McCORMICK REAPER
CENTENNIAL
SOURCE MATERIAL

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INTERNATIONAL HARVESTER COMPANY
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The Invention of the Reaper

Just one hundred years ago a Virginia farm boy of twenty-two, after a few weeks of concentrated thought and toil, solved a problem that had baffled the minds of men and blocked the progress of civilization for nearly two thousand years—perhaps longer.

That midsummer day of 1831, when Cyrus Hall McCormick publicly proved the success of his reaper, marked the beginning of the new agriculture that was soon to change farming from the sheerest drudgery with the poorest of results into a business calling for mind as much as muscle and yielding substantial results for reasonable labor.

That day, too, marked the beginning of a new epoch in civilization, in which mankind was to be freed forever from the presence of hunger and the dread of famine; in which millions of men, emancipated from universal enslavement to the soil, could give their time and strength for the development of the industries, the arts, the sciences, the research, and the culture of modern life.

In this year of 1931, when the centenary of Cyrus Hall McCormick's invention is being observed around the world, it is of interest and importance to know something about the times, the environment, the racial and family inheritance, and the circumstances of the youth who achieved this triumph.

Cyrus Hall McCormick was of Scotch-Irish ancestry. His blood was the same as that which dared to fight and suffer for the Scotch covenant of faith and which, transplanted to Ireland, made Ulster prosperous. When the British armies pursued the exiles to Ireland, a full half-million of them emigrated to America. One of those Scotch-Irish men was Thomas McCormick, who came to America in 1734. His son Robert moved from Pennsylvania to Virginia and fought in the war for independence. Robert's son, who was to become the father of Cyrus, was also named Robert. In 1808 he married Mary Ann Hall, a true daughter of the faith-spurred and battling Scotch-Irish strain.

The first Robert McCormick was a weaver as well as a farmer. Robert, the father of Cyrus, was an educated, prosperous land owner who, besides his farms, operated grist mills, sawmills, a smelter, and a blacksmith shop. He was a reader and a student, gentle but energetic, an active churchman, and was wide in his interests. His mechanical ingenuity, interest, and imagination made him an inventor of rare ability.

Cyrus inherited all these qualities from his ancestors, and to them he added an indomitable will that transcended the stubbornness of his race. Cyrus Hall McCormick was born February 15, 1809, on the family farm, Walnut Grove, in Rockbridge County, Virginia. As a boy, Cyrus went to the Old Field School. When he was fifteen, he found that his boyish physique was insufficient to swing a heavy cradle in the harvest grain; so he made a smaller implement to suit his slight muscles. At eighteen he made himself some needed surveying instruments. Of greater importance was the invention of a hillside plow, which was his first major contribution to modern agriculture. It is also certain that he was in constant attendance on his father's labor in the farm blacksmith shop.

In 1816 Robert McCormick made the first of his several attempts to build a mechanical reaper. Like the devices of others who had interested
themselves in the problem, his machine was pushed ahead into the grain by two horses and the wheat was to be pressed against stationary convex sickles by rapidly revolving beaters. This machine utterly failed to cut the grain. At various times during the next fifteen years, he made other fruitless attempts to revive his scheme. His eldest son was informed as to his ideas and may have helped him prepare his last machine for its unsuccessful trial in May, 1831.

Cyrus must have started on his own machines as soon as he saw the admitted evidence of his father's failure. Between May and July he conceived his own new principles, built one or more models, and developed a machine which cut grain successfully. He did not know that for years many men had been toiling to solve the problem of the reaper or that before his time many futile reaper patents had been issued in England and America. He had never heard of Pitts' work nearly fifty years before, nor of Bell and Ogle, nor did he know of Manning, who had already patented several of the features he was to incorporate in his own machine. His sole experience was with his father's unsuccessful attempts.

He set to work in the old log blacksmith shop cutting and fashioning wood and bending into shape the few iron pieces of the machine. His first reaper was built in six weeks at most. He tried it out privately in an adjacent wheatfield on the farm with none but the members of his family for spectators. Convinced that he was on the right road, he set to work feverishly to remodel it for a public test. The initial machine of early July had a straight-edged reciprocating knife, actuated by gears from the main wheel, a platform extending sideways from the wheel, shafts for a single horse, an outside divider to separate the standing grain from that to be held against the cutter bar, and fingers to project in front of the blade. The late July machine had the improved divider, a better cutter bar provided with saw-toothed incised serrations along its leading edge, and a reel to hold the grain against the knife.

There is no record of the exact day of the first public trial in July, 1831. The reaper worked in a small field near Steele's Tavern, Virginia. Neighbors assembled from the vicinity. Cyrus' family had driven down the valley from their farm. The young inventor walked behind the machine. Jo Anderson, the negro servant who had toiled with him to build the reaper, walked, rake in hand, beside him to keep the platform clear from severed grain. Certain farm hands were also there, men carrying sickles and scythes which, with the cradle, were the only instruments of harvest. They may not have understood what they were seeing, but the reaper was, nevertheless, laying the foundation for their future emancipation.

Cyrus Hall McCormick, then a boy of twenty-two, was proving dramatically to a skeptical and needy world that machinery could be brought to the aid of man. Tall, square-shouldered, high of brow, purposeful, wise before his time, determined, feeling the power of destiny within him, he strode behind the machine which was laying the foundation for all mechanized agriculture.

Today the field at Steele's Tavern is almost unrecognizable. A paved roadway passes through it; a gasoline station occupies the corner where a side road leads away to the Walnut Grove Farm, and ugly telephone wires mar the primitive charm of the landscape.
The historic little farm shop where young McCormick built the first successful reaper a hundred years ago is still standing today. It is a small, square log building on a high stone foundation. Inside is the forge, a littered workbench, the hammered section of a tree, and the old stone anvil. The walls and ceiling are black with the smoke of a thousand fires. Old walnut trees stand beside the shop and cast their shadows impartially over the past and into the future. Not far away is the homestead, a chaste brick building with the gentle, provincial lines of a sincere architecture. In the distance are the misty heights of the Blue Ridge Mountains.

Whatever the present world has since added to the science of agricultural equipment, all modern grain-cutting machines contain the essential elements which Cyrus Hall McCormick put into his reaper. These essential principles were seven:

1. The straight knife with serrated edge and reciprocal or vibrating motion which cuts the grain.

2. Fingers or guards extending from the platform to prevent the grain from slipping sideways while being cut.

3. The revolving reel which holds the grain against the knife and lays the cut stalks on the platform.

4. Platform behind the knife for receiving the cut grain and holding it until raked off.

5. The master wheel which carries most of the weight of the machine and, through ground traction, furnishes power to operate the reel and the knife.

6. Forward draft from the right or stubble side by means of shafts attached in front of the master wheel.

7. A divider on the left side to separate the grain to be cut from that to be left standing.

In 1831, and for several years thereafter, Cyrus had not the slightest idea that he was not the sole and original discoverer of each one of these cardinal elements. Actually he originated them all independently and alone; but in the case of six of them he was duplicating prior discoveries of other inventors. The main wheel only was original with him. Even so, he is honored as the first inventor of the reaper because an invention need actually be no more than a new combination of known features producing a novel result.

Cyrus Hall McCormick would have been the first to admit that the reaper of 1831 was no more than a beginning. Thus he was not even satisfied enough with his effort to patent it until 1834, nor did he begin to seek a market for it until 1840.

His experimentation continued during 1833. Cyrus built another larger reaper, and with it and the 1832 model he cut the Walnut Grove grain as well as the wheat of several neighbors.

The reaper was patented in 1834. Cyrus saw in a magazine the picture of a reaper patented the previous autumn by Obed Hussey. He did not
necessarily feel that his own machine was a finished product, but he felt the necessity of protecting his interests and so secured a patent of his own. In later years Hussey admitted the priority of McCormick's reaper.

In 1840 Cyrus made his first real reaper sales. He sold one reaper to a farmer who rode in from the northwestern part of the state, and one to a man from the James River district. These two machines did not work well; so he spent the harvest period of 1841 in private experimentation. By the next year he had so improved the cutting ability of the knife by changing the angle of the serrations that he was able to sell seven reapers in 1842. The volume of sales rose to twenty-nine in 1843 and to fifty in 1844. The price of the reaper was $100. All the early machines were made in the blacksmith shop on the Walnut Grove Farm. In 1844 he sold reapers in New York, Tennessee, Ohio, Indiana, Illinois, Wisconsin, and Missouri, as well as in his home country.

As soon as the Virginia harvest of that year was over, the inventor decided to investigate for himself the western states from which this unexpected business was trickling in. He traveled to New York and then on through Ohio, Wisconsin, Illinois, into Missouri and back to Ohio. His imagination was challenged. He wrote to his family that reapers are luxuries in Virginia, but were necessities in Ohio, Illinois, and on the great plains of the West.

He began immediately to develop the thought of moving his entire business to some place in the West. In preparation for the ultimate move to Chicago, he went to Brockport, New York, on the Erie Canal, and sold a manufacturing license to Seymour & Morgan. He sent his brother, Leander, now a young man of twenty-eight and able to fit himself into the growing business, to Cincinnati after making a similar contract. He, himself, and such county agents as he had appointed sold 123 machines in 1845. The next year his sales mounted still further. In 1847 he moved to Chicago.

Among the several firms which McCormick had licensed to build reapers was Gray & Warner of Chicago, manufacturers of cradles. For a time Gray became his partner and together they built 500 machines for the harvest of 1848. Then Gray sold out to William B. Ogden, the great pioneer of early Chicago, and W. E. Jones. The firm name was McCormick, Ogden & Company. By 1849 they agreed amicably to disagree, and McCormick bought the Ogden and Jones half of the business for $55,000. Fifteen hundred machines had been sold that year (and he had made enough money), enabling McCormick to pay so large a price. Already, at forty years of age, the Virginia farmer boy had become a captain of young industry.

If the 1831 reaper was but a crude affair compared with his later models, the first Chicago shop was no more than a bare foreshadowing of the factories he was later to organize. * * * the factory of 1848 was remarkable in the eyes of those who saw in it the beginning of Chicago's industry. * * * Growth began immediately. By the end of 1849 the main building had been extended to a length of 190 feet. One hundred and twenty men were at work. There were riverside docks for unloading materials from lake schooners and for shipping finished reapers.

In 1851 a fire destroyed a large part of the old main building, and a new four-story wing was erected. In 1856 it had a producing capacity of 40 reapers a day, and actually made 4,000 that year. In 1859, when it had passed its tenth birthday, there was a total floor area of 100,000 square feet and a working force of 300 men.
By 1856 there were McCormick agents all over the wheat-growing sections of the United States. They were putting into effect the sales policies and program of a new business system. He had provided as a background for his machine a new kind of factory where, though he doubtless knew it not, he was inventing the first steps toward standardization and mass production, with a sternly enforced code to insure quality in the machines. Then he invented a system of distribution which included the first bold use of public debate in the press to expound his new mechanical doctrine, the first broad warranty of a manufactured product, the first aggressive system of selling, the first conception of service, and the first broad application of credit. He had invented the reaper, and he also invented the means to make it attainable to farmers.

The first advertisement to the reaper appeared in 1833 in the Lexington Union. From time to time until 1835 McCormick published notices of it and also of his hillside plow. By 1845 he was publishing long advertisements in the farm papers of Chicago, Columbus, and northern New York. As early as 1842, when for the first time he began really to be satisfied with his invention, he gave his customers an absolute guaranty of satisfactory performance or the return of their money. The gearing on the 1853 reapers failed and had to be replaced during the following winter free of cost to the purchasers.

One important innovation introduced into the selling system by McCormick was of credit on easy terms. In the early fifties the price of the reaper was $125. The farmer was asked to pay $35 cash, plus the freight from Chicago. The balance was due on December 1, with 6 per cent interest from July 1. The cash received at the time of a sale varied from 10 to 25 per cent, and the balance was collected whenever possible within the next year and a half.

Ever since 1849, when he built a special machine designed for presentation to Prince Albert's Royal Agricultural Society, McCormick had been turning his eyes toward the English market. The Crystal Palace exhibition of industries of all nations in the summer of 1851 furnished the suitable occasion. He sent a special reaper across the Atlantic in the spring and himself followed in August. Hussey sent a machine of his own. They met on the farm of J. J. Mechi, a rich manufacturer, where, before 200 spectators including the jury from the exhibition, Hussey's machine failed miserably because of the operator's lack of skill. A second trial confirmed the result of the first, and the Virginia reaper was awarded the Council Medal, the highest prize of the fair. McCormick made arrangements with a British firm to manufacture his reaper, and went home.

** France clung to hand reaping methods until 1855, when there was an International exposition in Paris. A great field trial for reapers was organized in LaTrappe. The McCormick machine won and received the grand gold medal of honor.

Use of the reaper began early and spread rapidly throughout Europe. A McCormick machine was sold in Austria in 1850. In 1856 the reaper was introduced into Prussia and Poland. In 1858 the first McCormick machine reached Russia. In 1878 McCormick was made a member of the Legion of Honor and a member of the French Academy for having done more than any living man for the cause of agriculture.
McCormick's interest and activity in improving his machine never waned. He secured two other patents in addition to his original patent of 1834—one in 1845 and one in 1847—and thus the original implement of the thirties became "Cyrus McCormick's Patent Virginia Reaper," a two-horse machine with a wider cut and a seat on the side whereon the raker sat as he worked. Before 1855 the weight of the machine had increased from 800 to 1200 pounds. The main wheel was enlarged; the reel was further improved; the wood platform was covered with sheet zinc to make it more durable and easier to rake clean; malleable iron guards were substituted for cast iron. Most important of all, the modern form of knife with riveted-on cutting sections was devised in 1851.

Many men had for a long time been trying to build a self-rake reaper, and invariably they tried to sell their ideas to him, but he was never satisfied. McCormick stood his ground and refused to desert his original type of reaper until something better appeared. His own self-rake machine was produced in 1862. This was the regular reaper equipped with a rake arm pivoting near the axis of the reel which swept grain off the platform and to the side of the machine. It eliminated the time and work of one man.

The Civil War furnished the supreme test of the worth of the reaper. The U. S. Commissioner of Agriculture said in 1862 that it would have been impossible to harvest the wheat crop if it had not been for the reapers in use in the West, each of which released five men for service in the army. The Scientific American declared that without "horse rakes, mowers, and reaping machines one-half the farmers' crops would have been left standing on the fields." Secretary of War Stanton said: "The reaper is to the North what slavery is to the South. By taking the place of regiments of young men in western harvest fields, it released them to do battle for the Union at the front and at the same time kept up the supply of bread for the nation and the nation's armies. Thus, without McCormick's invention I feel the North could not win and the Union would have been dismembered."

The next important forward step in grain-cutting machinery was the Marsh harvester, patented in 1858 but not in general use for some years after that. This machine raised the grain by means of continuous canvas aprons from the reaper platform over the top of the main wheel, where it fell neatly on a table. Two men rode the machine, standing before this table on a footboard. They bound the grain as fast as it fell over to them and then tossed the bundles to the ground. One by one the reaper manufacturers, including McCormick, began the manufacture of Marsh-type harvesters.

