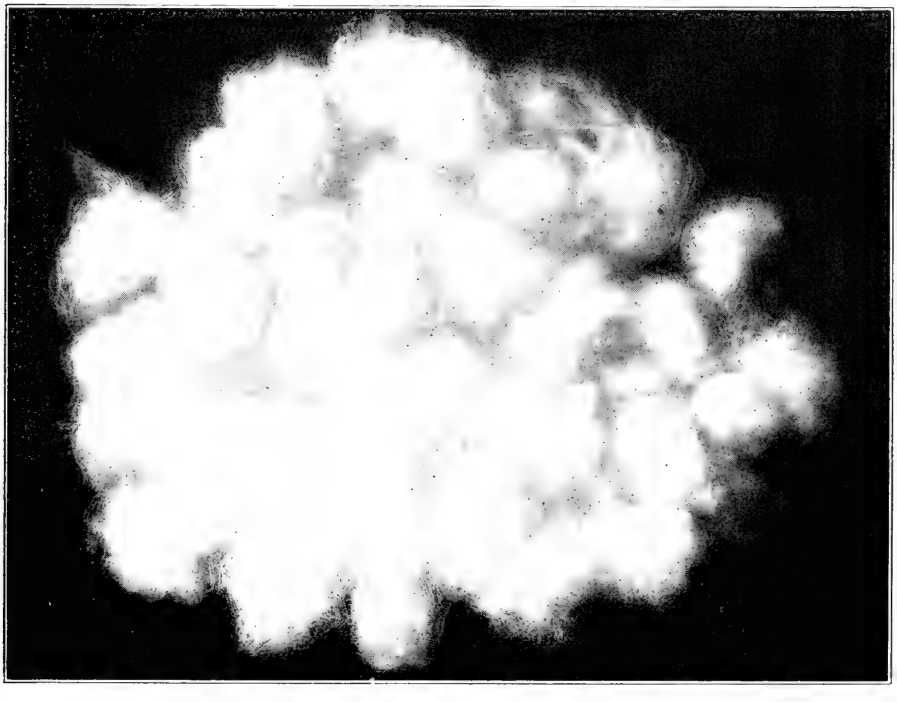


HAND PICKED COTTON
This cotton is unusually clean for hand picked cotton. Note the dirt, leaves and parts of boll and stalk mixed through it. It is a tangled, wadded mass resembling snow balls, and in no condition for perfect ginning.



MECHANISM OF THE STUKENBORG MECHANICAL COTTON PICKING MACHINE

Note the simplicity of its mechanism; how it mechanically removes the cotton from the boll without molesting the back leaves, and how it mechanically separates each seed of each lock of cotton, thereby bringing it out in a feathery-fluffy condition fully prepared for perfect ginning.



MACHINE PICKED COTTON

Note the character and cleanliness of the cotton picked by machinery—each seed of each lock of cotton is fully segregated, and almost free from all foreign matter.

and unripe cotton which is so objectionable to the spinners on account of such fibers being worthless, and to the cotton oil mills because unripe seeds are not only unfit for food products, but also cause other substantial losses. Machine picked cotton is almost free of foreign matter, such as boll-dirt, sand, leaf and parts of stalk. These statements being true, this machine thoroughly prepares the cotton for the ginning process just the same as the carding machine prepares the lint for the spinning process. Therefore, the gin, if properly operated, should not cut and tear the cotton as it does hand picked cotton because the machine has opened, cleaned and straightened out the fibers, thereby preparing the cotton so that the gin saws can perform their work perfectly.

We have, heretofore, stated that cotton is classified and graded according to its (1) length of staple; (2) its freedom from foreign elements, defects and impurities; (3) its strength; (4) its fineness; (5) its smoothness; (6) its uniformity; (7) its color; (8) its regularity of staple and (9) its pliability. Under official tests it has been ascertained that a bale of seed cotton picked with this machine will gin 40 pounds of lint, more or less, than a bale of like cotton picked by hand. At 30c per pound this item alone means a gain of $12.00 per bale for the producer over hand picked cotton. This is equivalent to 6% interest on an investment of $200.00. We mention this in order to show the commercial value of this machine exclusive of the higher grade given to the cotton and the other benefits of which we are about to discuss. The lint ginned from the same bale showed by official test to measure from 1/64 to 1/8 inch longer staple (1) than from a bale of hand picked cotton from the same field. The lint being longer means a stronger (3) and more durable fiber, a better grade and a higher price in favor of the producer. Machine picked cotton being almost free from foreign substances, defects and impurities, (2) does not require repeated cleaning at the mills to prepare it for spinning. These cleaning processes, when often repeated, not only weakens the fiber, (3) but produces a certain amount of waste, and as usual, the producer always stands the loss in the shape of a lower grade and the price paid for that grade. If the cotton is full of sand, (2) it is almost valueless for spinning. The fineness and smoothness (4) and (5) depend largely upon the kind and variety of the cotton together with the absence of defects and impurities; however, proper harvesting and ginning add much in this respect. This is true of (6) except when it is cut and broken by the gin saws, and of (8) except when the hand pickers mix several kinds of cotton the

staples of which are uneven. The machine takes care of slight unnatural discoloration, (7) and even prepares storm cotton by drying, cleaning and brightening its fibers. Pliability may be increased by picking uninjured and fully matured cotton (9). Unripe and defective cotton should not be picked and mixed with ripe and fully developed cotton as it tends to lessen the grade materially.

From what has been said can there be any doubt in the mind of the average person that cotton picked by this machine will class higher, grade better and command a higher price than cotton picked by hand? Most assuredly not. First, because it is freer from gin-cut fibers, the presence of which not only lessen its value, but cause the fibers to knot when spinning the lint, resulting in an uneven product of inferior quality. Second, because of its freedom from foreign matter, the absence of which not only increases its value, but eliminates wasteful cleaning processes which always tend to weaken the fibers, affecting the strength and quality of the yarn. Third, because the staple is more uniform owing to the fact that the gin functions properly and defects and impurities not so numerous; therefore, it is better adapted to smooth and even spinning, thereby producing a superior quality of yarn. Fourth, because better color and greater pliability is added to the cotton, and lastly, because machine picked cotton goes through a process in passing through the machine which tends to eliminate undue moisture by reason of the peculiar advantages given to the cotton for curing before being ginned, and by drying the cotton, if damp from rain or dew, in the process of picking and conveying it to the ventilated receptacle. There can be little doubt, from what we have said, that machine picked cotton will reduce to no small extent the great loss and waste resulting annually from improperly picked and ginned cotton as well as the loss and waste due to improper grading and classification, both of which the annual monetary losses are estimated around $200,000,000. Of this reduction of the annual loss and waste, the producers should receive their proportionate gain in the shape of a higher price paid for their product. The more we think about it the more firmly are we convinced that this invention, in time, will reduce the loss and waste from this source to a very small fraction of the figure at which it is estimated today. Therefore, it does seem needless for us to dwell further upon this subject and its economic effect upon the cotton industry because it is so simple and so easily understood that even the most uneducated person could hardly fail to grasp its significance.

CHAPTER V

IMPORTANCE OF CLEAN COTTON

Elsewhere we have discussed the essential qualities usually considered in grading and classifying cotton; however, we are prompted to devote more space to ONE of these qaulities; namely, the cleanliness of cotton, for the reason that many planters contend that this quality has little to do with the grade or value of the product. In this respect, and for the following reasons, our view is to the contrary.

The defects and impurities most common to cotton may be described as follows:

1. Dead or unripe cotton constitutes defective fibers which have little or no natural twist, and when present in raw cotton to any great extent reduces its value very materially. Such fibers are difficult to remove which must be done before spinning, as they will not spin, dye or finish properly. Dead, unripe or injured cotton, if picked, should not be mixed with good cotton because the cotton mills are compelled to remove it, resulting in much waste and needless expense to the manufacturer, the loss of which the planter shares in the shape of a lower grade and a lesser price received for his cotton. In this connection we shall state that the seeds of unripe cotton are green and immatured, and therefore soon become soft and mushy. The ginning process not only crushes these soft seeds, causing the oily ingredients of the kernel to saturate the cotton, rendering it almost worthless, but also breaks and tears the shell of the seed into hundreds of fine particles, with some of the lint hairs attached to each particle, which are called "bearded motes." These particles are not only difficult but almost impossible to remove, resulting in much waste and great loss to the manufacturer. Again, green seeds become mixed with ripe seeds which cause untold losses to the cotton oil mills. They soon spoil and contaminate the good seeds, and thereby render the by-product unfit for food.

2. Broken fibers usually indicate "gin cut" cotton which occurs more or less when the cotton gin is improperly operated; the presence of dead, injured and unripe cotton; the ginning of damp or wet cotton; the gin machinery out of order; the choking or over-feeding of the gin; the failure to clean the gin machinery regularly, and also because hand picked cotton goes to the gin in a tangled, wadded mass of fibers, consequently, the gin saws cut and tear the fibers much more than were the cotton properly prepared and cured before running it through the ginning process. The broken fibers thus caused must be removed at the mills before spinning, resulting in another waste and loss which somebody must bear, and no doubt the manufacturer figures the average percentage of such losses in the shape of a lesser price paid for the raw cotton.

3. Seeds, husks and shells are often found to a great extent in raw cotton, which is the result of improper harvesting and ginning. The seeds are either whole or in broken particles to which are attached lint hairs rendering removal difficult. These impurities represent not only a total loss to the manufacturer but also a source of great annoyance and trouble. We venture an opinion that the planter stands the loss, whatever it may be, in some form or other.

4. Broken leaves indicate that the hand pickers did not use proper care in picking the cotton and pulled off many cotton leaves which are mixed with the cotton. The cleaning facilities at the gin fail to remove all of the leaves and what is not removed pass on through the gin which breaks them up in fine particles, and the finer they become the more difficult are they to remove. Naturally, each successive process breaks them into still finer particles. The fine particles go into the yarn, thereby producing not only an inferior grade of yarn commanding a lesser price, but also causes trouble in spinning on account of breakage, etc. Again, somebody must bear the loss thus occasioned, and no doubt it will fall upon those who permitted the leaves to be present in the cotton.

5. Sand, dirt, dust and other foreign elements are found in cotton in a greater or lesser degree, depending largely upon the particular section from which it came, which is always a total loss to the manufacturer. These foreign elements not only cause much damage to the mill machinery but increase very materially the possibility of fire. The average losses thus occasioned must be met, and as the cotton is carefully graded before it is purchased by the manufacturer, it evidently falls upon the grower who made possible its presence in the cotton to meet it in the shape of a lesser price received for his cotton.

6. Moisture in cotton is essential to keep the fibers soft, pliable and elastic. The usual amount is from four to seven per cent, varying with the different varieties of cotton. Any amount above normal is deducted from the weight of the cotton when sold.

7. Stained or tinged cotton may arise from various causes. It may have remained in the boll too long during rainy weather. It may become stained from rusty hoops coming in contact with the cotton, or from mildew, or the fibers may become stained from oil caused by crushing seeds while passing through the ginning process; especially, unripe seeds, and which cause much trouble in carding and spinning. Stains are also due to leaving cotton bales in the open unprotected from the weather. The losses thus occasioned are taken care of in the shape of a lower value placed on the cotton.

In order to remove the defects and impurities from the cotton above enumerated, it is necessary for the mills to run the cotton through various processes, and among other things performed, these processes remove the defective elements as much as possible. The usual processes are as follows:

Bale Breaking	Scutching
Mixing	Carding
Picking	Combing

When the cotton contains abnormal amounts of these foreign elements, some of the above mentioned processes must be repeated, resulting in further waste, loss of time and weakened fibers. Each process tends to weaken the fibers, having a corresponding effect upon the yarn.

Cotton grading is more or less imperfect due to the variation of the fibers coming off the same acre of land, soil conditions and the time at which it was picked as well as the care exercised in harvesting it. Even a single bale of cotton may disclose all of the imperfections above mentioned. If the sample taken from a bale happens to be the best cotton in the bale it will bring a higher price than if the sample happened to be the poorest in the bale sampled. Cotton is graded according to the poorest sample, and different expert graders seldom obtain like results. Therefore, the defects, impurities and mistakes common to grading cotton are all taken into consideration in setting the market price to be paid for cotton and usually to the great disadvantage of the grower. The only real salvation for the planter is to do all he can to avoid all those things in producing, harvesting and handling cotton which lend such splendid opportunities for the various factors to work to the sole disadvantage of himself. He alone is in a position to correct these evils.

The basis of grading in all markets is "middling" white cotton. "Strict good middling" is the highest grade recognized for American Upland cotton. It is a very bright, clean white cotton. "Good ordinary" is the lowest grade and contains an increasing amount of defects and impurities, and may be slightly off color. The official standard of the United States is as follows:

3—Strict Good Middling
2—Good Middling
1—Strict Middling
Basis—0—Middling
1—Strict Low Middling
2—Low Middling
3—Strict Good Ordinary
4—Good Ordinary

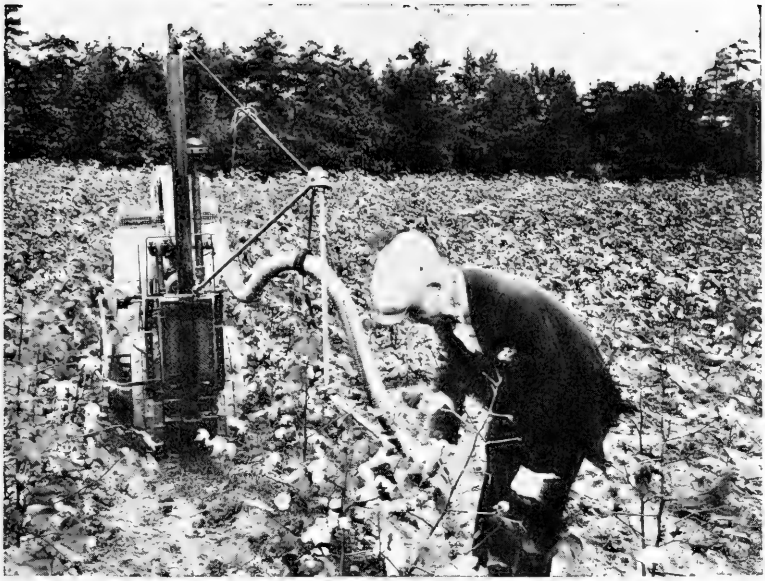
With cotton selling around 30c per pound the difference between the value per pound of "strict good middling," the highest grade, and "good ordinary," the lowest grade, is about 12c to 13c per pound, more or less. Usually, the price variations run from 4c to 6c less than "middling," and other grades accord-

ingly. Some cotton is so inferior that it is not graded upon the basis above specified. Sea Island cotton, being the finest cotton grown, is graded upon another basis.

It is true that cotton buyers take into consideration the particular section where the cotton was grown. If such section is dry, sandy and windy, the buyer knows fairly well what he may expect to find in the cotton, and offers a price accordingly. They consider the conditions under which it was picked, the weather, the time of the year as well as the average grade of cotton coming from such sections for years past, all of which operate to the disadvantage of the planter, however, the planter can correct these imperfections, and if he does not, then he alone is at fault.

We cannot over-estimate the importance of clean cotton. As it comes from the field so shall it be in the bale, because the cleaning facilities at the gin will not remove all of the defects, impurities and foreign elements. Therefore, the chief source of the trouble lies in the method of picking the crop, and this method must be corrected if the evil results are to be checked. Cotton should be picked as free from dirt, sand, trash, leaf, unripe, injured, sun-dried and frost bitten bolls as possible. It should be properly cured and thoroughly prepared for the ginning process in order to eliminate, as much as possible, husks, broken seeds, particles of leaves and gin cut fibers. Again, the gin must be operated perfectly, and be in a first class condition at all times. If the cotton should be delivered to the mill in the condition in which it was picked, minus seeds, leaf, sand, dirt, unripe fibers and other foreign elements and impurities, spinning would be comparatively easy work, and several cleaning processes could be dispensed with and thereby reduce expensive operations which always create waste and weaken the fibers so that the yarn will prove to be inferior in quality. The gin and other cleaning machinery at the gin does not remove all the defects and impurities, and, consequently, they go into the bale, graded, and the value of the cotton based upon the grade determined from several samples taken from the contents of the bale.

We have now covered the subject of the value of clean cotton. The next question is, how are the planters to correct the present method of harvesting the cotton crop so as to eliminate the foreign and defective elements common to cotton picked by hand? The correction lies in the universal use of the STUKENBORG MECHANICAL COTTON PICKING MACHINE which cleans the cotton of its defects and impurities to a greater or lesser extent,



Stukenberg Single Head Cotton Picking Machine Attached to a Small Beeman Garden Tractor

and prepares it perfectly for the ginning process. If the gin is in perfect order, and operated as it should be, these defects and impurities of which we have spoken will be very materially lessened, and for this reason the planter will receive a higher price for his cotton because his cotton will be superior in quality.

CHAPTER VI

JUDGING THE FUTURE BY THE PAST

We have discussed the history and evolution of the several prior inventions and discoveries, and how they made possible the great and efficient industries of today. We asked you to bear in mind how one useful invention properly utilized necessitated the introduction of other inventions and appliances of equal or even greater importance, and how these in turn developed economic, social and industrial progress and efficiency. The invention of new spinning devices required better and quicker means for carding and weaving. With the advent of new and improved carding and weaving devices, it was necessary to introduce spinning devices with sufficient capacity to supply the weaving machines, and vice versa, and in order to supply material for the new and improved spinning, carding and weaving machines, the cotton gin was a necessary invention because hand labor could not remove the lint from the seed fast enough, and so on, step by step. Therefore, basing our judgment upon events that have passed before, we are more than fully convinced that with the introduction of the cotton picking machine, a better and more economic system of baling, housing and marketing the crop will be brought into use; improved methods of grading and classifying will take place; new and better methods of cultivation will be gradually put into effect; cotton will be picked from the field properly, and little left unpicked and wasted; new and improved farm machinery will be universally utilized; intense and diversified farming will everywhere prevail; fertility of the soil increased so that it will produce twice as much as it did before; better selection of seed for planting, and of kinds and varieties best suited for the different localities; better ginning processes, and so on until each of these factors reach the highest degree of progress and efficiency, and each division of the cotton industry share its proportionate amount of gain and benefit. We believe that the STUKENBORG MECHANICAL COTTON PICKING MACHINE will be the means of bringing these things to pass within a reasonable time, and our belief is based upon the history of past inventions and discoveries as reflected in this pamphlet. Of this, there can be no question, and for this reason, materially reduce the percentage of loss and waste due to unpicked cotton remaining in the fields; baling, housing and country damage; marketing facilities; improper cultivation and diminishing soil fertility; imperfect grading and classifying and the damage caused by insects and injurious pests.

CAPACITY

The Stukenborg Mechanical Cotton Picking Machine pulls the cotton from the boll by means of two cylindrical brushes, revolving inwardly. The cotton is combed from the brushes by a cylindrical take-off device acting eccentric to its axis, the teeth of which protrude as they comb the cotton from the brushes, and disappear at a point fartherest removed from the brushes, thereby releasing the cotton when it is conveyed by suction to a cleaning device and by it dropped into a receptacle.

The capacity of good hand pickers is about 100 pounds per day; however, the average number of pounds per day of all classes of pickers is around 65 pounds. Some planters claim that they have pickers who pick 300 pounds per day; others, 600 pounds per day, and a few claim that they have pickers who can pick 900 pounds per day. We do not question these figures as they are probably true, but in order to properly interpret the meaning of these figures we submit the following examples:

John Doe picked, wrapped and packed 50 bushels of apples in one day. He picked each individual apple from the tree. He did not pick any defective apples nor did he bruise any of the good apples. He secured a fancy price for the lot.

Richard Doe picked 150 bushles of apples in one day. He shook the apples off the tree letting them fall to the ground to become battered and bruised and their keeping qualities impaired. For this lot of apples he received less than Richard Roe did for his 50 bushels.

John Brown, an uncle of Richard Doe, picked 300 bushels in one day. He went from tree to tree and shook the apples off which fell to the ground. He then turned the hogs in the orchard to devour the fruit. They did it easily by sunset. If he had had more hogs he could have picked more apples that day, and for this reason he did not pick apples nearly as fast as he was capable of doing. This lot of apples did not repay John Brown for the expense he was put to in raising them.

This is a fair interpretation of what is meant by picking 300, 600 and 900 pounds of cotton per day. Some pick cotton with utmost care; some pick cotton and everything that gets in their way; some snap the cotton off the stalk while others pick boll, cotton leaf, dirt and all that happens to go with it. The results need no further discussion.

It requires from 1,500 to 1,750 pounds of seed cotton, more or less, to yield a bale of lint cotton (500 pounds). Some varieties of cotton require only 40 to 50 bolls to make one pound of seed cotton; some 80, others 100, and some few as many as 150 bolls, depending upon the variety and the condition of the cotton when picked. The average number of bolls to a pound is around 90. Hence, the number of pounds that can be picked in a day depends upon the kind of cotton; the number of bolls required to make a pound; the number of bolls opened and matured, and the condition in which it is at the time it is picked.

The Stukenborg Mechanical Cotton Picker has a capacity, on an average, throughout the season, of about five to one over hand labor. However, capacity alone does not represent of itself the true commercial value of the machine. If it picked only as much as can be picked by hand labor, and performed the work

Stukenberg Double Head Cotton Picking Machine Attached to a Small Beeman Garden Tractor

of preparing the cotton for ginning, as is claimed, still its commercial value would be inestimable. The average daily capacity of hand labor of all kinds and classes is reliably estimated at less than 70 pounds per day. The capacity of the machine throughout the picking season may be 5 to 1 on an average, more or less, depending largely upon the skill of hand pickers and that of machine operators. The machine is easy to operate, picks the cotton from the boll cleaner, better and quicker than hand labor, and prepares it perfectly for the ginning process. There is no complicated machinery to get out of order. Therefore, the vital points to be considered are, as follows:

1. The Cotton Picking Machine means just as much to the producers of cotton as the Self-Binder and Mowing Machine does to the growers of wheat and oats. They could not get along very well if they had to use the old fashioned wheat cradle and mowing scythe.

2. It means that the skill of the expert hand picker will not only be matched but excelled by unskilled pickers, and even by any white man.

3. It means that the planters of cotton can hire men to operate the machine and pay them by the day, week or month, and thereby exercise full control of them and their work. This is important to the planters because the men are not at liberty to work as and when they please, and therefore, a higher efficiency can be easily maintained.

4. It means that the labor necessary to cultivate the crop is almost equalized with the labor required to gather the crop. This, in itself, greatly reduces the necessity of surplus labor, if any, which has, in the past, been a heavy burden to the planter. By reducing surplus labor, the cost of production is lessened. On the other hand, if no surplus labor exists, and labor is scarce, still the planter has a great advantage because less labor is needed to operate the machine. Through the use of the machine labor will become more equally distributed.

5. It means that the crop will be gathered more quickly, and therefore, the possibility of damage to the fiber from rain, sleet and storms is lessened, and if only slightly damaged from inclement weather conditions, the action of the machine on the cotton will cure the damage. Even storm cotton, if not too muddy, will be cleaned and brightened by running it through the machine, and its fibers parted and straightened out.

6. The power used to operate the machine can be used for many other purposes, such as plowing, cultivating, pumping, hauling, grinding, lighting systems, etc. The cotton harvester is an attachment which can be removed when the picking season is over. The cost of the picking equipment will be exceedingly low, and within easy reach of every small grower of cotton.

7. It means that cotton can be picked by the machine when the weather is too cold to pick by hand, as gloves and overcoat can be worn without any inconvenience to the operator. Can pick early in the morning and late at night as the machine takes care of the dew and dampness. The machine leaves no "cow licks." Hand pickers do.

8. It means the early removal of the cotton from the field, which makes possible fall plowing. Fall plowing produces a fine seed bed for the next season, not only insuring a better germination of the seed, but also tends to destroy the boll-weevil, insects and other

troublesome pests which sting the cotton bolls and damage the plant. Cotton stalks, bolls and all trash should be burned immediately after picking, and if possible before heavy frosts occur in order to destroy the hiding places and wintering places of the pests. The machine, in this respect, will prove itself to be a destructive weapon in the hand of the planter for the purpose of exterminating troublesome insects.