Then, in 1874, Charles B. Withington sought out McCormick and showed him a model of a wire binder. The reaper inventor immediately bought the Withington device, made a few machines experimentally, and in 1877 was ready to produce the wire binder in quantities. Fifty thousand of the new machines were sold during the next few years. Hand labor had now been practically eliminated from cutting and binding. A boy old enough to drive a team could reap and bind the crop.

William Deering entered the reaper business as a silent partner of E. H. Gammon in 1870. In 1879 Deering, then in sole control of the business, decided to move away from Plano and build a new factory in Chicago's northern suburbs. At the same time he bought shop rights under the patents of John F. Appleby and prepared himself to build a twine binder. In the first season, 1880, he made and sold 3,000 of the new machines. The wire binder's brief day...
of supremacy was over. Appleby, one of the great names in the history of American invention, hit upon the combination of successful units that had barred the access of all other men to the secret of a successful twine binder.

Thus, fifty years after the test of his reaper at Steele's Tavern, McCormick found * * * his leadership challenged by competition far more serious than the Marsh harvester of a few years before. With lightning rapidity he adapted himself to the new circumstances, arranged for a license to manufacture Appleby binders, and entered the 1881 harvest ready to do battle as before.

Cyrus Hall McCormick's name figured prominently in the rebuilding of Chicago after the Chicago Fire of 1871. He was one of the group of leaders who had an aggressive confidence in the city's future.

A few days before the fire he had acquired a new factory site on the southwest side of the city, far away from the crowded center of Chicago. To insure plenty of room for growth, he bought a wide expanse of prairie where his vacant acres might serve first as testing fields and then for the expanding industry he foresaw. If it did nothing else, the Chicago fire hastened the construction of the new McCormick Works. It soon became and ever since has been the greatest farm implement factory in the world.

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BRIEF CHRONOLOGICAL BIOGRAPHY OF CYRUS HALL McCORMICK

1809–1884

1809—Born February 15 at Walnut Grove Farm, Rockbridge County, Virginia.

1824—Constructed a light cradle of his own design to enable him to compete with grown men in the harvest field.

1831—Patented, June 13, a hillside plow which he had invented a short time previous. In the latter part of May began work upon a reaper, and in July gave a successful public trial of his machine on a field near Steele's Tavern, Virginia, in the presence of a considerable number of people. In the fall went to Kentucky near Lexington attempting to introduce his father's hemp rake among the hemp growers of Kentucky.

1832—Made improvements on reaper and cut fifty acres of grain with it on the Walnut Grove Farm. During harvest gave a successful public trial of his reaper on the farms of John Ruff and Colonel William Taylor near Lexington, Virginia.

1833—September 14, 21, and 28 appeared the first published descriptions of McCormick's reaper in the "Union," Lexington, Virginia. November 19 patented a horizontal self-sharpening plow which he had invented a short time previous. During harvest gave successful public trials of his reaper on the farms of Archibald Walker, William Moore, Colonel James McDowell, and John Weir in Rockbridge County, Virginia.

1835—Went to live on a farm on South River, Virginia, which had been given to him by his father. This farm was about nine miles from Walnut Grove. Continued work on reaper and used it on the Walnut Grove Farm.

1836—Constructed an iron furnace in Augusta County, Virginia, which was called Cotopaxi, and entered into a partnership with his father, Robert McCormick, and others to manufacture iron, meanwhile improving his reaper and using it on the home farm.

1837—Operated the Cotopaxi furnace and sold iron. His reaper again cut the crop on the Walnut Grove Farm.

1839—On July 23 gave a successful public trial of his reaper on the Scott Farm of Mr. Joseph Smith, three miles south of Staunton, in the presence of Abraham Smith, George Eskridge, James Bell, Joseph Smith, William W. Donaghe, Silas H. Smith, Nicholas C. Kinney, Edward Valentine, Kenton Points, James Harper, Benjamin Crawford, and Solomon D. Coiner. During harvest sold two reapers, one to Abraham Smith, of Rookingham County, Virginia, and one to Richard Sampson, of Goochland County, Virginia, for the harvest of 1840.

1840—Reapers of Smith and Sampson delivered, but cutting apparatus clogged in heavy grain.

1841—Sold Cotopaxi iron furnace December 21. Forced to dispose of furnace, largely due to the effects of the panic of 1837. Cyrus and his father, Robert, plunged heavily into debt because of the iron furnace venture. Improved cutting apparatus of his reaper by reversing the direction of the serrations on the straight sickle every inch and a half. This change eliminated the clogging found in the Smith and Sampson reapers. Guaranteed reaper for the first time. Testimonial of Abraham Smith, recommending the operation of Cyrus' reaper, appeared September 23 in the Staunton Spectator.

1842—In spring manufactured seven reapers at Walnut Grove and sold them for use in the harvest of that year. Traveled through the Valley of Virginia and eastern Virginia advertising and selling his reaper.

1843—Manufactured reapers at Walnut Grove and sold twenty-three for the harvest of that year. Held first competitive public trial of his reaper in July against Obed Hussey, of Maryland, on a plantation near Richmond, Virginia. McCormick won the decision. Sold rights to manufacture reapers in five counties near Richmond, Virginia, to Jabez Parker.
Sold rights to manufacture reapers for the county of Washington, Mary¬
land, and a county in Michigan.
Sold rights to manufacture reapers for Virginia south of the James River
and the Blue Ridge Mountains to Colonel James Tutwiler, of Fluvanna
County, Virginia.

1844—Manufactured reapers at Walnut Grove and sold fifty for the harvest of
that year.
Among the fifty reapers sold in that year, eight were ordered from and
sent to New York, Wisconsin, Missouri, Iowa, Ohio, Illinois, and
Tennessee. Some of these were transported over the Blue Ridge Mountains
to the James River Canal, shipped down the canal to Norfolk, Virginia,
and from thence by boat to New Orleans, at which place they were
transported by steamboat up the Mississippi and the Ohio Rivers to
Cincinnati. Several of the eight machines arrived too late for harvest.
After harvest in Virginia, made a trip through western New York,
Wisconsin, Illinois, Missouri, and Ohio to ascertain possibilities for
sale of reaper in these regions.
Made contract with Backus Fitch & Company at Brockport, New York, to
manufacture forty reapers for four counties in New York for the harvest
of 1845. Cyrus was to receive a patent fee of $20 for each reaper sold.
Contract not fulfilled.
Made contract with A. C. Brown, of Cincinnati, Ohio, to manufacture
reapers for the harvest of 1845. Contract not satisfactorily carried
out.

1845—Took out a patent January 31 for improvements incorporated in his reaper
between 1839 and 1845. These included the reversed angle of the
serrations on the knife, spear-shaped single fingers, a method for
adjusting the height of cutting, and alterations in the reel post and
the divider.
During the spring of this year sold rights to A. C. Brown, of Cincinnati,
Ohio, to supply sixteen of the best wheat counties in Ohio with the
reaper for a period of four harvests.
Made contract with A. Fitch & Company, of Brockport, New York, to manu¬
facture reapers for 1846. Contracts renewed until 1848.
Contracted with Seymour & Morgan for manufacture of reaper at Brock¬
port, New York, for 1846. Contracts renewed until 1848.
Manufactured and sold forty-eight machines at Walnut Grove. About
seventy-five others were made and sold in the North and West. John B.
McCormick, of Versailles, Kentucky, a cousin of Cyrus, appointed
traveling agent for sale of reaper in the West. Traveled through the
North and West arranging for manufacture and sale of reaper.

1846—Robert McCormick, father of Cyrus, died July 4.
Made a contract with A. C. Brown at Cincinnati, Ohio, to manufacture
reapers. Sold 190 machines.

1847—Took out a patent October 23 for improvements incorporated in his reaper
between 1845 and 1847. These included the placing of a raker seat on
the machine.
Entered a partnership with C. M. Gray, of Chicago, known as McCormick
& Gray, for sale of reapers.
Factory established in Chicago on the north bank of the Chicago River,
near its mouth. Manufacture elsewhere discontinued as soon as contracts
expired. Manufactured and sold 500 reapers.

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1848—Application made for extension of original 1834 patent. Extension refused. Sold 800 machines.

1849—Seat for the driver placed on reaper.
Sold 1,500 machines.
Began experiments with mowing attachment for reaper.

1850—Sold 1,603 machines. Sued Seymour & Morgan, of Brockport, New York, for infringements of patents. Finally won suit in 1857. William H. Seward counsel for McCormick.

1851—Cyrus introduced his straight sickle formed of a row of obtuse angular plates with alternate serrations on cutting edges of plates. The plates were fastened to a cutter bar. This sickle operated in conjunction with a single spear-shaped finger.
Sold 1,004 machines.
Displayed a specially made reaper at the Exhibition of the Works of Industry of All Nations in London.
During harvest defeated Hussey in a public trial on the farm of J. J. Mechi, near London.
Awarded Council Medal for reaper at the Exhibition of the Works of Industry of All Nations.

1852—Sold 1,011 machines.

1853—Manufactured and sold a combined reaping and mowing machine. This reaper, known as the "Old Blue Machine," sold by thousands between 1854 and 1865.

1854—Sold 1,558 machines.

1855—Sold 2,534 machines.
Took first prize with reaper at the Paris Exposition.
Introduced a double finger or guard with an opening underneath to allow chaff to escape.

1856—Sold 4,095 machines.

1857—Sold 4,091 machines.

1858—Sold 4,563 machines.

1859—Sold 4,119 machines.
Endowed four professorships in the Presbyterian Theological Seminary of the Northwest. This institution, located at Chicago, after 1859 became one of the leading theological seminaries of the Northwest.

1860—Sold 4,076 machines.
Established the Expositor, a religious periodical, at Chicago and published it until April, 1861, with a view to persuading the Presbyterian church to use its influence to prevent war between the North and the South.
Bought the Chicago Times and published it until April, 1861, with a view
to influencing the Democratic party to prevent war between the North and the South.

1861—Sold 6,000 machines.

1862—Won first prize with reaper at London Exhibition. Manufactured and sold McCormick self-rake reaper, which automatically discharged the grain in gavels. This machine, which had a mowing attachment, was known as the "Old Reliable" and sold largely from 1862 to 1875.

1863—Won first prize with reaper at the Hamburg Exposition. Won first prize with reaper at the exposition at Lille, France.

1864—Sold 6,090 machines. Ran for Congress against Long John Wentworth. Defeated.

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1865—Manufactured and sold a separate mower. This machine was made on a license basis.

1866—Manufactured and sold the first McCormick separator. This machine, a rear-cut mower, was very popular in the late sixties and early seventies. Gave an endowment to the Union Theological Seminary, Hampden Sidney, Virginia. Gave an endowment to Washington College, Lexington, Virginia, later known as Washington and Lee University.


1869—Manufactured and sold improved form of McCormick self-rake reaper, known as the "Advance." This was a two-wheeled machine with a mowing attachment and sold extensively between 1869 and 1875.

1871—Factory, near the mouth of the Chicago River, burned October 9. Erected a temporary structure for factory on the old site following the fire.

1872—New factory built on Blue Island Avenue, Chicago.

1873—Won first awards at the Vienna Exposition. Purchased the Interior, a Presbyterian periodical. This paper, with McCormick as publisher, became one of the most influential organs of the Presbyterian church.

1874—Sold 10,114 machines. First manufactured the McCormick Harvester with wire-binding attachment, based on the patents of Charles B. Withington. This famous wire binder was produced and sold in quantity from 1877 to 1880.

1875—Manufactured and sold McCormick Harvester. This machine, of the Marsh type, elevated the grain over the main wheel to a platform on which two or more men stood and bound the grain by hand. This harvester sold extensively between 1875 and 1882.

1878—Elected Officer of the Legion of Honor. Won first awards at Paris Exposition.
1879—Elected a member of the French Academy of Sciences "As having done more for agriculture than any other living man."
Manufactured and sold the McCormick Iron Mower, a front-cut machine. This mower sold largely between 1879 and 1885.

1880—Manufactured and sold the McCormick Imperial Combined Reaper and Mower. This was a self-rake machine with a mowing attachment. It sold principally between 1880 and 1885.
Manufactured and sold the McCormick Dropper, a front-cut machine. This mower sold principally between 1880 and 1885.
Presidential Circuit of the Virginia Society at Chicago.

1881—Manufactured and sold McCormick Harvester with twine-binding attachment of the John F. Appleby type. This machine, known as the "McCormick Twine Binder," sold very largely for many years.

1882—Sold 48,000 machines.
Manufactured and sold the McCormick Daisy Reaper. This machine sold extensively for many years. It was a predecessor of the present Daisy Reaper.

1883—Manufactured and sold McCormick Center Draft Mower. This machine was only made from 1882 to 1885.

1884—Sold 54,841 machines.
Began the manufacture and sale of the McCormick Steel Twine Binder in this year.

Died in Chicago at Rush Street residence on May 13.


"No disposition has been felt to disparage the claims of the applicant as an inventor. He has, it is alleged, devoted twenty years of his life to perfecting his inventions and introducing them into public use. For his patience, zeal, and indomitable energy, in the midst of almost lifelong difficulties, and for the genius with which he has surmounted them, he has deserved, and is receiving, the warm commendation of the world. . . He has been so fortunate as to link his name indissolubly with a machine which, unless outstripped in the race of progress, may endure as a proud memorial, so long as the ripening grain shall wave over the boundless plains of the West, or the songs of the reaper shall be heard in its harvest fields."


"Cyrus H. McCormick is an inventor, whose fame . . . has spread throughout the world. His genius has done honor to his own country, and has
been the admiration of foreign nations, and he will live in the grateful recollection of mankind as long as the reaping machine is employed in gathering the harvest."

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"William H. Seward once claimed that the McCormick reaper had extended the American frontier at the rate of thirty miles each year—a sentiment practically identical with that uttered by Stanton, who in his previously-quoted address in 1861 showed upon a map how 'McCormick's invention in Virginia, thirty years before, had carried permanent civilization westward more than fifty miles a year'."

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"In 1859, Reverdy Johnson declared that the McCormick reaper 'had already contributed an annual income to the whole country of $55,000,000 at least'."

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"I do not hesitate to say that it is one of very great merit. In agriculture, it is in my view as important, as a labor-saving device, as the spinning-jenny and power-loom in manufactures. It is one of those great and valuable inventions which commence a new era in the progress of improvement, and whose beneficial influence is felt in all coming time."

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HENRY HOWE, ADVENTURES AND ACHIEVEMENTS OF AMERICANS (Cincinnati, 1859) PP. 153-154.

"Among the inventions of our countrymen, in aid of agriculture, the reaper of Cyrus H. McCormick stands at the head of the list, as a labor-saving machine, and as having brought honor to the American name, by the ingenuity displayed in its construction."

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The Award of the COUNCIL MEDAL to CYRUS HALL McCORMICK at the Exhibition of the Industries of All Nations, London, England, 1851.

William T. Hutchinson, in his book "CYRUS HALL McCORMICK" (The Century Company), says of this important event:

Among this curious assortment of wares from America, Cyrus McCormick's Virginia Reaper had a conspicuous place. "A cross between a flying machine, a wheelbarrow and an Astley chariot," said the London Times of May 1, 1851. "An extravagant Yankee contrivance," ... "huge, unwieldy, unsightly and incomprehensible," concluded others.
By August the scornful London Times admitted that the McCormick reaper alone was doubtless worth more to England than the cost of the entire exhibition.

The award to McCormick by the jury on agricultural implements ... was not bestowed simply because his machine appeared to surpass all other reapers displayed on the floor of the Crystal Palace .... The American member on the jury suggested that the ... machines should be given a practical test in wheat. It was in the month of July, and although the grain was still green, J. J. Mechi, a rich manufacturer, ... invited the commissioners to stage their test in his grain. The trial ... on July 21, 1851, was the first appearance of the McCormick and English grain ... (it) moved ahead through the wheat ... cutting well in spite of the rain and soggy stalks with a speed which the jury estimated to be equal to 20 acres a day. The crowd gave four cheers for McCormick, but ... the final decision was reserved until another trial under more favorable circumstances should give the McCormick reaper an opportunity to demonstrate that it was also a fair weather machine.

The English press carried long accounts of the trial and probably McCormick and his reaper were momentarily the most talked-about topics associated with the exhibition ... the deciding trial was set for August 6. In this contest, at which Cyrus McCormick was present, ... (his machine) operated admirably. The jury was now fully satisfied and recommended that the Grand Council Medal be awarded to the Virginia Reaper.

The Council Medal "was almost exclusively reserved as a reward for remarkable inventions, and was considered not to be applicable in cases where excellence of execution, however great, was the only merit."

The London Times of September 27, 1851, was convinced that "the reaping machine from the United States is the most valuable contribution from abroad, to the stock of our previous knowledge, that we have yet discovered."

J. DELAFIELD. Address on Presenting the Medals of the New York State Agricultural Society to Its Members Who Received Awards at the Great Exhibition in London (Albany, 1852).

"To Mr. McCormick has been awarded one of the highest honors granted by the Royal Commissioners of the Great Fair—The Council Medal. It is an honor, sir (Mr. McCormick), of which you may be justly proud; for your skill and talent have given to the world an implement or machine of rare utility, contributing largely to the general character of most American objects presented for the World's examination; its character of usefulness to man directly aiding in the supply of sustenance at a reduced cost, and indirectly increasing his comforts and welfare ... I present to you the Gold Medal of the Society." (PP. 28-29)
AGRICULTURE IN THE UNITED STATES IN 1831

FARM POWER

Oxen provided much of the power for heavy farm work at this time. In the North horses were used for riding and light draft work, oxen for heavy draft work. The value of mules was little appreciated. In the South horses were generally used for racing, riding, and light draft work. Oxen did much of the heavy work. Following the war of 1812, mules were rapidly introduced and by 1831 were rivaling oxen in popular favor. Mules were particularly adapted for use in the South. They possessed great strength and endurance, ate less and coarser food than horses or oxen, and were impervious to heat. Equally important, they performed well under negro management.

In New York and Pennsylvania there seems to have been an increasing use of horses instead of oxen in farm work, especially after the introduction about 1820 of hay rakes, cultivators, and other horse-drawn tools. The New Englanders clung to their oxen, using them still in preference to horses for plowing and teaming. A single horse was kept by well-to-do farmers "to go to mill and to church" and for the convenience of the family. Occasionally a horse was hitched ahead of a yoke of oxen to add strength to the team.

Oxen did not appear to be losing in favor until the decade between 1850 and 1860. Even then the number increased during that decade in the country as a whole from 1,701,000 to 2,255,000; although in every northern state east of Indiana, except Connecticut and Maryland, oxen decreased. As late as 1850 the proportion of oxen to horses in New England was about 3 to 2. West of Ohio the proportion of oxen to horses was much less. Although the number of western oxen increased, the increase did not match the increase in the number of horses.

For working in the woods or for breaking up tough, new sod or for plowing fields filled with rocks and stumps, the ox was quite generally preferred to the more nervous and energetic horse. The price and cost of keeping an ox was less than that of a horse. The price of a yoke was less than that of a harness. The ox served the twofold purpose of working and providing beef. Oxen did not travel faster than 1 or 1-1/2 miles an hour, and a yoke of oxen did not plow more than 1-1/2 acres a day. For use with the cultivator, the horse rake, and other light machinery, the horse proved capable of much more work than the ox.

STATUS OF AGRICULTURAL KNOWLEDGE

The agriculture of 1831 was vastly different from that of today. Scientific knowledge was in its infancy. A few notable figures like John Taylor, of Caroline, Edmund Ruffin, and Jesse Buel were giving much attention to scientific farming, but as yet they were prophets in a wilderness. Little was known about fertilizing, rotation of crops, soil analysis, plant insects, plant diseases, and drainage. Storage, transportation, and marketing facilities were primitive. Weather reports were nonexistent. Hand labor was relied upon far more than machinery. Much of the livestock was of an inferior character, since few farmers at that time understood or appreciated scientific breeding. Agricultural organizations were few and these only patronized by a small minority of the farmers. The chief societies were those of New York, Massachusetts, Pennsylvania, Maryland, and South Carolina. Several local societies, such as the Albemarle County (Virginia), Agricultural Society, were doing good work, but their influence beyond the locality was
small. Agricultural fairs were infrequent. Only a few agricultural periodicals of any note were in existence. The best known were the American Farmer, founded by John S. Skinner, at Baltimore in 1819; the New England Farmer, established by Thomas G. Fessenden, at Boston in 1822; the Southern Agriculturist, first published in Charleston in 1828; and the New York Farmer, started by S. Fleet in New York City in 1828. In 1831 the Genesee Farmer, now the Country Gentleman, made its appearance in Rochester, New York. Even these publications had a limited circulation. The farmer who wished to obtain authoritative general or special treatises upon agriculture found few American books available. It was true that an extensive English literature on the subject could be imported, but this was expensive, and the works were not adapted to American conditions. There were only two or three agricultural schools and few experimental farms in existence and their influence was limited. The national government gave no special aid to agriculture. Nevertheless, despite lack of agricultural knowledge, which we regard as commonplace today, the better farmers of 1831 managed to live in reasonable comfort and some of them made money.

TYPES OF AGRICULTURE

In 1831 there were two general types of agricultural economy plainly discernible. One, the plantation system, prevalent in the South, involved the use of units of land of considerable size owned by individuals or companies and generally operated by slave labor. The other, the farm system, found chiefly in the North, made use of smaller units of land independently owned or leased and operated by free white labor. Exceptions to the plantation system in the South were the German and Scotch-Irish farmers of the Valley of Virginia, and residents of western Kentucky and Tennessee, and northern Alabama and Mississippi, who operated large units of land with both free and slave labor. As is true today, no class or type in 1831 had a monopoly on successful agricultural operations.

FIELD CROPS AND OTHER PRODUCTS

In the South the major field crops were wheat, corn, tobacco, cotton, rice, sugar cane, and hemp. Wheat and corn were raised chiefly in Maryland, Virginia, Tennessee, Kentucky, and Missouri. Tobacco was mostly cultivated in Maryland, Virginia, North Carolina, Tennessee, Kentucky, and Missouri. Cotton was largely grown in North and South Carolina, Georgia, Tennessee, Alabama, Mississippi, Louisiana, Arkansas, and Missouri. Rice was produced principally in South Carolina and Louisiana. The sugar cane industry was centered in Louisiana. Kentucky had almost a monopoly on the hemp crop. Natural grazing lands existed in many places in the Piedmont and Highland sections and in North Central Kentucky, but hay was only a minor crop. Truck gardening and horticulture were little developed as yet, though some attention was being given to them near the larger cities. One main crop was the customary practice in most places. The draft animals in the South were mainly oxen and mules. Some progress had been made in breeding racing and riding horses, but the draft horse, of the type known today, had not yet been developed. Beef cattle were raised in considerable numbers in the Piedmont and Highland districts, but the stock was of poor quality. Dairying had made but little progress. Sheep were raised where grazing was available, but the breeds, despite the infusion of Merino strain, were poor. Hogs were numerous but almost entirely of the razorback variety. The meat was used mostly for hams and bacon. Much of the pork, needed for feeding the slaves, had to be imported from the North.
Different conditions prevailed in the North. The principal farm products here were wheat, corn, hay, and livestock. The cereal grains were raised chiefly in the Connecticut Valley, Pennsylvania, New York, Ohio, Indiana, Illinois, and northern Missouri. Hay was a major crop in the New England states and was also cultivated to a lesser extent in the West. Northern farmers also had certain special crops, such as maple sugar, produced largely in New York, Ohio, and Vermont, which added to their income. Dairying and truck gardening in the vicinity of New York City and Philadelphia were beginning to attract attention, but they had not been extensively developed at this time. Horticulture had made some advance in New York and Pennsylvania. Agriculturists depended less on one main crop than in the South. Livestock, particularly in Pennsylvania and New York, was superior to that in the South. The average quality, however, throughout the North was low. Horses were used for riding, carriage, and draft work. The principal draft animals were horses and oxen. Sheep had been improved by the Merino strain but were far inferior to present-day varieties. The hogs were only a stage above the razorback, scientific breeding being yet in the future.

METHODS OF PRODUCTION—USE OF MACHINERY

In 1831 almost all of the operations of agriculture were performed by hand. Farm equipment largely included the implements of the early colonists, only slightly improved. It was still mostly the product of the farm or the local blacksmith shop. Two outstanding improvements that had been made up to 1831 were the substitution of the cradle for the old-time sickle and the replacement about 1825 of the old wooden moldboard plow by the cast-iron plow, a change which was practically completed by 1840. The new plow with one yoke of oxen would plow an acre and a half as against one acre with the old plow and its four-cattle team. On many farms wooden cultivators with iron points replaced the hoe or the plow for corn cultivation, and on some farms a wooden horse rake had been substituted for the old hand rake. Here and there one might find a fodder cutter, a hand seeder, a horse power, a thresher, or a small fanning mill. In general, ox, horse, or mule power could be used only in plowing and tilling, cultivating, raking hay, and for transportation. All other work was still done by hand. Seed was usually broadcast and wheat was cut with the cradle or sickle. When threshed it was trodden out by horses or beaten out with a flail. Hay was cut with a scythe and corn commonly planted and harvested by hand.

PLOWS

Shallow plowing was the usual practice, and the furrows were rather uneven. Cast-iron plows were in general use in 1831. Up to 1820 farmers continued to stick to their old-fashioned, clumsy bull plows. Between 1820 and 1830 they rather suddenly abandoned their wooden plows and adopted those of cast iron. One type of early plow was made with a wooden moldboard roughly plated over with pieces of old saw blade, tin, or sheet iron. It had a clumsy wrought iron share, and the handles were upright. Another type was the "bar share" plow, sometimes called the "bull plow." This plow had a flat bar forming the landside, with an immense piece of iron shaped like half a lance head, into the upper part of which a kind of coulter was fashioned. It had a wooden moldboard fitted to the iron work in the most bungling manner. Then there was the "shovel plow" in very general use in the middle and southern colonies. A rough hewn stick was used for a beam and into this another stick was framed, upon the end of which was a
piece of iron shaped a little like a sharp-pointed shovel. Two rough handles were nailed to the side of the beam. With such unwieldy instruments two men or a man and boy, using two or three horses or four or six oxen, could scratch over one or two acres a day.

Newbold's cast-iron plow, having a moldboard share and landside all in one casting, was patented in 1797 but was not adopted. Jethro Wood in 1814 and 1819 obtained patents differing from Newbold in that the plow-share was not cast in one piece but in several. Wood's plow was generally adopted in the North. Stephen McCormick's cast-iron plow patented in 1819 found much favor in the South, particularly in Virginia. The Davis plow was another implement used in the South. Many plow patents were taken out by 1830 so that by 1831 fairly good cast-iron moldboard plows had almost entirely replaced the earlier types of wooden plows. A single plowman and one yoke of oxen was the standard outfit.

HARROWING

The old triangular or "A" harrow was still in use in fields littered with stumps and rocks. In some cases square harrows, either single or double, were used. The first harrows had wooden teeth, but later the wooden teeth were replaced by iron teeth.

CULTIVATING AND ROLLING

In 1831 a crude cultivator, which had been first introduced about 1820, was taking the place of the plow and the hand hoe in the East for plowing corn. These cultivators were made entirely of wood with iron points. In the West and South the shovel plow or one-horse plow were the implements commonly used for cultivating corn.

In addition to the plow and cultivator, the only other tillage tools the farmer had were the spade, the broad and narrow hoe, and the homemade land roller, usually a section of the trunk of a tree to which shafts for a horse were attached.

SEEDING

Although grain drills had been invented, they did not become practical until after 1840. In 1831 grain was still sowed broadcast by hand, the sower either walking or riding. Some sowers used only one hand in broadcasting, covering a strip about 8 feet wide, thus seeding 10 or 11 acres a day. The more expert used the double broadcast; that is, with the seed bag hung directly in front and broadcasting with both hands. This method permitted covering a strip about 16 feet in width, or as much as 20 to 22 acres a day. The seed was customarily covered by harrowing in two directions.

CORN PLANTING

Methods of planting in 1831 show but little if any change from colonial methods. Corn was dropped by hand and covered with the hoe or the plow. Drills of various construction for both hand or horse operation were used to some extent in the East, principally for sowing turnips, beets, and other small seeds. No satisfactory corn planter appeared until the fifties.
One method was to plow the ground, furrow it both ways, 4 feet apart, and, where the furrows crossed, 4 or 5 kernels were dropped. Two men could plant 10 acres a day. Another and older way was to open the ground 3 or 4 inches after plowing with a broad hoe, drop in the corn, and cover it. After the corn was up, the ground was hilled around the stalk with a hoe.

**CORN HARVESTING**

Frequently when the corn had attained its growth it was topped; that is, the tops and strongest blades were cut off for fodder. Later the ears were pulled off and carried home. Another method was to cut the crop and stack the corn and later feed it to the stock in the field.

**HARVESTING**

The method employed and the implements used in harvesting, threshing, and cleaning grain were but little advanced over those of the ancient Israelites. Wheat and sometimes other small grains were still reaped with a sickle on many farms. In early colonial days the sickle was often referred to as the reaping hook, which the colonists brought with them. With the sickle or reaping hook a man could reap from a half acre to an acre of wheat in a day. One writer, speaking of harvesting hemp in Kentucky as late as 1844, said that with a hemp hook a good hand could cut an average of a half acre a day.

In 1831 the cradle, which had been introduced before 1800 in the middle colonies, was the most effective harvesting implement. The cradle consisted of a broad scythe with a light frame and several wooden fingers attached, corresponding in shape and nearly of the same length. With this the grain could be cut and at the same time gathered, and by a dexterous turn to the left the reaper could throw it in a swath ready to be raked and bound into sheaves.