9. It requires an expenditure of over $225,000,000 annually to harvest the cotton crop. The machine will work a very material reduction of this enormous sum, and also benefit the planter by lessening the cost of production.

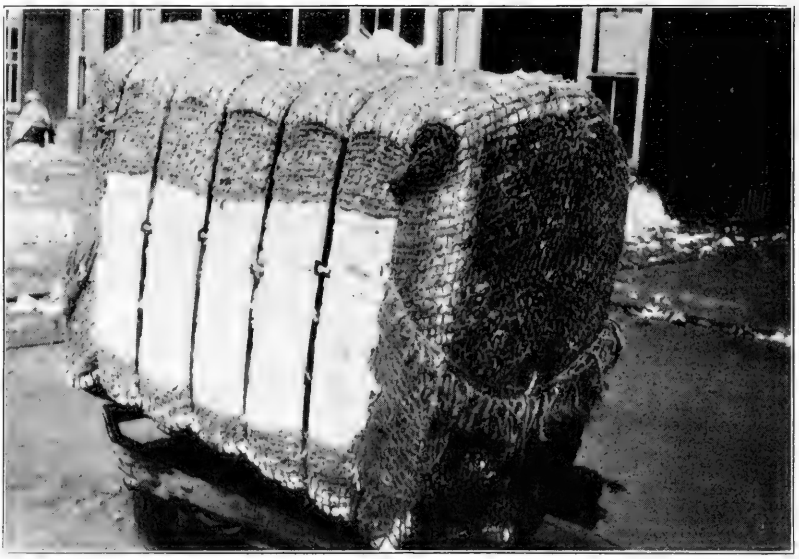
10. This machine will do much toward an economic and social elevation of the Negro race. It will tend to keep the women and children out of the fields. The women will then be able to attend to household duties and to the wants of the children. The children should attend school, which will make them better men and women than by working in the cotton fields.

The advantages and savings that will inure to the benefit of the cotton growers through the universal use of the Stukenborg Mechanical Cotton Picker cannot be well over-estimated.

The use of cotton picking machinery will sooner or later usher in new and improved methods of baling, housing and marketing the cotton crop. There is now much agitation relative to the imperfect system of baling. It has to do with uniform classification, weight, compression, covering, housing, marketing and transportation. Too much care cannot be taken in picking the cotton as the baling of the cotton takes place at the gin and is baled as it comes from the gin. As it is picked and ginned it goes into the bale. Damp cotton should not be ginned because the gin saws cut and tear the fiber, and it then passes on into the bale in a damp condition, and in many instances the producer received a price as much as 20c per pound under the market price that his cotton should have brought. Green cotton should not be picked and mixed with ripe cotton as it produces a like result—dampness and gin cut fibers. Again, the seed has a tendency to heat, rendering the oil and meal unfit for food. More care should be taken by the ginners to keep the seeds from heating. Again, if the gin is not run properly, depending upon the quality and moisture of the cotton, the fiber is also cut and torn which lessens the value of the product. All gins should use the very best cleaning facilities.

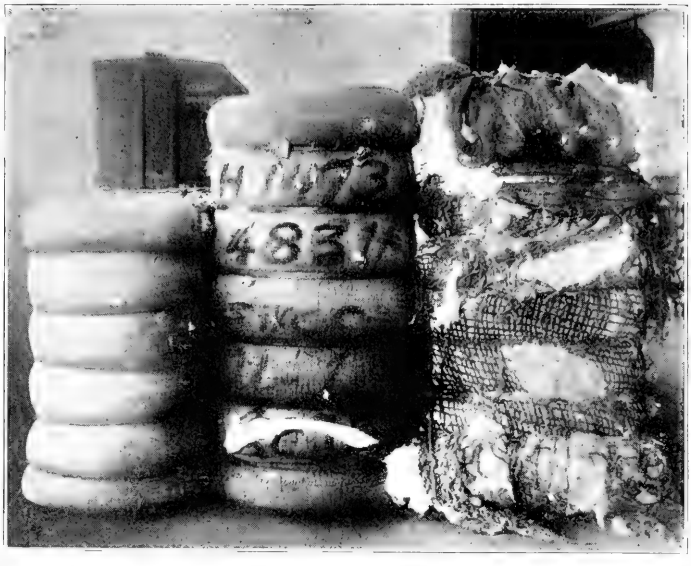
BALING

The best time to sample and grade cotton is as the cotton comes from the gin, and before baling. This is the condition in which it is best suited for spinning. When it is baled, the spinners are compelled to reverse the process; that is, work it into the same condition as it was before baling in order to prepare it for the spinning process.



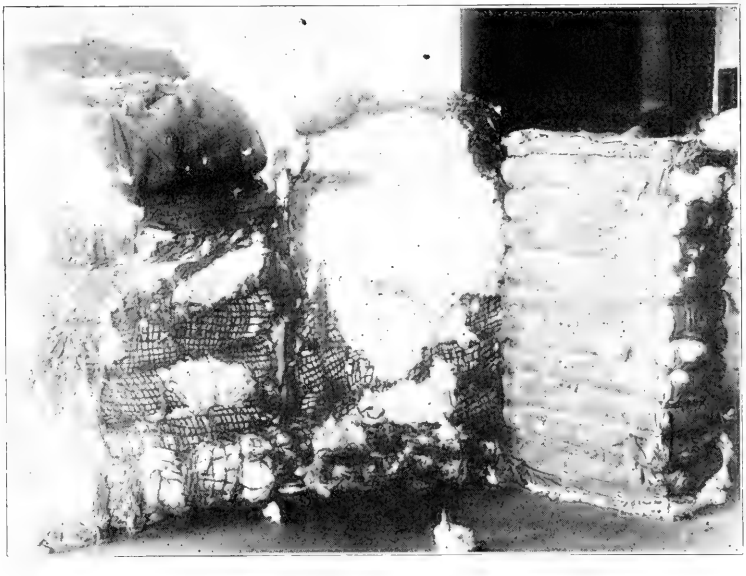
APPEARANCE OF AN AMERICAN COTTON BALE AS IT LEAVES THE COTTON GIN

The American bale is poorly covered and presents a very ragged appearance. The jute covering of the bale easily deteriorates permitting the elements to destroy and injure the outside fiber. Under high compression the jute fibers are pressed into the cotton which renders the outside unfit for spinning. The bales, after being ginned, are usually dumped outside exposed to the weather, either at the gin, river banks, docks or railroad terminals, where they become wet, absorb moisture and the outer edges of the bales become discolored and the grade injured. In handling the bales the jute covering is usually torn off before reaching destination, allowing the outside of the bale to become dirty, wet and mildewed. Again, the bale is cut and torn in taking numerous large samples from it to ascertain its quality. It goes to the compress for repacking and then reloaded for shipment or export. The bales are not usually uniform in weight, poorly covered, roughly handled, resulting in tremendous losses.



SOUTH AMERICAN INDIAN AMERICAN

One bale from South America, one bale from India and one bale from United States shipped to New Bedford, Mass. Note the neatness of the foreign bales and the ragged appearance of the United States bale upon reaching destination.



AMERICAN AMERICAN INDIAN

Two bales from United States and one from India shipped to New Bedford, Mass. Note the condition in which they were received at destination.

TEXAS OKLAHOMA

One bale from Texas, the other from Oklahoma, both shipped to New Bedford, Mass. Could any system of baling be more wasteful and inefficient?

We repeat, too much care cannot be taken in picking the cotton so that the various qualities of staple are regular and even. This would include ginning methods as well. A variation of one thirty-second of an inch in length of staple makes a bale unsatisfactory to certain spinners, and the same is true of color variations and the texture of the fiber.

Several different bales are now compressed. However, the rectangular bale is preferable to the round bale. High density bales are a source of great annoyance to spinners as the high compression injures the fiber and the quality of the yarn is not so good. The cotton in the center of the round bales is a hard mass unfit for spinning, and almost a total loss to the spinner. The fiber is too delicate to be squeezed so tightly. The life is taken out of it. Oft times, the jute covering is pressed so tightly that the fibers of the jute render worthless much of the outside of the bale. They cannot be easily removed, and if not removable, the cotton cannot be spun. It is said that under a more economic system of covering over $3,000,000 would be saved annually. It is estimated that over $200,000,000 is lost annually through the faultiness of baling and country damage. Surely, these faults are worth while correcting, and they can be corrected. In this respect, a little time and effort expended on the part of the grower and other factors would count for much.

WAREHOUSING

If the Stukenborg Mechanical Cotton Picking Machine makes it possible to inaugurate a uniform system of grading and classifying cotton, which it will, then it will cause to be brought about new and improved systems of compression and baling at the gins, and this, in turn, will induce the planter to erect proper housing facilities for storing his cotton, also the ginners will build ample warehousing accommodations to take care of the cotton temporarily, which will eventually give rise to local warehouses suitable to the needs of the different localities, and thereby work to the benefit of the planter and the good of the industry as a whole. There must be better co-operation between the producer, the ginner and the other factors representing each branch of the industry. Without genuine co-operation little can be accomplished. We are not inclined to favor the opinion that any warehousing system under one management, either directly or indirectly, will prove advantageous to the producers of cotton. It tends to create something like a monopoly, and would very likely place the planters at the mercy of the other factors of the industry. We believe that the only real salvation of the planters rests in their position to take care of and conserve their property just the same as the Northern farmer is able to hold and conserve his grain by erecting suitable granaries for storing it, and taking care of it wisely. This is exactly what the planters of cotton should do. They must build substantial housing facilities for the proper storing of their cotton so that they may not be forced to sell at any certain time, and at all times be in a position to hold their cotton until the demand calls for it, or until such time as they may see fit to sell their cotton. Like the northern farmer, they will then be able to finance their crop locally, but not until they provide themselves with ample equipment, encouraging capital to meet their wants. The hazards must be lessened. The custom of holding cotton for better prices is not profitable when leaving the cotton out of doors unprotected. The damage to the cotton is often greater than the increased price obtained for it, and therefore, the planter is more or less at the mercy of those who seek to take advantage of him. Private and local warehousing facilities would do much good in establishing more favorable prices, because the selling of the crop would continue all the year round instead of a few months of the year. This method renders possible the stabilization of prices as nearly as it could ever be hoped for. Not only should the planter provide

housing facilities for his own cotton on his own land, but the ginner should do likewise, and there should also be larger warehouses in different localities suitable for storing a large supply of cotton, thus providing storage room for those who are unable to have suitable storage houses of their own. Grading the cotton at the gin will do much toward solving this problem.

ILLUSTRATION OF COTTON EXPOSED TO THE WEATHER

Hundreds of thousands of dollars worth of cotton at the compress exposed to the weather resulting in untold losses.

PLANTATION SCENE

This cotton is within 100 feet of a covered shed, not shown in the above picture, illustrating the wasteful and inefficient system of warehousing cotton. Millions are lost annually from this source alone.

We have told you that classifying and grading cotton should be done at the gin, and before the cotton is baled. That is the very time, in our opinion, when it should be graded, classified, marked, tagged, weighed and all the other things necessary to do to it so that its contents and quality can be guaranteed by the buyer, and eliminate the wasteful and inefficient systems of destructive sampling and grading, and at the same time, so full of sins and advantages uncommon to the producer. The planter would then know exactly the grade and quality of his cotton and the daily market price that his cotton is worth. There is no reason why these faults cannot be cured, or corrected to some extent at least.

Lack of co-operation for the sake of pecuniary benefits is one reason why the system has not been changed, but, in our opinion, the various factors of each branch of the industry can do much good in this respect by responding readily to a closer co-operation for the purpose of doing good to each other. The mills could pay more for cotton because of the assurance in securing large quantities of cotton of a uniform grade, and thereby lessen the multiplicity of middlemen who prey upon the producers of cotton. Many millions of dollars could be saved each year by improving these wasteful systems, and which would prove to be of mutual benefit to both producer and manufacturer. We believe that through the universal use of the Stukenborg Mechanical Cotton Picking Machine that these wasteful and inefficient systems will be gradually rectified. The very fact that it will change the method of harvesting and ginning the crop shall force new and efficient systems in baling, housing, handling and marketing the crop.