In cradling grain, two acres was considered a day's work. In referring to the cradle, an early writer said that a man could cradle four times as much oats or barley as he could cut wheat with the sickle in a day. That cradling was considered an art is evident from the fact that cradlers received better pay than ordinary farm hands. In some communities cradling was almost a trade by itself, and a good cradler could demand and would receive two or three times as much pay as a common laborer. Sometimes grain was cut with a scythe but usually with the sickle or the cradle. Even as late as 1840 the sickle had not been entirely abandoned. Sometimes oats and barley were cut with the scythe, and three acres a day was considered a good day's work.

It is said that a man could hand-bind behind a cradler and keep up with him. That this is probably true is evident from a comparison of the reaper and cradle at the Geneva trial held by the New York State Agricultural Society in 1852. It was asserted by the committee in charge that the cradling and binding of a field of 15 acres of wheat in one day would require 14 or more men—about 7 cradlers, each cutting 2 acres, and 7 or 8 men at the most to rake and bind and shock the crop.

Hay was usually cut with a scythe, and estimates vary as to the amount of ground covered. Some writers insist that an acre a day in heavy green grass was a fair day's work. Others state that a man could mow as
much as 3 acres of barley or oats in a day. Much of the hay crop was
still raked by hand with the old wooden-tooth rake, although the wooden
horse rake was proving very popular.

As originally constructed, the wooden horse rake was simply a big
comb 10 feet wide with 15 or 18 wooden teeth 20 inches long, which was dragged
along the ground by a horse attached to the frame by ropes. Handles
resembling plow handles served to guide the rake, to lift the teeth over rocks
or stumps, and to empty the accumulated load by throwing the handles forward
and lifting the rake over the windrow for another load. Such rakes were in
use in Long Island as early as 1812 and in Massachusetts and Pennsylvania in
1820. The so-called revolving horse rake had teeth on both sides of the
scantling, which formed the head. The latter was pivoted so that the rake
might be emptied without stopping the horse. Wheeled rakes were not in use
before 1840, nor was iron or steel wire substituted for wood teeth until
after 1840.

THRESHING

A few small hand-power and horse-power threshers of different
makes were in use in 1831. Pitts' thresher was not to be patented until
five years later nor come into popularity until ten years later. Threshing
with a flail, however, was still carried on everywhere, particularly where
only a small amount of grain was desired. This operation was considered
one of the slowest, most laborious, expensive, and wasteful operations
performed on the farm. If the laborers were hired by the day, five or six
bushels were produced. If paid one-tenth of the crop they might thresh
out 10 or 12 bushels a day. Ten bushels of wheat was considered an average
for a man to thresh with a flail, although when the wheat was well filled
the result was higher.

Tramping out the grain with horses or oxen upon a floor or plat¬
form in the open air was a common practice both in the South and in the
North. This work was usually done in the wintertime. The grain was
winnowed and the straw used from day to day as threshed for feed and bedding
purposes. The process was an interesting one. After arranging a dozen or
more sheaves known as a "heat," with the heads of the grain lying in the
same direction, the horses were ridden over it until the grain was dislodged.
The small boys and girls delighted on such occasions for frequently they
rode the horses.

Following the tramping of a heat, the grain, straw, and chaff
were piled to one side to await later cleaning. The piling operation was
known as "caving." One tramping succeeded another until a sufficient
quantity of grain had been secured. Later the straw was separated from the
grain and the latter cleaned by fanning it with a cloth or with a hand wind¬
mill. With several horses, one or two men and a boy could tramp out and
winnow from 20 to 40 bushels in a day.

Hand Implements for Reaping

From the beginning of history up to 1831, man made only slight
improvements in methods of reaping. Aside from spasmodic attempts to develop
power machinery, characterized by such implements as the Gallic header of
ancient Rome and the devices of Ogle and Bell of England, all of which proved
impracticable for general adoption, the hand-manipulated sickle, scythe, and
cradle ruled supreme until a hundred years ago.
The sickle, the earliest form of reaping implement, dates back to prehistoric times. Burial mounds, drawings in caves, and the sculpture and literature of the Egyptians, Romans, and peoples of medieval and modern Europe, afford abundant evidence of its widespread uses. (See Columella, Scriptores Rei Rustica, Ed. 1745, Book II, pp. 98-99; Maisou Rustica, 1856, Reaping Implements, p. 1; Loudon, Encyclopaedia of Agriculture, 1857, pp. 7, 24-25, 38-39, 373.) The form of the sickle was simple, merely a curved blade with a short handle on one end. Two types, frequently referred to as the sickle hook and the reaping hook, predominated from the beginning. The sickle hook had a narrow curved blade with a serrated cutting edge; the reaping hook, a similar curved blade, somewhat wider and longer and with a smooth cutting edge. The sickle hook was used to cut grain; the reaping hook to cut both grain and grass. In practice, the operator with the serrated-edged implement grasped a handful of grain in one hand and cut it with the sickle which was held in the other. In cutting grain with the reaping hook, an operation often called bagging, the laborer held a small portion of grain within the curvature of the blade and severed it by drawing the hook sharply toward him. (See Loudon, Encyclopaedia of Agriculture, p. 515; Copeland, Agriculture, 1866, Vol. I, pp. 634-640.) The average capacity of a man with a sickle was about half an acre a day.

The scythe, which was probably a development of the sickle, is also a farm implement of great antiquity. It was known and commonly used by the Egyptians, and the Romans and their successors among European peoples. (See Ardry, American Agricultural Implements, 1894, p. 83; Columella, Scriptores Rei Rustica, Book II, p. 52; Loudon, Encyclopaedia of Agriculture, pp. 372, 373, 515, 515; Copeland, Agriculture, pp. 634-640.) The simplest form of scythe consisted of a thin steel curved blade attached at right angles to one end of a long straight handle. (See Loudon, Encyclopaedia of Agriculture, p. 38.) Up to 1800 it was used to cut both grain and grass; after that time, chiefly grass. The handle was grasped by the operator with two hands and the blade swung with a rhythmic motion against the grain or grass, cutting and depositing the grain in swath. In the early nineteenth century, a curved handle was introduced and the blade strengthened, forming the implement which we know today.

Possibly before, but at least as early as the eighteenth century, the Flemish developed an abbreviated form of the scythe, used exclusively for cutting grain, which was called a Hainault scythe. This implement had a wide blade about two feet long; the handle was fourteen to twenty inches, depending on the height of the reapers, with a bent part at the top some five inches longer. This bent part was held in the laborer's right hand in such a way that the forefinger was inserted in a leather loop attached at the top of the long part of the handle so as to keep the scythe from slipping. Holding a wooden hook in the left hand and the scythe in the right, the reaper moved both implements simultaneously, drawing the grain toward him and pressing it slightly with the hook while he cut it with the scythe. (See Loudon, Encyclopaedia of Agriculture, pp. 372-373, 515.) A man with an ordinary scythe could cut an average of an acre of grass or about two acres of grain in a day. With a Hainault scythe he could cut about an acre and a half of grain in the same length of time.

The cradle, which was a natural evolution of the scythe, is of later date than either that implement or the sickle. Existing evidence shows that it was known among the Romans, and was used in Germany as early as the latter part of the fifteenth century, shortly afterwards being introduced.
in England. This implement, sometimes referred to as the cradle-scythe, was used only in cutting grain. In its early form it had a frame of short, straight wooden fingers attached to the handle of the scythe, parallel to the blade, the object of these fingers being to assist in laying the cut grain in better condition for binding.

This early type of cradle was introduced into this country about the time of the American Revolution. American ingenuity soon made of it an instrument of harvest that was far ahead of the sickle and scythe or the early cradle-scythe. Both the length and number of fingers were increased, and the fingers were curved to correspond exactly with the curve of the blade. Because Americans developed the old cradle-scythe to its maximum efficiency, the cradle as we know it, and used so generally between 1800 and 1840, is commonly referred to as an American invention. (See Columella, Scriptorum Rustorum, Book II, pp. 98–99; Heresbach's Four Books of Husbandry, 1601, pp. 39b–40a; Loudon, Encyclopaedia of Agriculture, pp. 373, 514–515; Bidwell and Falconer, History of Agriculture in the Northern United States, 1620–1860, 1925, pp. 125, facing 208.) A man working with an American cradle could cut about two acres of grain a day in such manner that it fell uniformly with the heads in one direction, and in good condition for binding.

THE DEVELOPMENT OF REAPING MACHINERY

Prior to 1831

The simplest and earliest known hand implement for reaping grain which comes down to us from antiquity is the sickle. It consists of a curved cutting blade set upon a short handle and has been used extensively wherever man has raised grain and grass, from the Egyptians, Jews, Greeks, and Romans down to a comparatively recent time. It has even been proved that stone and bronze sickles were in use before the dawn of recorded history. Sickles were of two types—a narrow curved blade with a serrated cutting edge used for grain, and a somewhat wider and longer blade with a smooth cutting edge used for grain and grass.

The scythe in its simplest form was a thin steel curved blade with a smooth edge attached at right angles to one end of a long, straight handle. This instrument, used for cutting both grain and grass, was known to the early Chinese, the Egyptians, the Romans, Britons, and Medieval Welsh. Up to 1800 various adaptations had been commonly used. Copeland, writing of ancient agriculture, says, "at the period of the Roman Conquest the scythe was not only employed in agriculture by the Britons, but also as a weapon of warfare, being attached to the axles of their chariots with which they drove furiously in amongst the hosts of their enemies, committing terrible havoc." The Hainault scythe, which had a shorter and wider blade and an abbreviated handle, was used for cutting grain only. This implement was much favored on the continent, particularly by the Flemish, but it was never popular in England.

The cradle was the most highly developed form of the scythe. It consisted of a framework of wooden fingers attached to the handle of the scythe and parallel to the blade, the object of the fingers being to assist the cut grain to fall in better condition for binding. Early records show that the cradle form was known to the Romans and used by the Germans and English as early as the fifteenth or sixteenth century.
In the Far East the natives of Java employed two peculiarly shaped pieces of wood in the cutting of cereals. It is supposed that, holding a piece in each hand, they brought them together in such a manner as to sever the heads of the grain by means of a lever cut.

The scythe and the cradle in its various forms never superseded the sickle, because the former two performed well only in straight grain, while it was necessary to resort to the sickle if the crops were beaten down or tangled. Working with the sickle, an expert could only cut about half an acre a day, while an experienced cradler rarely averaged more than two acres. In the same period it was possible by consistent labor to cut two acres of grain or one of grass with the scythe. Weather conditions and a shortage of labor gave the farmer frequent cause for anxiety; so it will be seen that harvest was a burdensome period, and it is no wonder that the ancients celebrated the final gathering of the sheaves with feasts and games.

From the dawn of civilization down to the nineteenth century the processes of agriculture were performed almost entirely by manual labor, and, because of this situation, nine-tenths of the population was necessarily, directly or indirectly, engaged in agriculture in order to produce food for themselves and the other tenth.

History shows us, however, that enterprising individuals tried from early times to relieve agrarian labor by the invention and perfection of a power implement for reaping grain. Inscriptions preserved on a stone located a short distance from Vienna, said to have been carved by Carthaginian settlers about 150 B.C., rudely portray what was perhaps the earliest mechanical reaper. A model constructed from the drawing shows a perpendicular drum with a circular knife projecting at the bottom and a notched-edged rim at the top, which was evidently designed by means of belts and pulleys to revolve in such fashion as to cut the grain and deposit it in swath.

The Gallic stripper, discussed by Pliny and Palladius, in the first centuries after Christ, was not as advanced as this Carthaginian machine, being merely a cart with a long row of teeth on its front, which was propelled against the grain by an ox, tore off the heads while a man walking alongside threw them by means of a stick into the body of the cart. In the ages of anarchy and barbarism, which succeeded the fall of the Roman Empire, and all through the Middle Ages, agriculture with a few exceptions seems to have been much neglected.

It is not until the revival of agriculture in England at the time of the industrial revolution that we find the problem of producing a mechanical substitute for the hand-manipulated sickle or scythe again seriously considered. The Scots Magazine for 1765 presented an engraving of a reaping machine invented by Peter Williamson, and the Edinburgh papers of the period record several successful experiments with this machine during August and September of that year, but nothing permanent resulted from the venture.

In 1780 the English Society of Arts, Manufactures and Commerce offered a prize for the invention of a reaping machine, but for a time the only result was an improvement upon the old Gallic stripper, suggested by one Capel Lofft in 1785 and actually constructed by William Pitt, of Pendeford, in 1786.

Walker's "Philosophy" published in 1799 contains a plan for a reaping device, by an unknown inventor, which suggested some of the principles
afterward used in successful implements. Cartwright, of Brothertoft, England, after experimenting for many years, finally completed a reaper in 1799, but like its contemporaries it was not successful. Joseph Boyce proposed to sever grain with six scythes attached to a revolving plate, for which he was issued (1799) the first patent for a reaping machine ever granted in England.

In 1800 Robert Meares produced a push pair of shears mounted on wheels which employed the scissors-cut principle. T. J. Plucknett followed in 1805. Evidence of the use of his machine, like that of Meares and Boyce, is lacking. Gladstone, of Castle Douglas, patented a reaper in 1806, using the side-draft principle. Defects in his first machine caused him to make improvements, and in 1815 he gave a number of public trials, but the implement never came into use. The Dalkeith and Highland Agricultural Societies of Scotland encouraged Gladstone for a time, but soon turned their attention to others whose devices showed more promise. Plucknett brought out another machine in 1807; but, like his first attempt, it was never adopted by the public.

The push-reaper of Salmon, announced in 1807, used the reciprocating principle adapted to shears or scissors. Contemporary with these last two inventions, a simple form of the old Gallic header designed for reaping clover came into vogue in Norfolk and Suffolk. In this case the cart with the teeth in front was set low to the ground and propelled against the clover, causing the heads to fall back into the body of the cart.

In 1809 the Dalkeith Monthly Farming Club offered a premium for the best model of a machine for reaping corn (cereal grains). From among the entries, four were chosen to compete: those of Alexander Scott of Ormiston, Charles Umpherston of Loanhead, and Thomas Wilson and William Carthrae of Dalkeith. Scott's model was awarded the prize and the Society ordered that a full-size machine of each model should be built at their expense. None of these machines seemed to have survived.