CHAPTER VII

LABOR, CULTIVATION AND SOIL CONSERVATION

We now turn to the subjects of labor, cultivation and soil conservation, the imperfection of which, has resulted in the loss of untold millions of dollars to the South. Before the Civil War cotton was almost entirely raised by slave labor. The price of cotton, therefore, was based upon free labor, which has been the primary cause in keeping cotton so low in price that the producer could not reap a sufficient profit to justify the proper care of the land and its products. Slavery has been the real enemy of the South. It has held back her progress for hundreds of years. After the war of the states, slavery ceased to exist, and labor was gradually placed under a wage system, such as it was, which fell short of being an efficient one. It resembled what might be termed the "exploitation of labor," and which, to some extent, is now practiced.

We have heretofore described the home of the southern planter; how the women and children, both white and black, regardless of age or hours, toil in the fields; how wretched were the conditions under which they labored in order to eke out a bare existence, and the environments surrounding their home life. Labor was not even considered an item of expense in the production of the cotton crop. How quickly things change! The World War came upon us. It was fought and won upon many bloody fields of battle. Labor conditions were completely upset, and are still changing and going through a process of re-adjustment. This re-adjustment of labor is making the South the greatest and most progressive section of the American Continent. It is elevating labor to a higher plane of social and economic efficiency. The price of labor has not only increased, but the price of cotton is soaring as well. No longer will the planter be able to control labor as in the past. Labor has demanded better working hours; better tools; better opportunities; better and more attractive homes, and a higher living standard. Labor shall no longer tolerate past conditions. Too many other avenues of lucrative employment are open to labor where living conditions are more comfortable and embody some of the conveniences of modern civilization, larger wages and less hours of work, ample time for recreation and splendid opportunities for educating its children so that they may become better men and women when they grow up. Labor demands a full measure of life, liberty and happiness, and why should labor not have it? But, labor must confine its activities to

its own sphere, and to its own tasks, and not attempt to be both employer and employee. Therefore, it behooves the planters to provide for labor that which labor reasonably demands, then, and then only, shall the South regain her agricultural supremacy. Her industries will expand and her agricultural products feed and clothe the world. She shall astonish the world with her rapid growth of progress and efficiency. The cost of labor shall be embodied in the price received for her cotton and other products. The price shall be one reflecting a reasonable profit to the planter, because the world is willing to pay it. THE WORLD ASKS THAT NO CROP BE PRODUCED AT A LOSS. If it did, then there is little doubt but that the world can get along without cotton because its utility is not sufficiently great enough to warrant profitable production.

As we have stated before, the Stukenborg Mechanical Cotton Picker will do much not only in meeting the demands of labor, but also in solving its economic changes for the producer. Farm laborers are flocking to the cities which are now over-crowded and short of housing facilities. The lure of high wages, short working hours and the prospects of a good time induce them to leave the farm. They seek employment with the great industrial enterprises where the drudgery of physical effort is lessened through the use of machinery. Sooner or later they must go back to the farm where they can live better and save more money and follow an independent life. But the agricultural interests must provide better inducements to labor than in the past. They must introduce modern farm machinery, and modern farm machinery as in the other industries raises the standard of labor. Labor saving devices and improved machinery must be developed and used by the planters of the South if they expect to move with the wheels of progress, and keep the farm supplied with efficient labor. The Stukenborg Mechanical Cotton Picker will have much influence in the solution of the farm labor question.

CULTIVATION

The South is said to be the natural home of agriculture. Its genial climate and fertile soil turned the attention of the early settlers to farming. Cotton became the principal crop of the South. No other factor has influenced the development of agriculture so much as the use of machinery. At the beginning of the nineteenth century, farming was done with implements little better than those used in ancient times. Lands were broken up, crops sown, cultivated and harvested by hand labor. The very

fact that land was cheap and plentiful; labor scarce and costly, quickened the development of labor-saving devices and appliances as a means of increasing production and decreasing the heavy expense of hand labor. The Civil War was a great factor in stimulating new and improved machinery because the supply of labor was thereby lessened and the demand for cotton increased. Since the Civil War, mechanical agricultural devices were gradually substituted for hand labor, but the southern planters failed to utilize new and improved farm machinery as readily as the northern farmers, and for this neglect, they have paid dearly; however, some extenuation may be granted to the planters because they had to contend with uneducated and unskilled labor which could not adapt itself to the use of machinery, and furthermore, because of the surplus labor required to gather the cotton crop. These conditions now cease to exist, and therefore, the South must begin to educate farm labor so that it becomes skilled and better qualified to follow agricultural pursuits. The planters must fully realize that the measure of their success depends largely upon the efficiency of their laborers and croppers. Good home conditions, good educational facilities and better opportunities for labor will do much to put farming on a scientific basis, which shall result in increased efficiency for both planter and laborer. This is an age of machinery, and the South should lose no time in introducing modern farm machinery and urge scientific culture of all crops.

Of all other countries, the South is best suited for the culture of cotton. The climatic conditions are ideal. The summers long and the climate humid, both of which are essential to the growing of cotton. The ground should be broken in the early fall which not only affords a good seed bed for the coming season, but is destructive of many of the insects by destroying their hiding and wintering places. The cotton plant is sensitive to frost, and therefore, should not be planted until all the danger of frost is past. Intense and scientific culture always show good results. We are not inclined to believe that there is any one best system for cultivating the crop, because the soil and climatic conditions are not uniform, and for this reason, each particular section or locality should employ such methods of cultivation as tend to yield an increased production.

SEED SELECTION

The planter must exercise the greatest care in selecting seed cotton if he expects a maximum yield. Never plant mixed seed from the gin or mill. Good selection of seed will increase the

yield from 10% to 50%. It is reliably estimated that the loss due to poor selection of seed amounts to $75,000,000 annually. This indicates that the planters have been very negligent, and for this neglect, they bear the loss, and the people do without the cotton.

Each planter can easily determine the type and variety of cotton best suited to his particular soil and climate. If long staple cotton is grown, the yield per acre will be 40% to 50% less than short staple, and therefore, the planter will receive a price much higher than for short staple cotton. The longer the staple the more valuable it is. Some varieties require 125 or more bolls of seed cotton to make one pound; some 40 to 60 bolls to weigh one pound. Therefore, a greater number of pounds can be picked per day of the latter than of the former. Some yield their locks easily and some adhere closely to the boll, the latter being more difficult to pick and suitable for windy countries.

Use the utmost care in selecting seed cotton. The northern farmers are very particular in this respect, and often pay fabulous prices for seed adapted to their soil and climate. It is a good rule to go through the cotton fields soon after the first bolls begin to mature and select the best cotton, take good care of it and gin it separately so as not to get foreign cotton seeds mixed with it. It is said that the early maturing bolls produce the earliest cotton the next season.

We have briefly touched upon the subject of cultivation for the purpose of showing how essential new and improved farming machinery has been to agriculture, and how it has gradually developed during the last half century, because of the necessity of increasing production through the use of mechanical devices to take the place of hand labor in order to supply the demand which is ever increasing with the higher standards of living. The decrease of agricultural production compared with the increase in population has caused a deficiency far below the demand, and therefore, more production is not only demanded, but absolutely necessary to supply the world's wants. Scarcity of labor is also a factor to be recognized, and a very serious one. More production and more farm labor is absolutely essential if the cost of living is to be lowered, not higher wages and less hours of labor. The latter sounds well, but it will not work out advantageously in any respect.

The Stukenborg Mechanical Cotton Picking Machine will not only revolutionize the method of harvesting the cotton crop, but

also materially aid in the introduction of new and improved labor saving devices for cultivating the cotton crop. It will be the means of supplying skilled labor and the inducement for labor to demand the best machinery so as to practice the best agricultural methods. The labor necessary to cultivate the crop will be equalized with the labor required to grow the crop. The cotton will be picked better and gathered from the fields in due time for fall plowing. It will increase the use of motor power on the farm which is so essential to fill the gap caused by the scarcity of labor. It will influence the planter to adopt scientific methods of culture, and thereby increase efficiency and production many fold.

Remember, one invention leads to another, and before long, a satisfactory cotton chopper will be invented together with other useful types of farm machinery. However, we predict that in the proper selection of seed cotton and the invention of proper planting machinery, the difficult task of cotton chopping will be eliminated entirely. Every useful invention put into use changes an old system of doing things into a new and better one. So it shall be with the cotton picker. It will bring about many changes in the present system of cultivating the crops.

SOIL DEPLETION AND RESTORATION

Land includes not only the surface of the earth and the elements above and beneath it, but the oceans and the seas, the lakes and other bodies of water and what they contain. Soil represents the outer surface of the earth and is made up of fine particles of rock, mixed with decaying vegetable and animal matter. The latter is called "humus," and is absolutely essential to soil fertility because of the looseness it gives to the soil and the effect it has upon moisture and ventilation so necessary to plant growth. It furnishes the food elements of plant growth. As the humus is exhausted, fertility is likewise diminished.

In the early days, the American farmer paid little or no attention to soil depletion. The soil of the southern plantations diminished in fertility more rapidly than elsewhere. Virgin lands were cheap and plentiful, and as the soil of old cultivated lands diminished in fertility the planter took up newer lands of greater fertility. This method was followed from time to time until the country was fairly well under cultivation. Today, the best lands of the country are occupied and land values have increased almost beyond reason, therefore, it is necessary for the planter to rebuild the wasted fertility of his lands in order to bring him money, success and happiness. He must either maintain or increase the

fertility of his soil to a maximum strength so that each acre shall yield the highest possible return in both crops and money; otherwise, nothing short of disaster awaits him.

The cotton states have been more or less noted in the practice of the "one crop" system of cultivation. No other system is so destructive of soil fertility, and many plantations show evidence of soil exhaustion due to this system to so great an extent that production has become unprofitable. During the last few years. the southern planters have realized the weakness and unprofitableness of this system of cultivation and have taken steps to improve it. Past experience has proven to the planters that any system of farming which reduces or even tends to reduce fertility of the soil must be followed by some scientific process of restoring and increasing the fertility in order to maintain the fertility at its heighest standard of productiveness.

To restore and improve soil fertility no system is so full of good results as is diversified farming. Today, the most successful farmers are those who rotate their crops. A number of crops should be grown; especially, grain together with live stock. The crops should be selected so as to make the best use of the residue, and thereby return to the land a good portion of the crops that were grown on it. This can be done through herds of live stock and the manure derived therefrom and by turning under the residue, or green crops. It can be readily seen that if soil depletion is to give way to soil restoration the planters must diversify, and supply the soil with the elements of which it was robbed by the crops produced on it. It is not our purpose to go into detail as to how to restore soil fertility. The many government agencies supply this information, but we do desire to mention the fact that the "one crop" system is unsound in every way. The returns are highly speculative on account of failures due to weather conditions, insects, pests and other destructive elements. It is far better for the planter to raise two or three money making crops marketable at different seasons of the year. Then, a failure in one crop will not occassion a loss of the entire year's work. In addition to these several crops, more grain and live stock should be raised which not only bring good returns, food, milk and meat, but also provide manure for soil building. Again, the rotating of crops lessens the damage from weeds, pests, plant diseases which are always more or less prevalent where lands are used for the same crops year after year. Furthermore, the rotation keeps labor occupied the year round which otherwise would be more expensive and less efficient. These few statements deserve

great consideration. They constitute the basis of successful farming. Why should anyone aspire to be an unsuccessful farmer?

In our opinion, if the fertility of the soil is restored and maintined to the highest point possible the acreage of cotton need not be increased for many years because in the application of modern and scientific methods of culture the planter will be able to raise as much cotton from one acre as he did before from two acres. The planter can then develop soil fertility in various ways and still produce as much cotton as before. It is estimated that over $140,000,000 are lost annually through the negligence of the southern planters to restore and maintain soil fertility, and as much more in their neglect to inaugurate diversified farming methods. This great loss should and can be eliminated, and thereby enhance the profits and value of the land of every planter.