The next machines, those of Smith and Kerr, appeared in 1811. They were somewhat similar and the Highland and Agricultural Society awarded each a prize, but it was generally conceded that Smith's was best. This implement consisted of a circular cutter, attached to the periphery of a conical drum which was made to revolve by means of cogs and belts attached to a horizontal shaft, which in turn received its motion from two main wheels. The machine was propelled from behind. Although operating fairly well in straight grain and on level ground, it was unwieldy and when it met with a slight obstruction or fallen grain, was worthless. Smith, who was connected with the Deanston Cotton Works and interested in agriculture, made a number of improvements during the next four or five years but never succeeded in perfecting a successful reaper. His principle, however, became the pattern copied by a number of subsequent inventors. John Common invented a machine in 1811 and Donald Cumming also took out a patent that year, but, like their contemporaries, they failed to produce anything practical. James Dobbs in 1814, Alexander Scott in 1815, and Joseph Mann in 1820 all brought forth machines somewhat after the Smith principle; that is, a revolving circular cutter, but none of them reached the stage of general use. Amos, of Boston, Lincolnshire, produced in 1820 a machine consisting of a number of scythes caused to revolve rapidly by the usual adaptation of wheels and pinions.
In 1820 Henry Ogle invented a reaping machine which has since been found to contain more of the principles employed in practical reaping machinery than any one down to the advent of the first successful reaper. Ogle, who was a schoolmaster, may have based his machine on a combination of his own early ideas (he is said to have discussed plans with John Common as early as 1803), and from later observation of the ideas of others. At any rate he collaborated with Thomas Brown and Son, foundry men of Alnwick, who added their manufacturing experience to the building of the reaper. This machine, probably the first advertised by printed circular for sale to the public, was supported on two wheels, had a smooth-edged, one-piece straight knife which vibrated over fingers, a revolving reel, front side draft, and if desired a rear delivery by means of a tiltable platform. At least four of these principles were later found necessary in producing a practical reaper. The machine was tried on corn (grain) with reported success, but was immediately abandoned due to the threats of farm hands. This opposition of labor to power machines, one of the factors which retarded the progress of mechanical agricultural invention, usually took the form of stoning and other like violence. Some previous inventions had been tried by moonlight to escape the anger of farm hands.

Patrick Bell, a minister of Carmelyie, Scotland, invented a reaper in 1826. It contained a reel, a scissors-cutting apparatus, a moving belt which deposited the grain in swath, and was propelled from the rear. Bell's machine, impractical from a mechanical point of view, worked under special circumstances; but its principles were not sufficiently correct and it never maintained itself on the market. A few were sold and used for a little while between 1828 and 1834, but by the later date it was practically abandoned. When rediscovered in 1852, the English were obliged to adopt the cutting apparatus from a successful reaper before it performed well, after which it was sold for a time, but finally again fell into disuse. The chief objections seem to have been the delicacy of the cutting apparatus, the difficulty of steering from behind, and the expansion and shrinkage of the movable canvas due to changes in atmospheric conditions. John Frozer, of Edinburgh, adopted the scissors principle in his machine brought out as late as 1832.

Because of the activity of early agricultural societies in England and Scotland in the preservation of records, it would seem that much of the ingenuity concerning the development of the reaper was confined to Great Britain. Down to 1850 we find little attention paid to its development on the continent. Francois Pellet, of Switzerland, adopted a form of the Gallic header for use in his country in 1782 and it seems to have had some vogue. In 1802 Person de Berainville published an account of two primitive machines which had come to his notice in France. These implements were supported on one wheel, after the type of a wheelbarrow, and propelled forward by man power. The first French patent was granted to Tasteman in 1826. The invention of Mr. P. Huay, of Odessa, was noticed in the Journal of St. Petersburg in 1823, but it was not described. Ugaezy, of Austria, perfected a reaper in 1818; but the Austrian government did not grant a patent until they issued one to Henry Springer, of Vienna, in 1839. These complete the record of machines which we have been able to find on the continent.

In the meantime, inventors of the United States had not been idle. The first patent for a reaping machine in this country was issued to Richard French and J. T. Hawkins, of New Jersey, in 1803. The next in order was one to Samuel Adams in 1805. Other patents followed at short intervals. Due to the burning of the United States Patent Office in 1836, we do not have as full
Among the early American machines about which we have little information are the grain- and grass-cutting implement of J. Comfort, of Pennsylvania, patented in 1811; machine for cutting wheat invented by W. P. Claiborne, of Virginia, patented in 1811; a grain- and grass-mowing machine invented by Peter Gaillard, of Pennsylvania, patented in 1812; a machine invented by John and Adams Rhodes, of New York, patented in 1814 (this machine had a circular scythe); a machine for mowing invented by P. Baker, of New York, patented in 1814; a machine for reaping and threshing invented by John Hersey, of Virginia, patented in 1816; a machine invented by John Wadsworth, of Rhode Island, patented in 1824; a mowing machine invented by Ebenezer and John Prentiss, of Connecticut, patented in 1825; a machine for cutting wheat invented by L. Durham and John Pleasants, of Virginia, patented in 1827; a machine for reaping and threshing invented by Samuel Lane, of Maine, patented in 1828; and a machine invented by Erastus Ingersoll, patented in 1830. The New England Farmer refers to a mower invented in New York in 1823, having a revolving circular cutter, also a grass-cutting machine invented by a young mechanic of Newport, Pennsylvania, in 1825, but does not give further information about the latter.

Robert McCormick, of Rockbridge County, Virginia, experimented with a device for reaping grain as early as 1809 and in 1816 produced a push machine which had a row of vertical revolving cylinders armed with long spikes. These spikes seized the grain and forced it against a row of fixed sickles. After being severed, the grain was supposed to be conveyed to one side by means of a series of moving leather bands with projecting nails. The implement performed fairly well in straight wheat, but was useless otherwise. In 1831 Robert made improvements upon the machine, but, finding it still unsatisfactory, decided to abandon it.

Jeremiah Bailey, of Pennsylvania, in 1822 brought out a side-draft implement, after the Smith, of Deanston, principle. This was followed in 1824 by the curved cutting shares of Harvey May, of New York, and in 1825 by the circular cutter of Ezra Cope and Thomas Hoopes, Jr. The latter was an improvement on Bailey's machine. The same year James Ten Eyck, of New Jersey, obtained a grant for a push mowing and reaping machine in which a number of scythes were attached to a revolving reel.

Perhaps the most significant of these early reapers in the United States was that of William Manning, who in 1831 produced a cutting apparatus consisting of sharpened spear-shaped cutters, vibrating over fingers or teeth. This was a distinct advance but on the whole was never practical.

In 1831, Cyrus Hall McCormick, of Walnut Grove Farm, Rockbridge County, Virginia, son of Robert McCormick before mentioned, invented and perfected the first practical reaper known to the world. This machine contained seven principles which have been found necessary to all reaping machines built since that date. A review of these basic principles gives a clear and rather complete description of McCormick's reaper. The seven principles were: 1, a straight knife with serrated edge and reciprocal motion to cut the grain; 2, fingers or guards to hold the grain while being cut; 3, a revolving reel to press the grain against the knife and tip it backward as it was cut; 4, a platform behind the knife to catch and hold the cut grain; 5, a master wheel to provide power through ground traction to drive the knife.
and reel; 6, forward draft from one side so that the draft animal does not walk in the standing grain; and, 7, a divider to separate the standing grain from that to be cut. These principles were later improved upon by the inventor, but it is interesting to note that none were added, none dropped. McCormick's machine was the first practical reaper to be marketed on a large scale and adopted generally on farms throughout the grain-producing areas of the world.

### Reaping Machine Development After 1831

Before 1831, when Cyrus Hall McCormick invented, constructed, and displayed at public trial the world's first successful reaper, there had been numerous attempts at building a mechanical grain-cutting machine, both in America and Europe. Among these are found all but one of the principles necessary to a successful machine. However, before McCormick's invention, no one reaper contained all of the principles which would produce a machine capable of meeting the varying conditions of harvest. McCormick spent three years in further experimentation after his first successful field test before he was sufficiently satisfied with his invention to seek a patent. His reaper was patented June 21, 1834.

Even though Cyrus Hall McCormick was the first man in all the world to invent a successful reaper, he was never entirely alone in the harvesting machine field. In the April, 1834, issue of the Mechanics Magazine appeared a description of a so-called reaper invented by Obed Hussey, a candlestick maker and ex-sailor, living in Cincinnati, Ohio. Since Hussey's reaper contained some of the principles employed in McCormick's machine publicly tested in 1831, Cyrus straightway wrote the editor of the magazine, claiming priority to these principles. This unexpected rivalry also led McCormick to seek a patent for his machine immediately. A few years later Hussey admitted the priority of McCormick's rights, although he continued to build his machine and sell it as a reaper for many years. Hussey's reaper was mounted on and operated by two main wheels. It had no reel. His cutting apparatus was different from that invented by McCormick, although the toothed cutter bar, having a vibrating motion and fingers or guards extending before it, was essentially the same in principle.

All successful grain-harvesting machines built since the dates of McCormick's and Hussey's patents have been based upon the principles used by these men. In later years it became generally acknowledged that Hussey's machine was better adapted to mowing grass than to reaping grain, while McCormick's was more successful as a reaper than as a mower. Hussey's work is important in that those who built mowing machines in later years copied his principles, while those who built reapers followed McCormick.

Hussey's machine sold to a limited extent in New York, Ohio, and the New England states. In 1851 and 1852 John S. Wright, founder and editor of Prairie Farmer, attempted to introduce Hussey's reaper into the Middle West but met with little success. Hussey was unable to meet the strenuous competition of the 1850's, so he sold his patents to the rivals of McCormick in 1858.

Between 1831 and 1842 McCormick reapers were built only in the little log forge shop on Walnut Grove Farm, the home of the inventor. However, unexpected orders coming in from the new western territory, and additional orders from the East, made it necessary to contract with licensed manufacturers for the building of McCormick reapers. Seymour & Morgan, of
Brockport, New York, was one of the earliest licensed manufacturers. Other contracts were made with firms in Ohio, Michigan, Missouri, and Illinois. Most of these manufacturing arrangements were for one year only, being renewed each year, although a few contracts covered a five-year period ending in 1848 with the expiration of McCormick's patents. Licensed manufacturers, not as interested as McCormick in building quality into the reaper, used cheap materials hurriedly put together. This trouble, coupled with McCormick's desire to have his own factory in the heart of the new grain territory, led to his move to Chicago in 1847. He established his factory on the north bank of the Chicago River just east of the present Michigan Boulevard bridge and began building reapers for the following harvest.

The original patents of both McCormick and Hussey expired in 1848. Hussey, through a misunderstanding, let the time limit for his application for renewal expire and soon discovered that it was too late even to apply for an extension. McCormick got his application for a renewal of his patents in on time, but Hussey, having lost his privilege of extension, exercised his influence toward having McCormick's application refused. His influence, coupled with that of Seymour & Morgan who wanted to continue building and selling McCormick reapers without paying a license fee to the inventor, resulted in the refusal of the patent office to extend McCormick's patents. Both McCormick and Hussey were thus left without protection on their original basic patents, and a number of manufacturers, capitalists, and aspiring inventors plunged into the reaper business, marketing machines built on the McCormick and Hussey principles.

In the East, Hussey had been McCormick's only rival. However, when he came into the new western territory in 1847, McCormick found a new foe in George Esterly, of Whitewater, Wisconsin, who was building a header for the southern Wisconsin and northern Illinois territories. Esterly's machine consisted of a large box having revolving beaters which, when pushed into the grain, pressed it against stationary knives, thus severing the heads which fell into the box. However, the header was not well adapted to that territory, and its high price, as compared with McCormick's reaper, limited its competition. Esterly soon abandoned this machine and later built reapers and mowers, continuing in business until his death many years later.

Immediately following the refusal of the patent office to extend McCormick's patents, Seymour & Morgan put a reaper on the market which was almost an exact duplicate of the machine they had formerly built for McCormick on a license basis. In July, 1851, Palmer & Williams obtained a patent for a sweep rake and quadrant platform. Assigned to Seymour & Morgan, this patented device was added to their McCormick-type reaper and later blossomed out as the first popular self-rake machine, known as the "New Yorker." This machine sold largely in New York and other eastern states.

John H. Manny obtained a patent in September, 1851, covering certain variations in a reaper copied after the McCormick machine. This reaper had a mowing attachment and became one of the earliest successful combined machines. Manny's firm later became Emerson, Talcott & Company and grew quite rapidly until the death of Manny in 1856, after which time the firm continued to operate but was never again an important competitor.

The next invention of importance was that of Jearum Atkins, who, in December, 1852, patented an ingenious and complicated self-rake device resembling human arms raking the reaper platform. John S. Wright, who had
unsuccessfully attempted to introduce Hussey's reaper into the West, acquired manufacturing rights for Atkins' device and in 1853 began building in Chicago a machine known as the "Automaton." He used Atkins' self-rake arrangement on a McCormick-type reaper. The machine worked well under favorable conditions, and Wright built up a large business, selling about 3,000 machines in 1856. He received so many orders for the 1857 harvest that, in order to fill them, he used green lumber in the machines, with the result that the hot sun warped and twisted them, ruining the complicated mechanism. This misfortune, and the panic of 1857, removed Wright and Atkins from the field.

In 1853, Walter A. Wood, of Hoosick Falls, New York, blacksmith and wagon maker, purchased of John H. Manny the manufacturing rights for his reapers and mowers in the state of New York. Not long afterward Wood obtained patents for improvements on Manny's machines and by 1855 was building Walter A. Wood reapers and mowers. His machines met with a popular demand, and in 1866 the firm of Walter A. Wood Mowing and Reaping Machine Company was organized, with Wood as president.

Springfield, Ohio, was the seat of much reaper activity during the 1850's and 1860's. In 1851 Benjamin H. Warder obtained an interest in the Seymour & Morgan machines and began manufacturing in Springfield. The following year William N. Whitely, also of Springfield, began experimental work on a combined reaper and mower. The competition between the firms organized by these men increased steadily until 1867, when they joined forces in the formation of the Champion Machine Company and proceeded to build the Champion system mowers and reapers.

In September, 1860, McClintock Young obtained a patent for a self-rake device consisting of a revolving rake arm which operated as one vane in the regular reel. This invention was important in that it formed the foundation of the famous McCormick self-rake reaper, which gained immediate popularity when it was introduced on the general market two years later.

The success of McCormick, Hussey, Manny, Seymour & Morgan, and others with mowing attachments for reapers between 1850 and 1860 led to much experimental work and many new patents which finally developed into the separate mower and a new series of combined mowers and reapers. W. F. Ketchum, of Buffalo, New York, was one of the first to recognize the value of Hussey's principles for a separate mower and in July, 1847, patented a mower of his own. In 1852 he added a reaping attachment, giving him a combined reaper and mower. Ketchum's machines sold largely during the 1850's in the New England states, in Ohio, and to some extent in the Chicago territory.

R. T. Osgood patented certain mowing machine features in February, 1852, chief among which were the ratchet wheel and pawl in each drive wheel as used in the mowers of today. His patents were assigned to Cyrenus Wheeler and, together with others, formed the basic patents of the "Cayuga Chief," which later became a very popular mower.

Another eastern harvesting machine competitor during the 1850's was William A. Kirby, of Buffalo. Beginning with the Kirby mower in 1856, he added a reaping attachment and built combined reapers and mowers. E. Forbush also obtained patents on a mower in the early 1850's, to which he later added a reaping attachment. David M. Osborne purchased an interest in the Kirby and Forbush patents and began manufacturing in Auburn, New York, in 1856. In 1857 the firm of D. M. Osborne & Company was organized and quickly became an
important factor in the eastern harvesting machine trade. In 1875 Osborne's firm absorbed the business of the Cayuga Manufacturing Company, builder of the famous "Cayuga Chief" mower.

Lewis Miller, of Canton, Ohio, took out a series of patents about 1857, which resulted in the development of the famous "Buckeye" mower. Miller's chief contribution to the industry was a hinged cutter bar. He became associated with Cornelius Aultman, and the firm of Cornelius Aultman & Company, later Aultman & Miller, began building Buckeye mowers in 1858. A reaping attachment was soon added, and the Buckeye mower and combined reaper and mower became an important factor in McCormick's competition in Ohio and New York.

Although McCormick produced a mowing attachment for his reaper as early as 1849, he did not build a separate mower until 1865. This machine was of the Hubbard type, patented about 1859, and was manufactured on a license basis. The following year McCormick introduced his own separate mower which combined the best points of a number of earlier machines. The McCormick mower soon took the lead on the market, a position which it never lost.

Not long after the outbreak of the Civil War the reaper industry assumed a new importance. It soon became known that women, old men, and children could operate reapers and thus replace the men who joined the army. During the war period, practically every reaper manufacturer who had not already done so introduced a self-rake machine. One of the most important of these was the self-raker patented by Samuel Johnson in February, 1865, on which all the revolving arms of the reel carried rakes. This type gradually superseded all other self-rakes. At the end of the war the opening of much new territory where land was sold to soldiers at very low rates caused the reaper market to expand rapidly.

In the 1860's John F. Seiberling developed the type of machine known as a "dropper." It was primarily a mower to which was added a movable platform device for holding the cut grain until an amount sufficient to form a sheaf was gathered. The operator could deposit the grain at intervals as desired. The dropper made a place for itself in the industry and licenses were taken out by several leading firms, including McCormick, for its manufacture.

The next invention of importance was one destined to revolutionize completely the harvesting machine industry. This was the invention of C. W. and W. W. Marsh, two young farmers of DeKalb, Illinois, who obtained their first patent on the Marsh hand-binding harvester in August, 1858. The machine consisted of a McCormick-type frame and cutting apparatus with a moving canvas which elevated the cut grain over the drive wheel to a binding platform on which two men rode and bound the grain by hand. The first machine was built on the home farm in 1853 and a few more were constructed the following year. Most of them failed by reason of poor construction, although the principle was sound. The inventors continued the work, however, and in the winter of 1860-61 W. W. Marsh and J. F. Hollister built a machine which worked successfully during their harvests. With the assistance of George Seward, these men formed the Marsh Harvester Company and built Marsh harvesters in increasing numbers each year until 1870, when over 1,000 were sold. Through the aid of William Deering, Lewis Steward, J. D. Easter, and E. H. Gammon, who early became connected with the Marsh Brothers, the business continued to grow and from it developed the Deering Harvester Company. It was in building a machine to
which the practical forms of binding devices could be attached that the Marsh Brothers established a landmark in the development of harvesting machinery.

With the Marsh harvester as a basis upon which to work, Sylvanus D. Locke, of Janesville, Wisconsin, developed and, in 1871, patented a self-binding device, using wire to tie the bundles of grain. Aided by the Walter A. Wood Mowing and Reaping Machine Company, the Locke wire binder was put on the market in 1873.

While Locke was perfecting his machines, James F. and John H. Gordon, of Rochester, New York, in connection with William Deering, then of the Marsh Harvester Company, were working on a machine also of the wire-binding type. John H. Gordon's first "packer" binder, which made bundles of uniform size, was produced in 1873, and, soon after, his brother brought out his "crane" wire binder—both machines becoming popular. D. M. Osborne & Company, as well as Deering's firm, built and sold Gordon wire binders.

Simultaneous with the development of the Locke and Gordon wire binders, Charles B. Withington, of Janesville, Wisconsin, working with Cyrus Hall and Leander J. McCormick, worked out a very simple wire-binding attachment which was patented in February, 1872. The McCormick firm began to produce the new machine immediately, and it soon became one of the most popular and successful wire binders ever built. Between the years of 1877 and 1885 McCormick sold 50,000 wire binders of the Withington type.

The day of the wire binder's supremacy was brief. The farmers complained that the wire injured their livestock and that it became scattered all over their farms. In 1875, John F. Appleby, of DePere, Wisconsin, who as early as 1858 had invented a successful twine knitter but who had since that time been devoting his time to wire binders, again turned his attention to cord machines. His device became the foundation of the binding apparatus which is used in almost every twine binder of today. It combined the best points of a few partially successful inventions, with some new principles original with the inventor. It underwent improvements during 1876 and 1877 and, through the aid of William Deering, was still further perfected during the two following years. By 1880 it was practically perfected, and 3,000 binders using the Appleby automatic twine-binding attachment were put upon the market. The McCormick, Deering, Champion, and Osborne companies at once procured rights and began the manufacture of this type of twine binder, adding various improvements in detail as they saw fit. The Holmes Brothers invented a practical twine binder in 1880 which was marketed with considerable success by Walter A. Wood. However, the Appleby style of machine immediately leaped into popularity and soon out-distanced all others in the race of superiority.

Since about 1882 all successful grain binder manufacturers have built practically the same machine—the Appleby binding attachment on the Marsh type of harvester, which, in turn, was founded on the McCormick reaper frame and cutting mechanism. Steel construction, anti-friction bearings, tractor-power drive, etc., are the most recent contributions of modern engineering and manufacturing methods. Improvements in detail have given each manufacturer a slightly different machine, yet the twine binder of today is in principle the machine of fifty years ago, more nearly perfected.
Labor Required to Produce an Acre of Wheat By the Hand Methods of 1830 and the Power and Machine Methods of 1930

<table>
<thead>
<tr>
<th>Hand Methods of 1830</th>
<th>Labor Required Per Acre</th>
<th>Machine Methods of 1930</th>
<th>Labor Required Per Acre</th>
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<tr>
<td>Breaking Ground - Plow and 2 Oxen</td>
<td>6 40</td>
<td>Plowing - Tractor</td>
<td>54</td>
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<tr>
<td>Sowing Seed, Sack (Hand)</td>
<td>1 25</td>
<td>Disking - Tractor</td>
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</tr>
<tr>
<td>Pulverizing Topsoil and Covering Seed (Brush and 2 Oxen)</td>
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<td>Threshing Wheat and Stacking Straw - Flails and Pitchforks</td>
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<tr>
<td>Winnowing - Shovel, Measure, and Sheet Attached to Rods</td>
<td>12</td>
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<tr>
<td>Gathering up and Sacking Wheat Shovel, Measure, and Needle</td>
<td>4</td>
<td></td>
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<tr>
<td>Total labor required to produce one acre of wheat by</td>
<td>64 15</td>
<td>Total labor required to produce one acre of wheat by</td>
<td>2 24</td>
</tr>
<tr>
<td>hand methods of 1830</td>
<td></td>
<td>machine methods of 1930</td>
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</tbody>
</table>

In 1830 it required 64 hours and 15 minutes to produce an acre of wheat. In 1930 it required only 2 hours and 24 minutes.

Both the 1830 and the 1930 crops averaged 20 bushels to the acre. Therefore, in 1830, it required 193 minutes to produce one bushel of wheat, while in 1930 it required only 7 minutes.


Machine method figures taken from report of Mr. L. H. Guthals, Elmo, Kansas, for 200 acres of wheat grown in 1930.

W.F.L.
5-9-31
### Labor Required to Produce an Acre of Corn by Hand Methods of 1855 and Power and Machine Methods of 1930

<table>
<thead>
<tr>
<th>Hand Methods of 1855</th>
<th>Labor Required Per Acre</th>
<th>Machine Methods of 1930</th>
<th>Labor Required Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breaking Ground - Plows and Horses</td>
<td>5 -</td>
<td>Plowing - Tractor</td>
<td>1 3</td>
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<tr>
<td>Pulverizing Topsoil - Harrow and Horses</td>
<td>1 15</td>
<td>Packing - Tractor</td>
<td>21</td>
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<tr>
<td></td>
<td></td>
<td>Disking - Tractor</td>
<td>33</td>
</tr>
<tr>
<td>Marking Check Rows - Shovel Plow and Horse</td>
<td>2 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dropping Seed in Check Rows - Bucket (Hand)</td>
<td>1 15</td>
<td>Planting - Tractor</td>
<td>12.5</td>
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<tr>
<td>Covering Seed - Hoes (Hand)</td>
<td>2 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulverizing Topsoil - Harrow and Horses</td>
<td>1 15</td>
<td>Harrowing - Tractor</td>
<td>12.5</td>
</tr>
<tr>
<td>Cultivating Corn - Shovel Plow and Horse</td>
<td>10 -</td>
<td>Cultivating - Tractor (Three Times)</td>
<td>1 36</td>
</tr>
<tr>
<td>Husking and Hauling to Crib - Wagon and Husking Pegs</td>
<td>15 -</td>
<td>*Harvesting - Tractor and Corn Picker</td>
<td>1 23</td>
</tr>
<tr>
<td>Total labor required by methods of 1855 to produce one acre of corn</td>
<td>38 45</td>
<td>Total labor required by machine methods of 1930 to produce one acre of corn</td>
<td>5 21</td>
</tr>
</tbody>
</table>

*Includes Hauling*

In 1855 it required 38 hours and 45 minutes to produce an acre of corn. In 1930 it required only 5 hours and 21 minutes.

The 1855 yield per acre was 40 bushels, while in 1930 it was 50 bushels. In 1855 it required 58 minutes to produce one bushel of corn, while in 1930 it required only 6½ minutes.


Machine method figures taken from report of Christensen Bros., Lyons, Nebraska, for 72 acres of corn grown in 1930.

W.F.L.
5-9-31
Labor Required to Harvest and Bale an Acre (1 Ton) of Timothy Hay by the Hand Methods of 1860 and the Power and Machine Methods of 1931

<table>
<thead>
<tr>
<th>Hand Methods of 1860</th>
<th>Labor Required Per Acre</th>
<th>Machine Methods of 1931</th>
<th>Labor Required Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mowing Grass - Scythe (Hand)</td>
<td>7 20 Hrs. Min.</td>
<td>Mowing Grass - Tractor and 2 Mowers</td>
<td>12 Hrs. Min.</td>
</tr>
<tr>
<td>Tedding Hay - Pitchfork (Hand)</td>
<td>3 40</td>
<td>Tedding Hay - Tractor and Side Rake and Tedder</td>
<td>18</td>
</tr>
<tr>
<td>Raking Hay Into Windrows - Rake (Hand)</td>
<td>3 40</td>
<td>Raking Hay Into Windrows - Tractor and Side Rake and Tedder</td>
<td>18</td>
</tr>
<tr>
<td>Cocking Hay - Pitchfork (Hand)</td>
<td>1 50</td>
<td>Sweep Raking - Tractor and Sweep Rake</td>
<td>20</td>
</tr>
<tr>
<td>Hauling Loose Hay to Barn - Wagon</td>
<td>3 40</td>
<td>See Below</td>
<td></td>
</tr>
<tr>
<td>Baling Hay - Press (Hand)</td>
<td>14 40</td>
<td>Baling Hay - Tractor and Hay Press</td>
<td>2 30</td>
</tr>
<tr>
<td>Weighing Hay - Steelyard</td>
<td>40</td>
<td>Hauling Baled Hay to Barn and Weighing (Motor Truck)</td>
<td>30</td>
</tr>
<tr>
<td>Total labor required to produce (harvest and bale) one acre (1 ton) of timothy hay by hand methods of 1860</td>
<td>35 30</td>
<td>Total labor required to produce (harvest and bale) one acre (1 ton) of timothy hay by machine methods of 1931</td>
<td>4 8</td>
</tr>
</tbody>
</table>

In 1860 it required 35 hours and 30 minutes to harvest and bale an acre (1 ton) of timothy hay.
In 1931 it requires 4 hours and 8 minutes to harvest and bale this same acreage (1 ton) of timothy hay.


Machine method figures based on capacities of latest McCormick-Deering Farmall tractor and equipment.

W.F.L.
6-30-31
Labor Required to Harvest an Acre (1 Ton) of Timothy Hay by the Hand Methods of 1850 and the Power and Machine Methods of 1931

<table>
<thead>
<tr>
<th>Hand Methods of 1850</th>
<th>Labor Required Per Acre</th>
<th>Machine Methods of 1931</th>
<th>Labor Required Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mowing Grass - Scythes (Hand)</td>
<td>7 20</td>
<td>Mowing Grass - Tractor and 2 Mowers</td>
<td>12</td>
</tr>
<tr>
<td>Tedding Hay - Pitchfork (Hand)</td>
<td>3 40</td>
<td>Tedding Hay - Tractor and Side Rake and Tedder</td>
<td>18</td>
</tr>
<tr>
<td>Raking Hay Into Windrows - Rake (Hand)</td>
<td>3 40</td>
<td>Raking Hay Into Windrows - Tractor and Side Rake and Tedder</td>
<td>18</td>
</tr>
<tr>
<td>Cooking Hay - Pitchfork (Hand)</td>
<td>1 50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Loading Hay and Hauling to Barn - Wagon and Pitchforks</td>
<td>1 50</td>
<td>Loading Hay - Tractor, Loader, and 2 Wagons</td>
<td>30</td>
</tr>
<tr>
<td>Unloading Hay - Pitchfork (Hand)</td>
<td>1 50</td>
<td>Hauling Hay - 2 Wagons</td>
<td>15</td>
</tr>
<tr>
<td>Mowing Hay</td>
<td>55</td>
<td>Unloading and Mowing Hay</td>
<td>15</td>
</tr>
<tr>
<td>Total labor required to harvest one acre (1 ton) of timothy hay by hand methods of 1850</td>
<td>21 05</td>
<td>Total labor required to harvest one acre (1 ton) of timothy hay by machine methods of 1931</td>
<td>1 48</td>
</tr>
</tbody>
</table>

In 1850 it required 21 hours and 5 minutes to harvest one acre (1 ton) of timothy hay.
In 1931 it requires 1 hour and 48 minutes to harvest an acre (1 ton) of timothy hay.


Machine method figures based on capacities of latest McCormick-Deering Farmall tractor and equipment.

W.F.L.
6-30-31
<table>
<thead>
<tr>
<th>Hand Methods of 1841</th>
<th>Labor Required Per Acre</th>
<th>Machine Methods of 1931</th>
<th>Labor Required Per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedding Land - Wooden Moldboard Plow</td>
<td>8  48</td>
<td>Middle Busting - Tractor</td>
<td>30</td>
</tr>
<tr>
<td>Opening Beds - Bull-Tongue Plow</td>
<td>2  12</td>
<td>Dressing Beds - Tractor</td>
<td>15</td>
</tr>
<tr>
<td>Planting - Hand</td>
<td>4  24</td>
<td>Dragging - Tractor</td>
<td>8</td>
</tr>
<tr>
<td>Covering Seed - Covering Block</td>
<td>2  12</td>
<td>Planting - Tractor</td>
<td>15</td>
</tr>
<tr>
<td>Hoeing and Chopping - Hoes (Hand)</td>
<td>27 -</td>
<td>Chopping and Dusting - Tractor</td>
<td>17</td>
</tr>
<tr>
<td>Barring off Cotton - Plow</td>
<td>4  24</td>
<td>Cultivating - Tractor (5 Times)</td>
<td>1 7</td>
</tr>
<tr>
<td>Cultivating Cotton - Plow</td>
<td>26  24</td>
<td>Stripping and Cleaning - Tractor and McCormick-Deering 2-Row Cotton Stripper</td>
<td>1  -</td>
</tr>
<tr>
<td>Cultivating Cotton - Wooden-Toothed Harrow</td>
<td>2  12</td>
<td>Hauling Cotton to Gin—Motor Truck</td>
<td>1  30</td>
</tr>
<tr>
<td>Picking Cotton - Hand</td>
<td>77 -</td>
<td>Total labor required to produce one acre of cotton by machine methods of 1931</td>
<td>5  2</td>
</tr>
<tr>
<td>Hauling Cotton to Gin - Wagon</td>
<td>13  12</td>
<td>Total labor required to produce one acre of cotton by hand methods of 1841</td>
<td>167  48</td>
</tr>
</tbody>
</table>

In 1841 it required 167 hours and 48 minutes to produce an acre of cotton. In 1931 it requires 5 hours and 2 minutes to produce this same acreage of cotton with the tractor and most modern equipment, including stripping the cotton with a McCormick-Deering 2-Row Cotton Stripper.