GOOD ROADS

We cannot leave this subject without saying something about the advantages of good roads. Wherever farming has proved profitable, good roads, schools, churches, libraries and telephones may be found. The farm must be made more attractive to labor. Good roads are very important to those living in the rural districts who have to haul all their produce over them, and pass over them continually. Bad roads interfere with the social and business life of the farm. They work much harm both to the planter and the laborer as well as increase largely the expense of marketing crops, and some crops cannot be marketed at all. Good roads will tend to bring those who left for the cities back to the farms. The planters can have good roads if they insist and are willing to pay a small sum of money in building them. The gain in marketing crops and the increase in value of lands offset many times the cost of building and maintaining good roads. It is estimated that over $10,000,000 are lost annually to the planters on account of poor roads for marketing purposes alone. Good roads make good transportation facilities. As the farms become motorized, which they will, good roads will be quite necessary. The Stukenborg Cotton Picking Machine will do its part to motorize the farm and thereby aid in the construction of good roads as much as anything else.

BETTER HOMES

There is much need for providing better homes equipped with some of the modern conveniences. Better homes and educational facilities make better farmers and citizens. The efficiency of the

planter is, to a great extent, measured by the skill and efficiency of his workmen and croppers. Therefore, education, schools, churches and better homes count for much. Good comfortable homes will invite good labor and keep the younger people on the farm instead of driving them to the cities where they are now drifting. Social relationship must be developed in the rural districts to make the farming class satisfied on the farm, and this cannot be done unless better homes and roads are provided.

Again, beautifying the farm is very beneficial in every way. It is not only pleasing to the eye but reflects the character of the people living there. Beautifying the farm is really a paying investment. It does one good to see a farm well kept, all the fences in good shape, no weeds and trash to mar its beauty, buildings in good order, and a home so inviting that even travelers passing by are inclined to stop and compliment the people living there for their effort and good taste in this respect. These little things create a very favorable impression. No one is impressed with run down farms and improvements with weeds growing everywhere, and no lawns or flowers to attract one's attention to the fact that mankind there exists.

Improved farm machinery and scientific culture will do more to bring about these changes than anything else that we know of. The Stukenborg Mechanical Cotton Picker will aid in a speedy change to intense diversified farming, better roads which are now urged on every hand.

GOOD TOOLS

Good tools save labor, and go to make life on the farm more pleasant. Good housing facilities should be provided for tools. Never permit tools to remain in the open exposed to all kinds of weather as such methods not only decrease the possibility of reaping good returns from the investment in them, but greatly impairs their usefulness and lessens the efficiency of the work performed by them.

Good tools save time, and time is an element that must be reckoned with on a farm. Crops must be planted and harvested and cultivated at the right time, or they are sometimes partially lost and even totally destroyed.

Good tools save money because through their use the cost of production is reduced, labor curtailed, better work done, quicker and at the right time.

Good tools and knowing how to use them is a vital factor in successful farming.

Good tools should constitute the planters most cherished asset, out of which they should realize great profits on the investment in them.

We again mention the fact that the picking of cotton is the heaviest item of expense, and which will be greatly reduced in the use of the cotton picking machine. Its very use and influence shall be the cause of bringing other useful tools and machinery to the farm so that working on a farm will be a pleasure instead of a drudgery.

CHAPTER VIII

TEXTILE INDUSTRY

The beginning of spinning and weaving is shrouded in mystery and doubt. History fails to record the starting point. However, the work of spinning and weaving was at first carried on in the home. It was a family industry until the year 1760. The men toiled in the field; the women spun and wove the fabrics in the home, and in this manner, a living was provided for many of the agricultural classes. The fingers of the women were better adapted to spinning than those of the men because the fingers of the men become coarse and stiff from heavy field work. This accounts for the origin of the legal term "spinster," an unmarried woman. Soon the home was no longer suitable in caring for the demands of the industry, which gradually developed into larger and more efficient quarters where numbers of skilled workers assembled to perform the work of spinning or weaving. This marks the beginning of the "factory system" of the present day. Its center was and now is on or near the Irish coast, or Manchester, England. Here, the dampness of the climate made this section an ideal place for spinning and not so good for agricultural pursuits. Naturally, the people turned their attention to the textile industry.

The "factory system" stimulated the use of mechanical inventions to displace hand labor, which brought about a great industrial revolution during the period of 1760 to 1830. In 1771 water power was applied to spinning which led to the erection of factories along the suitable streams of Lancashire. Steam was applied in 1785, which brought about great changes in production. Great divisions of labor took place; large amounts of capital were necessary for operating the factories; corporations were developed for the purpose of managing and supplying capital to run the industries; the cost of production was cheapened because of the keen competition that took place, and which led to the practice of sharp and unscrupulous business methods on the part of various manufacturers; labor was not only cheapened, but imposed upon to such an extent that both health and character were jeopardized. Therefore, the struggle between capital and labor had its beginning. Civilization was for a time moving backwards. These evils were corrected from time to time through the passage of laws governing the employment of labor in the factories. In this respect, the industrial revolution had its bad effects, but it also developed changes which greatly benefited humanity. It

made possible the great textile industry of today. Machinery now does the work formerly done by hand. However, labor saving devices were developed so rapidly, changing the entire industrial structure from time to time, that the people could not adjust themselves to the changed conditions, and for this reason, they resorted to lawlessness and the wanton destruction of property and labor saving machinery in order to gain their end, and much bloodshed followed.

We now turn to the establishment of the industry in America. The first settlers of America brought with them spinning wheels and hand looms. The New England states became the home of the textile industry because of the available water power and ideal climatic conditions so necessary to good spinning. However, it was not long before friction arose between the Colonies and the mother country. England did not desire that the Colonies should become engaged in the manufacture of textiles because she wanted to force the Colonies to buy the finished materials from her, and, of course, this is one of the causes which led to the Revolutionary War. She wanted the Colonies to be dependent upon her, and enacted stringent laws to prevent any knowledge of her textile machinery to reach the people of the American Colonies, and also laws to prevent any of her skilled textile workers to come to the Colonies. She employed every means at her command to maintain a monopoly of all textile machinery.

In the year 1775, Samuel Wetherhill, of Philadelphia, took steps to build a model of Hargreaves. The Revolutionary War came on, and the Colonies were thrown upon their own resources, compelling them to encourage the textile industry more than ever before. It was a case of necessity. At the close of the war, England flooded this country with fabrics and yarns at a price much less than such products could be manufactured here. This led to various laws imposing duties upon English made goods in order to protect and stimulate home industries. During the war little knowledge reached America relative to new and improved textile machinery used in England. Special laws preventing copies, designs or models leaving England as well as the immigration to America of artificers, and they were enforced with great vigilence, which greatly hampered the introduction of the new systems of manufacture in America. So the Americans were compelled either to smuggle or invent their machinery, and both methods were practiced until most of the secrets of the industry were made available in this country prior to the year 1825.

Samuel Slater, called by President Jackson the "Father of American Manufactures," constructed with his own hands the Arkwright system of cotton machinery, and this system was first operated at Pawtucket, Rhode Island, in the year 1790. This is considered the birth of the "factory system" in America.

In 1811, Francis C. Lowell, of Boston, visited England, where he spent much time inspecting cotton factories. England still guarded her inventions very closely, but Lowell, being mechanically inclined, returned to the United States and perfected, as did Wetherhill and Slater, without plans or models, the English loom in the year 1814. A factory was erected at Waltham, Mass., which was the first in the world where all the processes involved in the manufacture of goods from the raw material to the finished product were carried on in one establishment. So while England did use every precaution to prevent this country from duplicating her textile machinery, they were in use in America by 1825. The English claimed that the people of the United States stole their ideas from them while the people of the United States claim independent discovery.

The textile industry in America now being well established, cotton, instead of being a garden flower became an agricultural product in Delaware and Maryland, the culture of which gradually extended southward into all of the southern states. The New England and eastern states became the centers of the textile industry. Many mills are now located in the South. Natural climatic conditions with respect to dampness are no longer necessary because mechanical means have been devised which artificially produce any degree of humidity needed in the industry.

Since the Revolutionary War industrial progress has been greatly stimulated by invention, science and art. The people of the eastern states developed industry rather than agriculture because the opportunities for developing industry were so abundant. In the South, agricultural lands were fertile and plentiful, and the climate ideal for the culture of cotton, tobacco, etc. The South was not as attractive to immigration as the North, and therefore, the North became the most populous, which encouraged manufacturing enterprises. Industry thrives best where population is concentrated, while on the other hand, the South was given to agricultural expansion, resulting in large plantations where hordes of slaves were utilized. Free labor did not appeal to immigrants or new settlers.

The Civil War came on which again wrought great changes in industrial and labor conditions, and the South, although badly crippled from the work of its destruction, soon began to progress rapidly not only in agricultural pursuits, but in the development of her industrial and natural resources. At this time the southern states had 325,000 spindles while the northern states had about 9,000,000. However, cotton mills began to spring up in various parts of the South, and when the World War came on the South was operating hundreds of textile mills and scores of other large industries. The South now has 15,500,000 spindles while the North has 20,000,000. So, a little after the close of the World War the South found herself almost independent, so rapid had been her progress, and as this war brought to her door so many opportunities for improving her agricultural and labor system, and for developing her industrial and natural resources, we trust that she shall not fail to take advantage of the things that are now easily within her grasp. Her textile industry should be expanded and consume more cotton from her own fields.

Taking the cotton industry as a whole, the United States consumes a little over half of the American crop, and we are of the opinion that our home mill consumption should not be less than two-thirds, and perhaps, in time, all of it. England and other countries are using every power at their command to stimulate cotton culture in their own dominions in order to supply their wants. These schemes may meet with success when the United States would be forced to take care of her own cotton production. The southern mills consume more cotton than the northern mills because the South produces the coarser materials while the North cater to the finer materials; therefore, the South does not receive nearly so much money for her product as does the North. In this respect, we are of the opinion that the people of the South should develop the industry so as to reap higher prices for their products because the demand for finer materials is increasing both abroad and at home. We believe that more textile mills should be operated in the South; especially, in the southwestern states; that the people of these sections should do all within their power to encourage capital for this very purpose, and thereby tend to improve marketing facilities; lessen transportation hauls and make themselves more independent of other parts of the country. To this end, machinery must be utilized for educating the masses. Social and economic conditions must be made more attractive not only to encourage new settlers, but also for the purpose of keeping the native sons at home, and thereby, grad-

ually create more populous centers which are so essential to industrial institutions. The centers devoted to industrial pursuits are the centers of thought, of mental friction, of intelligence and of progress.

In this respect, we are convinced that the Stukenborg Mechanical Cotton Picking Machine will exercise a great influence because of the great changes in industry and labor it will eventually bring to pass. It will surely bring agricultural pursuits up to a higher plane of social and economic efficiency; tend to motorize the farm, and ultimately result in making possible sufficent home capital for the purpose of maintaining and expanding industrial enterprises throughout the South, all of which should bring not only greater prosperity to the people of the South, but also make them independent of the influences that have hindered their happiness and prosperity in the past.

With this brief survey of the growth and development of the textile industry we pass to the next chapter, the future outlook of the cotton industry. The subject cannot be fully discussed for want of space, and we have touched lightly on those things only which have a bearing upon mechanical inventions in relation to the cotton industry.

CHAPTER IX

FUTURE OUTLOOK OF THE COTTON INDUSTRY

The climate of no other country is so peculiarly adapted to the growing of cotton as the southern portion of the United States. Other countries have expended large sums of money for the purpose of locating new fields where the soil and climatic conditions were suitable for cotton culture. While it may be said that new sources of supply were discovered, and can be developed, yet it will require many years to bring about any appreciable results, and still the fiber will be greatly inferior on an average to that grown in the United States. One of the drawbacks to cotton culture in the foreign countries is labor. Another is transportation facilities. Still another is the lack of modernized farm machinery, and also the absence of good marketing facilities. These drawbacks are difficult to overcome, and if at all, it will take many years. There is reason to believe that some of the South American countries may bring some relief to the shortage of ideal cotton lands; especially, Brazil and Argentine, but the drawbacks above mentioned are present in those countries. However, we are of the opinion that there is little cause for alarm that the South will lose her supremacy in the production of cotton because labor, marketing and transportation agencies and climatic conditions are not what they should be in the other countries. The South has the land, the climate, the soil, the labor, and her people may be expected to progress as those in no other country can, and thereby meet any emergency now or hereafter existing.