Machine method figures based on capacities of latest McCormick-Deering Farmall tractor and equipment.

W.F.L.
6-30-31
# How the Time to Harvest an Acre of Wheat Had Decreased in the Last Century

<table>
<thead>
<tr>
<th>Year</th>
<th>1829</th>
<th>1830</th>
<th>1831</th>
<th>1840</th>
<th>1896</th>
<th>1930</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cutting with Sickle</td>
<td>Cutting with Cradle</td>
<td>Cutting with McCormick's First Reaper - 4-1/2 Ft.</td>
<td>Cutting with McCormick's Reaper - 6 Ft.</td>
<td>Cutting with 5-Ft. Grain Binder</td>
<td>16-Ft. Combine</td>
</tr>
<tr>
<td></td>
<td>14 Hrs.</td>
<td>5 Hrs.</td>
<td>2 Hrs.</td>
<td>1-1/2 Hrs.</td>
<td>3/4 Hr.</td>
<td>1/2 Hr.</td>
</tr>
<tr>
<td></td>
<td>Binding by Hand</td>
<td>Binding by Hand</td>
<td>Binding by Hand</td>
<td>Binding by Hand</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>5 Hrs.</td>
<td>5 Hrs.</td>
<td>5 Hrs.</td>
<td>5 Hrs.</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Shocking</td>
<td>Shocking</td>
<td>Shocking</td>
<td>Shocking</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>1 Hr.</td>
<td>1 Hr.</td>
<td>1 Hr.</td>
<td>1 Hr.</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Threshing with Flail</td>
<td>Threshing with Flail</td>
<td>Threshing with Flail</td>
<td>Threshing with Flail</td>
<td>Threshing with Stationary Thresher and Fanning Mill</td>
<td>Improved Thresher</td>
</tr>
<tr>
<td></td>
<td>13 Hrs.</td>
<td>13 Hrs.</td>
<td>13 Hrs.</td>
<td>13 Hrs.</td>
<td>4 Hrs.</td>
<td>1-1/4 Hr.</td>
</tr>
<tr>
<td></td>
<td>Winnowing Rod &amp; Sheet</td>
<td>Winnowing Rod &amp; Sheet</td>
<td>Winnowing Rod &amp; Sheet</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>10 Hrs.</td>
<td>10 Hrs.</td>
<td>10 Hrs.</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Gathering and Sacking</td>
<td>Gathering and Sacking</td>
<td>Gathering and Sacking</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3 Hrs.</td>
<td>3 Hrs.</td>
<td>3 Hrs.</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TOTAL</td>
<td>46 Hrs.</td>
<td>37 Hrs.</td>
<td>34 Hrs.</td>
<td>11-1/2 Hrs.</td>
<td>3 Hrs.</td>
<td>1/2 Hr.</td>
</tr>
</tbody>
</table>

In the table above the figures for 1829 were taken from the Thirteenth Annual Report of the Commissioner of Labor (1898), Vol. II, Page 427. (Minutes have been omitted.)

While it required 46 hours to harvest an acre of wheat in 1829, it now takes only 1/2 hour. The introduction of the stationary thrasher, with which the fanning mill was combined, cut some 20 hours off of the time required for threshing. In the cutting of the crop, however, McCormick's reaper of 1831 started the development which saved critical hours, because the harvesting season is limited at most to about 10 days, during which it is absolutely necessary to cut and shock the crop. The entire winter, on the other hand, was available for threshing.
The First Crops

The Yearbook of the Department of Agriculture for 1899, on pages 309-312, gives the following dates, indicating the planting of the first crops and the introduction of livestock in Colonial America:

CORN. The first yield of Indian corn or maize in any considerable quantity produced in the United States by people of English blood, of which we have any authentic record, was that of 40 acres in the Jamestown Colony in 1609.

WHEAT. Wheat was first sown in Massachusetts, on the southern coast, as early as 1602, and it was first cultivated in Virginia in 1611.

RYE. Rye dates back in New England certainly to 1648 and perhaps to 1630.

OATS AND BARLEY. These date back to Gosnolds Colony in 1602.

BUCKWHEAT. The first cultivation of buckwheat dates back to 1625 or 1626 on Manhattan Island.

POTATOES. Plymouth Colony cultivated potatoes as early as 1629.

BEANS. Beans were grown on an island south of Massachusetts in 1602, in 1644 at Manhattan, and about the same time in Virginia.

APPLES. The first apples raised in this country were possibly from trees planted on Governor's Island, in the harbor of Boston, from which, on October 10, 1639, "ten fair pippins" were brought.

TOBACCO. The cultivation of tobacco was introduced into the Dutch Colony of New York as early as 1646.

FLAX. Flax was taken to Holland from Manhattan Island as early as 1626. Hemp and flax were raised in Virginia prior to 1648.

SUGAR CANE. This was first introduced in Louisiana in 1751, and the first plantation was established in 1758.

RICE. The culture of rice was introduced into the Colony of Carolina about 1694.

COTTON. Bancroft's History of the United States says the first experiment in cotton culture in the thirteen colonies was made in Virginia in 1621.

DAIRY CATTLE. Dairy cattle were first brought to Virginia in 1611 and to Plymouth in 1624 from the coast of Devonshire.

SHEEP. It is probable that the first sheep in this country came to Virginia in 1609 from England.

SWINE. DeSoto probably brought the first swine into this country in 1538 from Cuba, and these were landed in Florida. They were probably descended from some brought over by Columbus in 1493. The London Company imported swine into Virginia in 1609. They were introduced into the Plymouth Colony in 1624 and in New York in 1625.
HORSES. The first horses taken from Europe to the Western Hemisphere were brought over by Columbus on his second voyage in 1493. The present breed of American horses probably descended from the first horses brought to James-town in 1609, to New York in 1625, and to Massachusetts in 1629.

The Reaper and Industrial Progress

America in 1831 was incredibly primitive. It sprawled more than 3,000 miles across the continent. The original thirteen states had been joined by eleven new commonwealths. Except for the older states along the eastern seaboard, the nation was sparsely settled. The hardy pioneers had penetrated only as far west as Missouri.

"Old Hickory" Andrew Jackson, hero of the Battle of New Orleans, a trained Indian fighter, was president. The entire Southwest, including Texas and California, belonged to Mexico.

Georgia was the hunting ground of the Creeks and Cherokees, and the Florida Everglades sheltered the Seminoles. Chief Blackhawk was organizing the Indians in Illinois and Wisconsin and preparing for his uprising in 1832.

West of the Mississippi was virgin, unpenetrated country—a paradise for the buffalo, the Indian, and the trapper.

Transportation throughout the country was by canal boats, river flatboats, wagons, and pack trains. There was much talk about railroads, but as yet less than fifty miles of steam railroad was in operation.

Naturally the only cities of importance were along the Atlantic seaboard—Boston, New York, and Philadelphia. Chicago was a trading post for Indians and trappers. Buffalo was a struggling lake port, and St. Louis a fur-trading post and river port. Gay New Orleans stood guard at the mouth of the Mississippi, while the village of Washington dozed and dreamed on the banks of the Potomac. Such was America in 1831.

However, great changes were impending. The nation we know today, with its boundless resources, was in the making. The vast extent of territory under one flag, the number and multitude of the tasks to be accomplished, stirred men's minds and fired their ambitions. The West, with its free homes and rich black lands, was beckoning to those who sought freedom and wealth, and it was drawing some of the best blood of the East in a steady stream of westward immigration. Better means of transportation were sadly lacking. Highways, bridges, canals, and railroads were needed.

A new freedom, a boundless territory, unmatched and untouched resources, an increasing population, and countless unfilled needs—all these were urging America forward.

But there was a hitch in the march of progress—America was held at the crossroads. The cities—typifying industry—needed men and more men, but the farms needed them even more, and the farms had to be served. Food comes first.

Agriculture during all its history had hardly been able to keep abreast of the food demands of an increasing world population. The harvest of bread grains from Biblical times up to 1831 meant the wretchedness of dreary
toil and the despair of uncertainty. The fear of famine always overhung the land. Though crops were abundantly produced by sunshine and soil and rain, they were still being harvested by the straining muscles of weary men, just as in countless centuries before.

Even with the crudest of tillage implements it had always been easier to make a crop than to gather it. The harvest was the peak load of the agricultural cycle. And the farmer of 1831 had hand instruments for the harvest that were little better than those mentioned in the records of earliest times.

The sickle and the reaping hook were still common implements, and only recently they had evolved into the cradle. With this simple instrument two acres were all that a man could cut in a day. The crop had then to be raked, bound, hauled, and threshed. This method of harvesting was so pitifully slow that it was all a man and his family could do to garner enough grain to provide them with bread to last until the next harvest.

A people must have food, and this basic need kept young America practically chained to the soil. Labor was growing scarcer as emigration took it westward in increasing numbers. The well-to-do farmer in the wheat sections of the old East combed the countryside for efficient cradlers and paid the price. In the new West many a farmer planted more than he could harvest and it was not an uncommon sight to see thousands of acres of golden wheat unharvested for lack of men.

In 1831 necessity kept in agricultural pursuits four out of every five men gainfully employed. That is why America was stalled at the crossroads, eager to surge ahead but not yet ready.

Then, in 1831, came an event of tremendous importance. A young Virginian, twenty-two years old, fashioned a reaping machine in a crude blacksmith shop on his father's farm and proved that it could cut grain successfully. That young Virginian was Cyrus Hall McCormick. As if by magic, McCormick gave to a waiting world a machine that opened the gates to the advance of civilization.

It would be fruitless to attempt to measure the achievements of the great pioneers who, through their contributions, freed men from toil and gave them hope. Economic necessity spurred them on, but in no instance was the urge of necessity so great as in the case of the invention of the reaper. Before Cyrus Hall McCormick's time, agriculture struggled along with the same means and methods that were in vogue when history dawned. His invention mechanized the harvest and automatically opened a way for the release of labor to industry. He cut the shackles that bound young America to the soil and made it possible for the country to move forward as fast as its abilities and its resources permitted.

McCormick patented his reaper in 1834 and, while no machines were immediately put on the market the news of his invention traveled far and wide. Everywhere it was displayed in new communities, and not many years elapsed before the reaper was generally and gratefully accepted by farmers everywhere.

With the problem of the harvest solved, new difficulties arose. The opening of the western prairies shifted the peak load of agriculture from
harvesting to plowing. Prairie soil refused to yield to the wooden or cast-iron plows that were the best the industry could offer at the time. Again necessity mothered invention. In 1833 John Lane, a blacksmith genius, turned out his first steel plow in Chicago. John Deere and William Parlin about the same time made steel-faced plows suited to the western prairies. Once more the peak load in agriculture shifted—this time to threshing. It was time for the flail to go; and the thresher of Hiram Pitts spelled its doom in 1834.

With the completion of these three basic machines—the reaper, the steel plow, and the thresher—the age-old problem of the food supply was solved. Fear of famine no longer haunted the country. Men were free to leave the soil and turn their attention to the arts and sciences, to industry, to whatever they felt they were best fitted for. America rushed forward by leaps and bounds.

The forty years beginning with McCormick's invention of the reaper has been termed the Golden Age in the invention of farm tools and implements. As the problem of labor diminished in importance, farms grew larger, towns bloomed on the prairies, and older towns along the seaboard grew into cities. Commerce developed and railroads grew like mushrooms. Then came the Age of Steel and a still broader development.

With its limitless potentialities America would have moved forward without a decisive victory over the harvest, but the clash between the interests of the city and country would have retarded progress. Something dynamic had first to occur and the year 1831 saw the fact accomplished. That something was McCormick's invention of the reaper—the machine that broke the bottleneck on the highway of progress.

The great contribution of the reaper and its heirs to the advance of civilization is that it enabled cities with their industries to absorb into urban life millions of men who before the reaper were absolutely required on farms to produce food for the nation. What if the need of the farms for labor had continued to withhold them? Machine industry could not have existed. Our nation's industrial prosperity would have died unborn. We could never have become strong and rich and materially triumphant.

Inventions Before and After the Reaper

Before 1831 nine out of ten people lived on farms; now the ratio is about one out of five. That is the story of the reaper told in just nineteen words.

The swift succession of farm implement inventions immediately following the reaper was much more than happenstance.

America in 1831 was at the crossroads. It was favored with millions of undeveloped fertile acres, unlimited natural resources, a variety of climates, and a hardy stock of pioneers whose free government suited their bold ambitions. Yet their pent-up hopes were chained to the soil. Urban population was confined chiefly to the seaboard. New York, Philadelphia, Baltimore, Boston, New Orleans, and Charleston were the only cities worthy of the name. The land beyond the Mississippi was largely undeveloped, uncharted—almost unknown.

The United States could not have developed without the steamboat, the railroad, and the telegraph. It would still be largely a land of promise
rather than of fulfillment if it had not been for the genius of Whitney, Henry, Howe, Morse, Goodyear, Edison, and a host of other inventors who have emblazoned the path of modern civilization. But most of their efforts would have borne little fruit had it not been for the release of men's thoughts, time, and labor which the reaper accomplished. In many instances the hopes and ambitions of the inventors themselves would not have been realized had it been necessary for them to spend most of their waking hours in back-breaking farm labor. And even if they had been able to perfect their inventions, little could have been accomplished in the way of manufacturing and distributing them if it had remained necessary for nine out of ten people to live on farms.

Search through the centuries as far back as you wish, and you will find a relatively small number of important labor-saving inventions before the McCormick reaper. Johannes Gutenberg's printing press, James Watt's steam engine, the steamboats of John Fitch and Robert Fulton, George Stephenson's locomotive, Eli Whitney's cotton gin, Andrew Meikle's threshing machine, Richard Arkwright's spinning machine, James Hargreaves' spinning jenny, Roberts' machine for making paper, and a few others complete the roster.