The demand for raw cotton is increasing by leaps and bounds. Statistics show a world population of approximately 1,600,000,000 people. Of these, it is said that one-half are only partially clothed and 250,000,000 wear no clothes at all. However, present conditions indicate a more rapid development of civilization than at any other time in past history, and for this reason, a higher standard of living is becoming popular everywhere, and consequently, the demand for better food, better clothing and better shelter shall arise from all quarters of the globe, causing the demand for cotton products to exceed the supply for many years to come, and possibly, the demand may never again be satisfactorily met. In this connection, attention is called to the many new uses to which cotton is being put, and which has made enormous inroads upon the supply of raw cotton, such as cotton substitutes for silk, artificial leather, insulation of wires, aero-

planes, and other commercial uses. The shoe industry now consumes over 225,000,000 square yards of cotton cloth exclusive of tennis shoes, leggings, etc. The greatest new user of cotton, which was ten years ago almost negligible, is the automobile industry of the United States. This industry now consumes over 2,000,000 bales of cotton annually, and this estimate does not include the amount of cotton used by foreign manufacturers of automobiles. This industry shall consume more and more cotton as the years go by.

There are about 70,000,000 acres given to cotton culture in the various countries of the world. United States about 36,000,000 acres. India, 25,000,000 acres. Egypt, 2,000,000 acres. All other countries, 7,000,000 acres. The entire production of all these countries in bales of 500 pounds each is around 22,000,000 bales for 1919. The average pre-war value of these lands may be stated as follows: United States, $66.00 per acre. India, $75 to $100 per acre. Egypt, $600 per acre. All other countries, $60 per acre. In Egypt irrigation is necessary to grow cotton, and therefore, the value of cotton land is exceedingly high.

The consumption of cotton has doubled in the past 20 years, and no doubt it will more than double during the next 20 years. It is said that it would require something like forty-two million (42,000,000) bales of cotton to clothe the world as we are clothed, and that nine-tenths (9/10) of all clothing worn consists of cotton goods. Taking all statistics into consideration, we are obliged to come to but one conclusion relative to the future outlook of the cotton industry, and that is, the cotton crop to whatever extent increased is not likely to, at any time, equal the demand for it.

The world should be more than willing to pay a price for cotton sufficiently profitable to the producer so that he is able to restore and maintain the fertility of his soils of which the world has robbed him and to introduce new and modern systems of producing, harvesting, marketing and handling the crop. In this manner only can the world repay the South for the burden she has carried for all these years in providing cotton for the world to the end that her country was robbed of its soils and her people miserably impoverished.

The people of the South now have for the first time an opportunity to make for themselves wealth, happiness and prosperity, and their country the richest and most populous in the United States. We have every reason to believe that they will grasp this

opportunity and begin at once to correct the imperfections of the cotton industry as the work of reconstruction must necessarily be slow and gradual. It may not be necessary to increase the acreage in order to produce more cotton, but it will be necessary to restore and maintain the fertility of the soil if more cotton is to be raised without any increase in acreage. The average yield of cotton per acre is less than 200 pounds of lint cotton. This is entirely too low. It is possible to double it under proper methods of cultivation. The acreage devoted to cotton culture in the United States is about one acre out of every seventeen acres available for this purpose. This is conclusive evidence that the South can meet the world's demand for this product, but the world must do its part in the shape of paying a higher price for the cotton.

"Necessity is the mother of invention," and through the universal use of the Stukenborg Cotton Picking Machine the industry shall develop greater progress and efficiency, and this invention, in turn, shall usher in other new and useful labor saving devices and appliances which aid very materially in the solution of the various problems that now seem puzzling. Highly diversified farming, elimination of the enormous losses arising out of inefficient systems of producing and marketing the cotton crop together with the application of scientific methods of production will reform the old order of doing things. Such a course is necessary if the South is to occupy an important place at the wheel of progress.

CHAPTER X

SUMMARY AND GENERAL DISCUSSION

The preceding chapters contain a brief survey of the early growth and development of the cotton industry; the chief characteristics of the cotton plant and its fiber, its kinds and uses; the evils and abuses arising through imperfect systems of production, harvesting, marketing, handling and manufacture, and the estimated losses occasioned thereby each year in dollars and cents; the effect of new discoveries and inventions upon the development of the industry; the textile industry; the importance of clean cotton; how the Stukenborg Mechanical Cotton picker will materially aid in the future development of the cotton industry; how it will lessen many of the evils and abuses now prevalent; the defects of hand picked cotton; the only important crop not harvested by machinery; now the mechanical cotton picker will render obsolete the crude and primitive method of harvesting the crop, and why this invention may be said to be the "missing link" of the cotton industry, and when it is supplied it will bring about a true co-operation between the various factors of each branch of the industry, eliminating many of the wasteful systems and methods which have been so costly in the past, and finally, the discussion of labor, lands, soil and improvements, and the effect of new and modern machinery thereon.

It is well for the reader, in order to fully grasp the intent of the various discussions, to familiarize himself with what has been spoken of heretofore, as set out in the foregoing summary. Under each subject, it has been pointed out how the Stukenborg cotton picking device affects them; however, before taking up the closing chapters relative to this invention, we deem it advisable to again refer to the tremendous monetary losses occasioned by the evil and abusive systems and methods in producing, harvesting, handling and marketing the cotton crop, the estimated total sum of which is $700,000,000 annually, divided as follows:

Country damage, baling and improper housing, $200,000,000. Improperly picked and ginned cotton, $85,000,000. Inefficient marketing facilities, $75,000,000. Improper grading and classifying, $65,000,000. Crude cultivation and soil depletion, $150,000,000. Wasted and unpicked cotton, $50,000,000. Boll-weevil, pink boll worm and other pests, $75,000,000.

Seven hundred million dollars is an appalling sum of money to lose annually through wastefulness. It almost amounts to crim-

inal negligence were it not for the fact that some extenuating circumstances tend to mitigate the crime of the past, and of which we have spoken. In gathering the above statistics, the writer has been very conservative in their selection, and was inclined to under-estimate rather than over-estimate them; however, had the various estimates set out by the numerous writers and authorities been incorporated in the above figures, we believe that the aggregate total of the estimated losses would have been equal to two-thirds of the value of the entire cotton crop for the year 1919. Our conscience rebelled at the thought of it, and even at that, the estimates may be true. Irrespective of what the real losses from all sources may be, we do know positively that no other crop is subject to so much wastefulness through various evils and abuses, the burden of which falls upon the producer in the shape of a lesser price received for his product. We know, also, that these stupendous losses indicate that there is something out-of-joint. We know that somewhere there is a "missing link," so to speak, because where there is so much undue loss the industrial machinery of the cotton industry is not running evenly and smoothly. This being true, we know that by supplying the "missing link" that the chief trouble will be overcome. We believe that the "missing link" has been discovered in the shape of the Stukenborg Mechanical Cotton Picker, which bids fair to revolutionize the entire industry in all of its different branches, both social, economic and industrial, as did the cotton gin, and thereby prove itself to be the long lost KEY TO SOUTHERN PROGRESS.

The age of machinery began with the improvements for the manufacture of textiles, and has ever since pushed forward into the very heart of industry to the enrichment and betterment of mankind everywhere and in every way. Every new invention marks some progress in the development of social, industrial and economic life. Every piece of machinery accomplishes some useful end not before attained. The evolution of the application of machinery from the beginning on through its various periods of development reflects largely the progress and efficiency of mankind. As we stated so many times in the preceding chapters, the introduction of one invention into the life of industry makes necessary another of equal or greater importance, and in turn, another is called for, and so on and on until the old way of doing things gives way to new and modern methods for accomplishing similar results, and still the avenue for other and highly beneficial improvements and inventions is never closed to the genius of man.

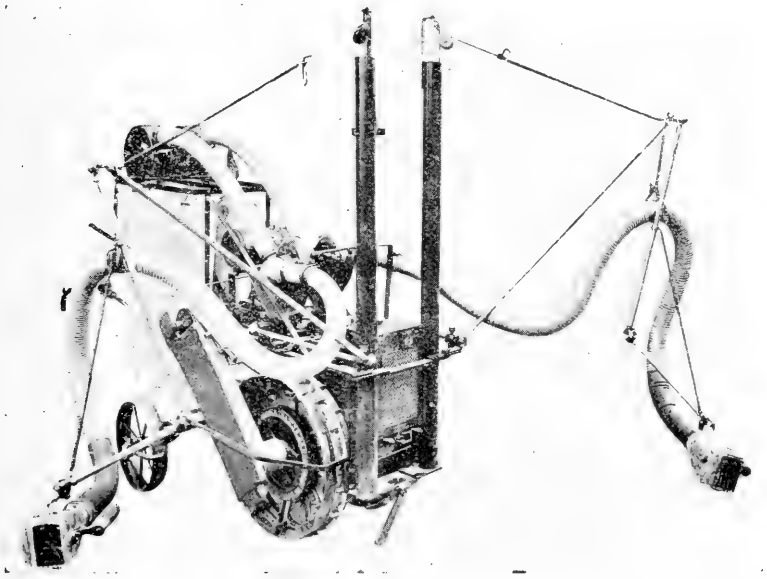
The slowness of spinning cotton by hand, and the increasing demand therefor, brought forth the spinning wheel, and this, of

course, made necessary better weaving devices, which the mind of man also overcame, and these new time and labor saving devices were greatly improved from time to time, which then required greater facilities for providing more raw material. So the ingenuity of man was again called upon, and gave to the industry the cotton gin. But the inventive genius of man overlooked the growing necessity for better methods for harvesting the crop. This over-sight has caused one of the links of the master chain of efficiency moving the wheels of this mighty industry to become so weak that further progress has been retarded. The defective link has been discovered and is to be replaced in the shape of the Stukenborg Mechanical Cotton Picker, and these pages give due notice that the workmen who are to make the replacement are on their way, and when their work is completed, the cotton industry shall again take on an added stimulus as it did when the cotton gin was introduced.

CHAPTER XI

PUBLIC OPINION AND STUKENBORG COTTON PICKER

The only important branch of the cotton industry that has not mechanically assisted or altogether displaced hand labor is the harvesting of the crop. Late in the fall of 1917, Louis Carrol Stukenborg invented the mechanical cotton picker bearing his name. The simplicity of its mechanism is marvelous. It consists of a picker head that is manually directed to the cotton boll, in which are encased two cylindrical brushes revolving inwardly at a certain speed, including a take-off device operating eccentric to its axis which combs the cotton from the brushes as it is picked. This picker head is attached to a hollow flexible tube (patented) through which the cotton is conveyed by suction as it is released



Stukenberg Mechanical Cotton Harvester Attached to a Small Beeman Garden Tractor

from the take-off device which combs the brushes. The suction is created by a small exhauster and through which the cotton passes into a cleaning device (patented), and from this cleaning device it is dropped into a receptacle for that purpose. The picker head mechanism is operated by means of a jointed flexible shaft leading from the engine to the picker head. The picker head is counterbalanced so that there is no weight in the hand

while picking the cotton, it being free to move in any direction quite easily. The picker head and its mechanism is called a "cotton harvester." It is so designed that it can be attached to any kind or type of suitable power machinery, and as many picker heads can be utilized as is necessary to give the greatest efficiency. Each picker head requires one operator. A one-horse power engine will drive a single picker head, and the more picker heads used the more power required. A small tractor is very desirable because it can also be used for doing light work about the plantation, gardening and other various uses. Two or more heads may be attached to a small garden tractor capable of performing the work of one good horse. Larger tractor, a multiplicity of picker heads may be attached. These picker heads, or cotton harvesters, may also be attached to Ford automobiles, chassis, trucks, or any other automobile or power machinery suitable, and with such number of heads attached thereto as is sufficient to harvest a bale of cotton before stopping to unload the cotton. The cotton harvesters can be used in several different ways and attached to all kinds of power machinery. For this reason, it will prove itself very advantageous to the planters, and the very fact that these cotton harvesters shall be built as attachments to power machinery only, this same power machinery will not remain idle during the period when there is no cotton to harvest, but put to other useful purposes about the plantation. This power machinery will be used to perform various tasks about the farm, such as ploughing, cultivating, hauling, seeding, mowing, pumping, grinding, milking, gardening and to furnish electric lighting systems about the house and barn, or, if the power machinery be a truck or automobile, after the picking season is over, they can be used for performing the work for which they were originally bought.

Therefore, the planter is not making an investment in a cotton harvester alone. He is investing in an article that has many uses, as the cotton harvester is only an attachment for the power machine, and can be removed when the picking season is over. This is why the cotton harvester should appeal to every producer of cotton, big and little alike. Could any device be better adapted to the particular needs of the planter, or better suited for motorizing the farm, or better calculated to influence the rapid introduction of improved machinery on the farm, and at a cost so ridiculously low compared to the possible return on the initial outlay of money invested in it? These statements ring with truth, but as we have often stated in this pamphlet, farmers do

not take to new and improved machinery very readily. They are more inclined to stick to the old method of doing things than in any other industry.

The writer remembers very distinctly the time when the manure spreader was first placed on the market. His father purchased two of these spreaders. The men gave them a try-out. The next day they refused to use them, claiming that they could do more work, do it easier and spread the manure better by hand than could be done with the spreaders. The answer is, what farmer is without one today? Any farmer without a spreader is far from being up-to-date. He is losing money. The writer might say also that one of these spreaders is still in use, being repaired many times, which is ample proof of the long life of farm machinery if properly housed and cared for. The writer also remembers when riding plows and cultivators first came out. He knows certain farmers who condemned them, and some who bought them, and later discarded them, saying that they were not as good as the old type of walking plows and cultivators. Everywhere there is plenty of evidence today that their theory was false, and the question need not be further discussed. Imagination is a dreadful disease if such it can be called. To cure it sometimes takes years. Cream separators were at first condemned. What article about a farm is more useful than a cream separator? Ask the women folks, they can tell you. Automobiles at first suffered the same treatment, next motor trucks, and so on. It has been no different with thousands of other inventions and labor saving devices. However, it is a fact that when a few of the real progressive farmers use new machinery, the other farmers in that community soon follow their lead.

It requires much time, patience and money to mold public opinion against its will, and to educate it up to a point where the true economic value of useful machinery is fully realized. This may be because the farmer, as a rule, is not mechanically inclined, or has no skilled labor to operate good machinery, and furthermore, farmers seldom figure profits as do other industries. A farmer will loan or borrow money at 6% to 8% interest, and on the other hand, it is very difficult to convince him that an investment in machinery will pay him returns equivalent to 25% to 50% and more yearly, and that the latter is by far a better investment. Why this is true we do not know, but we do know that the theory is unsound because the yield on the money invested in good machinery is many times greater than on the

loaning and borrowing transaction. Of course, this educational work is a characteristic of all new inventions, and many of the old ones if the many pages of advertising in our papers and magazines indicate anything relative to educational work, that is, keeping the merit of the goods before the public continually, and we know that the money invested in sound advertising yields enormous returns in the end.

Manufacturers figure from three to seven years before a satisfactory market is created for new inventions. In this respect, attention is called to the McCormick Reaper, which made possible the opening of the great wheat fields of the West. It is a matter of record that nobody believed in his harvester. Nobody would have it. He advertised it; he offered it for $50. Nobody bought. Then finally one venturesome farmer bought one. That was in 1840, and Mr. McCormick began trying to sell his reapers in 1831. So he sold one in nine years. The next year he sold none. Then came large business: for he sold seven the following year. This encouraged the young inventor. The next year he sold twenty-nine, and the following year, one each week—fifty-two. Four or five years ago, 975,000 of these reapers were sold in one year. Of course, the first reapers sold were not so highly improved as the last ones sold, but they answered a great want at that time. New inventions become more efficient from year to year because something new is added from time to time making it better than ever before.

The history of the vacuum carpet cleaner is very similar. It required almost eleven years to create a satisfactory demand for it. Likewise, the typewriter, the adding machine, the automobile, trucks, as well as all the other useful inventions of the past. The farm tractors are now going through the same process of evolution, at least the salesmen tell me so, and they ought to know. These are inventions coming within the reader's own knowledge, and therefore, he is capable of vouching for the truth of these statements.

Everybody is familiar with the great changes brought about through the use of improved machinery on the farm, and how necessary machinery is to the farmer of today, and how the late war has created a need for more modern machinery and labor saving devices. The Stukenborg Mechanical Cotton Picker is now running the same course as that run by the other inventions, but we feel that a device of this kind at this particular time is so greatly needed by the planters that it will not require a life time

to prove its real merit to them. Of course, the inventor has worked on it for almost twenty years, but the final successful machine was built a little over two years ago.

When any of the inventions were first placed on the market they were not so highly perfected as they are today. Thomas Edison says that no machinery is 50% perfect. We believe that no machinery will ever be 100% perfect as long as man, himself, is imperfect. When any invention reaches a point of perfection when it can be used to an advantage, it thereby becomes a utility, and for which there is a demand. The Stukenborg Mechanical Cotton Picker has been perfected to a higher degree than most other new inventions, and there is no doubt that countless improvements will be added to it from time to time. It is a wonderful machine as it now does the work of several persons, and much better than hand labor.

Every planter of cotton should own one or more of these cotton harvesters as they shall prove to be the greatest asset to the planter since the invention of the cotton gin. The World War has wrought many changes not only throughout the South, but also the entire world. The OLD ORDER of farming must give way to a NEW and MODERN ONE so as to square with conditions as they now exist. In this respect, the distributors of the Stukenborg Cotton Harvester desire to give full co-operation to the end that each planter shall be fully equipped with implements necessary for him to overcome the evils and abuses arising out of the old way of doing things, and thereby, bring about the greatest results in the shortest period of time.

CHAPTER XII

FINAL SUMMARY

While we have already stated what can be accomplished by and through the universal use of the Stukenborg Cotton Picking Machine, we shall again briefly enumerate the vital points, as follows:

1. This machine is needed just as much by the growers of cotton as is the reaper for harvesting wheat.

2. It removes the cotton from the boll by means of brushes, and conveys the cotton to a receptacle by suction. No physical effort or skill is necessary to operate it, and no complicated machinery to get out of order.

3. The price will be reasonable and within the reach of every 40-acre planter.

4. It is designed and built to be attached to power machinery. It can be taken off when the picking season is over and the power plant used for other useful purposes. Power machinery may consist of stationary gasoline engines, small and large tractors, chassis, trucks or automobiles.

5. It picks all the cotton out of the boll. Leaves no "cow licks." Hand pickers do. It does not injure the fiber. Hand pickers do. Prepares the cotton so that the gin can do perfect work. Hand pickers do not.

6. It picks the cotton better, quicker and cleaner than any hand picker could hope to pick it. Throughout the average season it will do the work of four or five to one over hand pickers.

7. Can pick in the morning, or late at night, as dampness from dew or rain is cared for by the machine. It brings the cotton out with each seed of each lock segregated, and in a feathery-fluffy condition with the fibers straightened out, just as they should be for perfect ginning. Can pick during cold or freezing weather for that matter, as gloves and overcoat can be worn without inconvenience to the operator. It takes care of most of the storm cotton by cleaning and brightening its fibers.

8. It not only equalizes the labor required to grow the crop with the labor necessary to gather the crop, but makes all classes of labor, white and black, equal so far as any advantage skilled labor may have over unskilled labor. Furthermore, it will tend to eliminate "surplus labor" wherever it may exist, and on the other hand, it will provide for "scarcity of labor" wherever it may exist. It will cause an equal distribution of labor. Again, it will give the

planter full control over his labor, whereby he can hire men by the day, week or month and exercise full authority over them. It assures labor a steady job, and the planter shall enjoy better returns out of labor's service. This, in itself, is a decided advantage to both labor and the planter.

9. It means that the crops will be gathered and out of the field in time for fall plowing, making it possible for the planter to prepare well his grounds for the next crop, and in this manner lessen the possibility of great loss due to bad weather conditions, boll-weevil and other troublesome pests. The losses due to pests are estimated at $75,000,000 annually.

10. It means that more lint will be obtained from each bale of seed cotton; free of foreign matter and gin cuts; the staple cleaner and more uniform in length; the grade higher and the class better, all of which adds quality and price to the product.

11. It will surely correct any of the evils and abuses of the industry which now cause an annual loss of $700,000,000, and which to a great extent is lost to the producer in the shape of a lesser price received for the product as well as in a lower yield per acre. The estimated loss is 50 dollars per bale on the crop of 1919.

12. It will greatly reduce an estimated annual loss of around $85,000,-000 due to improperly picked and ginned cotton.

13. It will influence the early introduction of new and better systems of baling and handling the cotton crop. The loss sustained annually under the present system is estimated at $200,000,000.

14. It will also cause to be brought about better marketing facilities, and thereby reduce a loss of about $75,000,000 estimated to be wasted annually through improper marketing systems.

15. It will sooner or later usher in new and improved systems of grading and classifying cotton, and thereby work a reduction in the annual estimated loss of $65,000,000 from this source.

16. It will practically eliminate the annual loss resulting from unpicked and damaged cotton left in the fields, which waste now exceeds $50,000,000.

17. It will prove itself an important factor in bringing the planter to a full realization of the necessity for better and more highly modernized farm equipments, and to adopt the best bethods of diversified farming and soil restoring, and in this way gradually reduce an annual estimated loss of $150,000,000, and also, it is possible to lessen the estimated annual loss due to pests of around $75,000,-000.

18. It shall prove itself to be the forerunner of better and more beautiful homes and farms, well kept plantations, barns and other housing facilities.

19. Farm life must be made more attractive. Farm machinery and labor saving devices will do much in this respect. It will make farming a pleasure instead of a drudgery.

20. It will stimulate country road building because of the effect growing out of the extensive use of motors and farm tractors. The tractor is the coming power, and will be quite essential to profitable farming.

21. It will be a mighty factor in elevating the Negro race, socially and otherwise. In our opinion, this is a very important matter, although our theory may be discouraged by a vast majority of planters in the South. The northern farmer cannot use uneducated and untrained labor advantageously. Its mistakes and blunders are too costly. This also holds good, in our opinion, with the planter, and he shall sooner or later realize the force of its inefficiency. As in any other industry, the cotton planter must not only rely to a great extent upon his own efficiency, but also upon that of his workmen or croppers. If his workmen and croppers are not efficient, it reflects upon the planter's administrative ability. The measure of the planter's success rests with the efficiency of his workmen and croppers. Therefore, they must be educated and trained for the work they are to perform.

CHAPTER XIII

TESTIMONIALS

The following copies of several of many letters now in possession of the writer practically substantiate the merits of the cotton picking machine as claimed throughout this pamphlet.

"Little Rock, Arkansas, Jan. 1, 1920.

". . . I have seen so-called cotton pickers but the Stukenborg Cotton Picker is the only one I have seen that did the work.

"I look forward to the day when the labor situation will be greatly relieved by the introduction of a cotton picker that will take the place of the present hand picking system. With few improvements on your picker, as some improvements will be made, I think the South will be greatly benefited by the invention.

"I see only one drawback to your picker, and that is the cost to the average farmer. He cannot afford to put the price up for it. Of course, the cost will be reduced I feel sure as the machine will be perfected and the number increased.

"JIM G. FERGUSON,

"Commissioner of Agriculture."

"Little Rock, Arkansas, Nov. 24, 1919.

"The Stukenborg Cotton Picker, which, through your kindness I saw work today, is really a wonderful machine, and in my opinion will at least double the picking capacity of each operative. The operation was truly remarkable in that, after all these rains the bolls on the plants were more or less rotten and the fact that it picked much cleaner than cotton being picked in the same field by hand was a great surprise to me. I believe the cotton which was picked by the cotton picker will be from ONE to THREE grades BETTER than that picked by hand.

"To really appreciate the advantages of this machine it is only necessary to see one in operation. I believe it is going to revolutionize the cotton harvesting of the southern states and will make possible the gathering of the crop in most years prior to bad weather, which, in my opinion, will save the state of Arkansas alone ten to twenty-five million dollars per year.

"S. Y. WEST.

"S. Y. West & Company, Cotton Buyers and Exporters."

"Washington, D. C., December 8, 1920.

"It was my privilege to see one of the Stukenborg Cotton Pickers at work a few days ago and I feel like giving expression to my opinion of this wonderful machine. As a government grader I am naturally interested in any method that will facilitate cotton picking, realizing as I do, the necessity of getting cotton picked at the right time and in the right manner.

"In the first place I am confident that your machine will pick more than double the amount possible to be picked by hand, which in itself is a strong point for the machine. But the difference in the cotton shown in a comparison of cotton picked by hand and that picked by your machine, out of the same field, in my opinion, is from one to three grades. The use of the Stukenborg machine will permit cotton being picked early in the morning while yet wet with dew, as the machine dries this all out and leaves cotton fluffy, which condition insures closer ginning with less damage to the staple.

"General use of this picker over the state of Arkansas would have saved millions of dollars lost in cotton that could not be gathered before bad weather set in this season.

"J. KNOX WOOD,

"Cotton Grader.

"United States Department of Agriculture,
Bureau of Markets."

"Dallas, Texas, December 7, 1918.

"After witnessing the demonstration of your mechanical cotton picker, under conditions unfavorable to the picking of cotton by hand or otherwise, and having noted the rapidity, the practical application of the mechanical principle, and the performance of the machine in general, I came to the conclusion that, as a cotton picking machine it is in every way practical. The machine will pick cleaner, a more easily ginned cotton, and the use of the machine will result in producing from the gin a better, cleaner sample, and also make the ginning process easier.

"With reference to the two samples of ginned cotton, one from hand picked and the other from machine picked bales taken from the same field under same conditions, the machine picked bale showed a cleaner sample, was not neppy, showed a better character of cotton, and was a better sample from every standpoint. This I attribute to the mechanism of the machine which fluffs the cotton and removes the dirt.

"J. B. SIMPSON,

"U. S. Cotton Grader.

"United States Bureau of Markets."

"Little Rock, Ark., Dec. 1, 1918.

"As an old cotton planter, year after year I have seen cotton stand in the field for months after it should have been picked, lose in grade and weight, and blow out on the ground because we have to depend upon the most unreliable labor to hand pick the crop.

"Under these conditions, and yet with no faith in your machine, I was interested in seeing it tried out, first in my own field and then in several fields adjoining, and from the first time you started it I never left the machine.

"I have seen it work in cotton that should have been picked 45 days ago, where weeds and grass were higher than the stalk and the bolls, and the stems rotton, the cotton dried out, light weight and blown all over the ground. I have seen old men, boys and girls pick with it. I have seen it work when it was too cold and too damp for the hands to pick cotton, and I have picked with it myself, picking four rows at a time, cleaning up the "storm cotton," immatured bolls and everything in sight. I picked more than twice as much cotton, a better sample and cleaner rows than the best hand picker out of five working in an adjoining field. Having seen the picker operate, and operating it myself, I am in a position to state what I know it will do.

"It will do better work and give a better sample than hand picked cotton.

"It will do the work of four or five hand pickers on an average, week in and week out, during the season.

"It will remove sand and dirt from the cotton.

"It will pick as much in cold weather as in hot weather.

"It is a simple machine and one man can pick all the cotton he can make.

"Thirty cents worth of gasoline and oil will run it one day at the present price of gasoline. (1918)

"It is a real and practical cotton picker.

"ED PROTHRO,

"N. Little Rock,

"R. F. D. No. 1."

Mr. Prothro is a cotton planter. Machines were demonstrated on his farm in 1918 and 1919.

"Georgia Experiment Station,

"J. D. Price, Director.

"In regard to your cotton picker and the demonstration made here at the Georgia Experiment Station farm, I wish to say I am much interested in the machine and really very enthusiastic about it. . . . There can be no doubt but in its present form it is a mechanical success. . . . It ought to be purchased by every farmer in the state as the picking of our cotton crop without "weather damage" is getting to be a very serious problem. This is the most successful cotton picker among the several I have seen at work and will be the greatest labor saving device invented in recent years.

"J. D. PRICE,
"Experiment, Georgia."

"Atlanta, Georgia, 1918.

". . . I have seen it pick cotton from the burr, and am confident of its success. I have noticed its work on premature and frost-bitten bolls, and the cotton in this condition is very difficult to pick, yet this machine picks the lint from these bolls to perfection. Damp cotton is also handled in fine shape by your machine, and it knocks out all the dirt and segregates it from the cotton and leaves the fiber in splendid shape. Your machine is the only one of its kind I have seen which has proven to be an absolute success.

"I am very much concerned in the success and manufacture of your machine, as it will mean a saving of millions of dollars in labor. I shall be glad to see your machine in the hands of the cotton farmers at the earliest date possible.

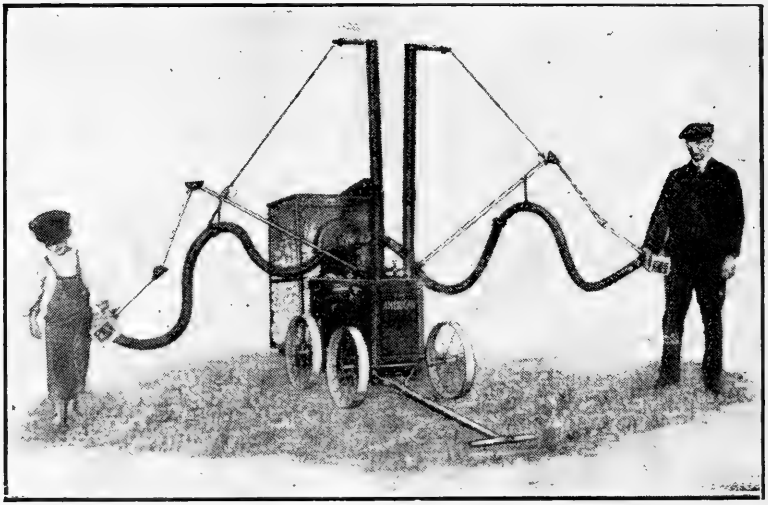
"J. J. BROWN,
"Commissioner of Agriculture,
"State of Georgia."

CONCLUSION

In conclusion, we feel confident that an earnest effort on our part has been made to produce satisfactory evidence to the effect that the Stukenborg Mechanical Cotton Picking Machine will eventually eliminate many of the enormous annual losses resulting from the various evils and abuses of the cotton industry. The circumstances which have largely contributed to the economic, social and industrial progress of the past have been

reviewed, and they reflect the conditions upon which such progress in the future depends. Unless the South responds freely to the enlarged opportunities which are now presented to her there is little hope for any increased efficiency in the cotton industry. We do not maintain that the Stukenborg Mechanical Cotton Picking Machine will suddenly upset existing conditions with respect to the cotton industry, but we do predict that through a gradual process of evolution it will prove itself to be a mighty factor in improving the present inefficient systems and methods of which we have spoken in this pamphlet throughout.

We are working for a great economic cause, one in which the whole world is interested. We are striving to change an old, wasteful and inefficient system of producing, harvesting, handling and marketing the cotton crop into a new and more efficient one; for a better and more effective co-operation between the planter and the other allied branches of the industry, and for a better general understanding of the needs and wants of each particular branch of the cotton industry to the end that each particular branch earnestly strive to understand and meet the needs and wants of the other, and thereby, acting as a unit, correct the evils and abuses of the industry which cannot be accomplished nearly so well by individual effort. This is our purpose, and may we not fail to receive full and proper support in our undertaking from all those who feel inclined to do something worth while for the good of the cotton industry, and which means so much to mankind everywhere. The introduction of the Stukenborg Mechanical Cotton Picking Machine is the KEY to SOUTHERN PROGRESS.

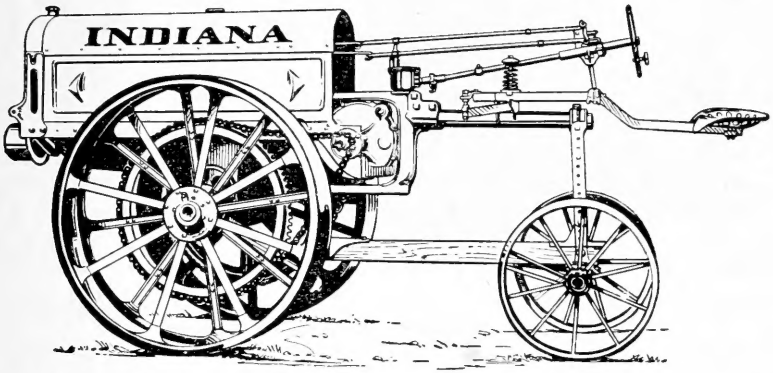


VIEW OF STUKENBORG'S FIRST MODEL OF A DOUBLE HEAD COTTON PICKER

The picking mechanism was driven by a small one and one-half horse power stationary gasoline engine mounted on a portable frame, and pulled through the cotton rows by hand power. At the right is the inventor holding one of the picker heads, and to the left a small boy holding the other, showing that a picker head can be operated by the latter.

In the fall of 1919, the same picking mechanism was attached to a small garden tractor, elsewhere illustrated in this pamphlet, thereby eliminating hand power in pulling the machine through the field.

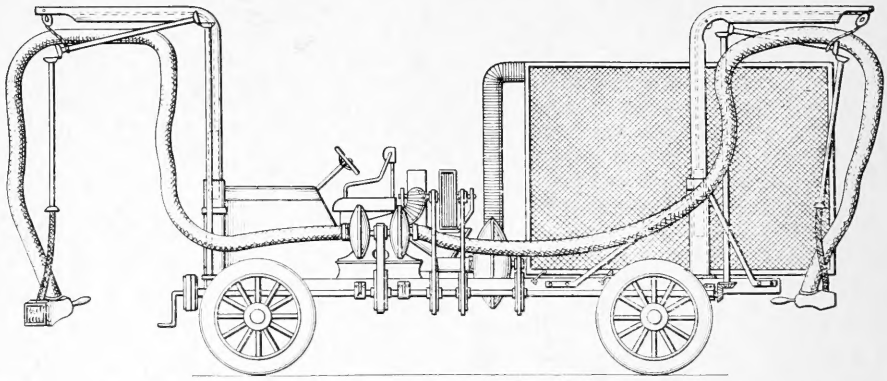
Attaching the Stukenborg Cotton Picking Machine to tractors not only increased the commercial value of the cotton picking machine, but also added a much greater value to the tractor because the cotton picking machine was less expensive to manufacture and market, and when used as an attachment for tractors, their usefulness and efficiency increased materially.



VIEW OF THE INDIANA TRACTOR

This farm tractor is manufactured by the Indiana Silo and Tractor Company, Anderson, Indiana, and to which the Stukenborg Cotton Harvester will be designed as an attachment. It represents the larger type of farm tractors to which four or more picker heads can be attached.

This tractor is representative of the best all round types for breaking up ground, cultivating crops, harvesting grain, hauling, and for other purposes about the average farm.



DESIGN OF A STUKENBORG COTTON HARVESTER ATTACHED TO A TRUCK, AUTOMOBILE OR CHASSIS

The Stukenborg Cotton Harvesters can be attached to trucks, automobiles, chassis or any other suitable power machinery. The above design represents four cotton picker heads attached to a truck, only two cotton picker heads are shown in the cut. More than four cotton picker heads can be attached, six to eight if the efficiency is thereby increased and more than a bale of cotton picked and carried before unloading it.

Your attention is called to the evolution of the Stukenborg Cotton Picker with respect to power, beginning with a small hand pulled power plant, then as an attachment to a small garden tractor, then to a larger field tractor, and finally to a truck, automobile or chassis. Electric power may be applied sooner or later.

The COTTON PICKER COMPANY OF AMERICA is now working out a system whereby the cotton as it is picked by the Stukenborg Cotton Picker will be conveyed to suitable ginning machinery attached to the tractor, chassis or truck and baled ready for the market. It now seems possible to put a system of this kind into practical use, and thereby do much good for the cotton industry as a whole.

The Cotton Picker Company of America has sub-licensed to several large tractor concerns the right to manufacture and sell Stukenborg Cotton Harvesters as attachments for their tractors.

ADDRESS ALL COMMUNICATIONS TO

COTTON PICKER COMPANY OF AMERICA

BOX 488

CHICAGO, ILLINOIS, U. S. A.

Price of "Stukenborg Mechanical Cotton Picking Machine, The Key to Southern Progress," $1.00, Postage Prepaid