Imagine for a moment what life must have been like a hundred years ago. No telegraph, telephones, radios, or cables. No cameras, phonographs, or movies. No X-rays, chloroform, or dental bridge work. No arc lamps, electric lights, steel pens, sewing machines, ice machines, pasteurization, safety razors, or modern plumbing. No steel plows, machine-made horseshoes, or barbed-wire fences. No gasoline, gasoline engines, automobiles, or vulcanized rubber. No dynamos, steam hammers, dynamite, endless bandsaws, riveting machines, pile drivers, I-beams, steel castings made to pattern, case hardening, acetylene, hydraulic presses, steam turbines, electric welding, or stainless steel. No passenger elevators, suspension bridges, or flying machines. No revolvers, breech-loading rifles, or machine guns. No typewriters, carbon paper, shorthand, adding machines, dictaphones, or linotypes. The list could be prolonged. And yet, strange as it may seem, men managed to live and fight and love and die in that barren environment, very much as they do today.

Compare the meager list of a few important inventions of nearly two thousand years of the Christian Era with the myriad of inventions which have sprung from the minds of men in the century since 1831. Inventions without number have crowded upon us to step up the tempo of our daily life, to make work easier, to make living more enjoyable and more fruitful.

After McCormick's reaper of 1831, transportation by steam received a great impetus, and many inventions in connection with transportation were made. The Age of Steel dawned with the perfection of the Bessemer process in 1856, and moved on with the open-hearth furnace in 1867 and the sand blast in 1870.

Improved methods of communication began when Morse sent his first telegraph message in 1844. In 1850 the first ocean cable was stretched from Dover to Calais, and the first transatlantic cable was laid in 1858. Alexander Graham Bell transmitted his initial telephone message in 1876, and the long-distance telephone was introduced in 1885. The first typewriting machine capable of actual work appeared in 1843, although it is said the first typewriter was not sold until 1874. Electrotypes, without which modern printing would be impossible, were first used in 1841. Stereotyping did not
appear until 1861, the linotype until 1886. Instantaneous photography was a mystery until 1841.

It would be an endless task to list the inventions during the century of the reaper. The manufacture of saws was begun in 1840, and files in 1850. The arc lamp appeared in 1878. Friction matches were unknown up to 1833. Edison gave the world the electric light in 1879. Although the cotton gin was invented in 1793, the first clothing factory in the United States appeared about the time McCormick invented his reaper. The first rubber boots followed soon after the invention of vulcanized rubber by Charles Goodyear in 1844. And leather shoes were not made by machine until 1845.

Today the history of inventions is almost entirely the history of electricity and internal-combustion motors. Strangely enough, 1831 also marks a most important forward step in electricity. In that year Michael Faraday of England published his discovery that an electric current in a wire can induce a current in another circuit. The dynamo was developed in 1867, the electric furnace in 1878, and the electric railway in 1879. Today a few wards in Chicago use more artificial light than there was in the entire United States in 1831.

The history of the internal-combustion motor, that makes our automotive industry the giant that it is, may be said to start with the striking of oil in Pennsylvania in 1845.

It would be grossly incorrect to say that without the reaper these inventions of the past hundred years would not have come to pass. The people in 1831 needed a quicker and less costly harvest, but they also needed more rapid communication and transportation, greater information about how to do things, and a freedom from drudgery generally. The railroads were needed to market wheat cheaply, iron was necessary for building railroads and reapers, cheaper paper and printing for the spread of information and education, the telegraph to conduct the exchange, and other labor savers to give people necessary leisure. All were dependent upon one another. The startling thing is that the vast majority of them followed the others so closely after McCormick invented his reaper in 1831. The world waited centuries for the progress of events that started in that memorable year.

The Reaper and Transportation

While the invention of the world's first reaper by Cyrus Hall McCormick in 1831 primarily brought about greater efficiency in the harvesting of grain crops, it also resulted in various other economic changes with far-reaching effects. Unquestionably it gave added impetus to the development of transportation. In all the centuries before the reaper the entire human race was chained to the soil. Drudgery, poverty, hunger, and the other grim possibilities that stalk on the borderland of famine were its lot. The century of the reaper—from 1831 to 1931—has been a century of tremendous industrial development, because the reaper and the other farm machines following it soon released two out of every three men from work on the farm, and made the work of the third lighter and more profitable.

In rapid succession let us picture the changes—from harvesting by hand with cradle and flail to the combined harvester-thresher; from ox teams to tractors; from candles to electric lights; from corduroy roads to concrete highways; from stage coach to de luxe train and motor car and airplane; from
ox cart to motor truck. And it all began with the invention of the reaper in 1831. The world may well honor the inventor of the machine that ushered in this new era of agriculture, of progress, and of freedom from humanity's age-long enslavement to the soil.

After the reaper, if not directly from it, came the long line of machines whereby agriculture has been changed from the hardest drudgery to the greatest of all industries—the machines that have conquered wilderness and desert, built new empires, founded new civilizations, set millions of men free to create new industries, converted yesterday's luxury into today's common comfort.

In 1831 and later, until the reaper came into common use, each farm was a self-contained unit where all of the family's simple wants were produced. The members of the family made home-spun clothes from wool produced on their own farm. Even soap, sugar, fuel, and artificial lighting were home products. There was nothing to buy but coffee, tea, and spices, and in lean years they even had homemade substitutes for coffee and tea. There was little need for transportation because there was little to haul. Close to 90 per cent of the population lived on farms and they were all too busy keeping the wolf from the door to afford or enjoy travel. It is true that the larger the family, the more it could harvest by hand; but by the same token the more wheat was required to feed that family. There was seldom a surplus.

Some economists have estimated that the invention of the reaper moved civilization westward at the rate of thirty miles a year. One hundred years ago the inhabited area of this country was confined mainly to a few thinly settled states on or near the Atlantic seacoast where farmers were eking out an existence by hand methods on small, unproductive farms.

What a great change the reaper brought—gradual, to be sure, but nevertheless when the sturdy sons of agriculture found that they could increase the profits of their labors on a larger acreage, their Eastern farms became too small. They pushed westward to the fertile prairies, taking their precious reapers with them.

A century ago the iron horse had just arrived. There were only a few miles of railroad, and the principal business was passenger transportation. It was not until farmers began to grow a surplus of grain that the railroads began or could begin to develop on a large scale. When the necessity for some better means of transportation arose, then the railways began to grow. The pioneer roads out of Chicago to the Pacific Coast were built across vast plains of virgin soil. The builders of these railroads knew the unlimited resources of this great expanse of territory, yet they never would have lifted a hand or driven a spike to open this vast grain-growing paradise but for the reason that they knew farmers had equipment available that would enable them to till the soil and harvest crops on an extensive scale, and thus could furnish them traffic. Not only did the surplus crops provide freight for the railroads, but when farmers had a surplus to sell they also secured money with which to buy, and this provided business for the roads both ways.

While Cyrus Hall McCormick's reaper of 1831 was the first successful attempt at mechanized agriculture, it had a very decided influence on the development of other industries. Without the reaper the railroads would not have pushed westward as rapidly. Railroad construction gave employment
to men who had been released from hand drudgery in the harvest field and also created a demand for rails, locomotives, freight and passenger cars, and various other products, which in turn gave employment to countless thousands. These thousands in turn became consumers of wheat, corn, pork, beef, and other farm products, and thus made a wider market for the farmer's surplus. This activity in turn brought more and more responsibility and profit to the transportation systems of the country. Rail and water transportation facilities expanded with rapidity during the first twenty years of the reaper century. Then the railroad came to the front and far outstripped water transport. This was probably due to the fact that geographically our country, as a whole, was better adapted to rail transport.

While the beginning of the automotive age coincided with the beginning of the twentieth century, it was not until 1905 that the motor truck began to take its place as a practical transportation unit. In that year six hundred motor trucks were in use in this country. Trucks increased rapidly, the annual increase ranging from 55 to 100 per cent until 1920, when over a million of trucks were in service. In the last ten years this figure has risen to four millions, with approximately 20 per cent, or about 800,000 trucks, doing service on farms. Today the motor truck has practically replaced horses and mules as transportation units on city streets, and because of its economy and speed it is popular with the power farmer. In industry and commerce, animal muscles could no longer stand the strain and compete with efficient machines. There still are a very few who maintain that horses are more economical for them to use in short-haul work. How much those slow-moving, animal-power units cost the community, as a whole, through slowing up traffic, with loss of time for thousands of motorists, truck operators, and street car passengers, is beyond computation.

The motor truck has also proved a valuable auxiliary to railroad transportation. Fifty-five railroads now operate 5,900 trucks, not including over 9,500 trucks operated by the Railway Express Agency and the thousands upon thousands of trucks operated by transportation companies making deliveries to the railroads. Today in industry and commerce the motor truck is a capable auxiliary of the locomotive and the steamship as a transportation unit.

The Reaper and Power Farming

During all the century of the reaper, agricultural development has traveled fast and far—its pace has been tremendous compared with the preceding centuries. The spur has been necessity; the key to it has been power. On that July day in 1831 when, in a Virginia wheat field, young Cyrus Hall McCormick proved that his invention of the reaper was a success, he did more than give the world a more efficient method of harvesting grain. He gave agriculture a new use for power. He broadened the application of animal power to farm operations by making it possible to use this power in the harvest field. The reaper was the beginning of the development of a long line of farm machines capable of utilizing horses and mules with greater efficiency in all field operations.

Twenty years after the invention of the reaper, agriculture in this country had a primary power plant of six and one-half million horsepower—all animal power. In fifty years this increased to twenty-three and one-half million horsepower through an increase in the number of work animals. In the last thirty years, however, agricultural power has expanded
to a total of about sixty-five million horsepower. Thus, while agriculture added seventeen million horsepower in the fifty years from 1850 to 1900, it has added over forty million horsepower in the last thirty years.

In 1831 farmers relied almost entirely upon human labor to cultivate and gather crops. It is true that horses and oxen were utilized for plowing, for hauling, and for transporting the families when they moved on in search of new lands; but the majority of operations on the farm were slow, tedious handwork. Almost 90 per cent of the population lived on farms, and to eke out an existence they labored from sunup until long after dark. It was a life of drudgery, privation, and heart-breaking toil.

For fifty years after McCormick's reaper became popular—the period up to 1900—farmers relied entirely on animal power. The reaper was gradually but consistently improved until it evolved into the twine binder. Machines for harvesting corn and cutting and curing hay closely followed the development of the grain machines, all with the same objective in mind—to lift the work from human shoulders and place it upon the stronger muscles of animals. Oxen, horses, and mules relieved the farmer of the heavier power tasks and served agriculture faithfully and well. But, like man, they were only bone and muscle power—subject to the same fatigue and similarly affected by climatic conditions. The present eclipse of animal power is no indication of its failure in the past. Relying solely on animals for power, agriculture was able to triple the output of every worker in a brief fifty years.

The greatest increase in our horse and mule population was between the years 1870 and 1890. From 1890 until 1919 animal power increased slowly, reaching its peak in the latter year when work animals numbered 26,436,000.

The twenty years from 1890 to 1910 were America's best years of horse farming. Undoubtedly this period marked the peak of efficiency of animal power and horse-drawn equipment. In the wake of the reaper and its successors for harvesting grain, hay, and corn, all kinds and types of machines for utilizing animal power had been developed and agriculture prospered.

During this twenty-year period a new power was being born—the internal-combustion tractor. By 1910 it had become a formidable competitor of the horse. The more adventurous farmers—the same type of hardy pioneers that were first to turn to the reaper—invested in tractors to help them in the hardest of all farm power jobs—the job of plowing. The motor truck for farm transportation was already on the horizon. Along came the World War and tractor popularity mounted.

The war created an unusual demand for animals for military purposes and thus again, spurred by necessity, farmers sought more efficient power to meet the requirements of increased production. This time the tractor stepped into the breach and replaced the horses and mules that were shipped to the front.

The end of the war saw the beginning of the end for animal power. In commercial work, keyed to an automotive age, muscle and bone could not stand the strain. In the last ten years the horse all but disappeared, as a beast of burden, from city streets. During the same period, horses and
mules have been decreasing on the farms at the rate of nearly a million animals a year, standing now at 18,762,000.

The following table gives a comprehensive picture of the increase in mechanical power on farms and the steady decrease of the use of animal power since 1919:

<table>
<thead>
<tr>
<th>Year</th>
<th>Work Animals on Farms</th>
<th>Tractors on Farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>June 1</td>
<td>4,896,000</td>
</tr>
<tr>
<td>1870</td>
<td>&quot; 1</td>
<td>8,270,000</td>
</tr>
<tr>
<td>1890</td>
<td>&quot; 1</td>
<td>17,265,000</td>
</tr>
<tr>
<td>1910</td>
<td>Apr. 15</td>
<td>24,043,000</td>
</tr>
<tr>
<td>1918</td>
<td>Jan. 1</td>
<td>26,428,000</td>
</tr>
<tr>
<td>1919</td>
<td>&quot; 1</td>
<td>26,436,000</td>
</tr>
<tr>
<td>1920</td>
<td>&quot; 1</td>
<td>25,323,000</td>
</tr>
<tr>
<td>1922</td>
<td>&quot; 1</td>
<td>24,202,000</td>
</tr>
<tr>
<td>1923</td>
<td>&quot; 1</td>
<td>23,645,000</td>
</tr>
<tr>
<td>1924</td>
<td>&quot; 1</td>
<td>22,952,000</td>
</tr>
<tr>
<td>1925</td>
<td>&quot; 1</td>
<td>22,195,000</td>
</tr>
<tr>
<td>1926</td>
<td>&quot; 1</td>
<td>21,570,000</td>
</tr>
<tr>
<td>1927</td>
<td>&quot; 1</td>
<td>20,785,000</td>
</tr>
<tr>
<td>1928</td>
<td>&quot; 1</td>
<td>19,999,000</td>
</tr>
<tr>
<td>1929</td>
<td>&quot; 1</td>
<td>19,295,000</td>
</tr>
<tr>
<td>1930</td>
<td>&quot; 1</td>
<td>18,762,000</td>
</tr>
</tbody>
</table>

Beginning with 1924, agriculture began to shake off the effects of post-war deflation and to heed the lesson of tractor efficiency taught by war-time agricultural demands. In the last six years mechanical farm power has made its way into every section of the country, and the transformation of agricultural power from an animal to a mechanical basis is rapidly taking place.

Just as the Civil War with its attendant food problem was a crisis that popularized the reaper, so the World War popularized the farm tractor. Mechanical farming began to appear in 1831 with Cyrus Hall McCormick's invention of the reaper. The tractor, key machine that solves the farmer's power problems, is a direct descendant in the original strain of power application and labor elimination. It has grown out of the reaper just as surely as the automobile is a direct descendant of the first wheeled coach.

**AMERICA TODAY THROUGH THE EYES OF 1831**

Reprinted from the Wisconsin Agriculturist, April 4, 1931.

Imagine America of 1931 without an automobile, a railroad train, or an airplane! Imagine New York City with only 1,000,000 people; Chicago, 500,000; and other cities with one-sixth their present population. Widen the picture a little and view a nation of more than 120,000,000 people without the conveniences and comforts of today, pushed back in its primitive setting of a century ago.

Impossible, one might say. Yet, if Cyrus Hall McCormick had not invented the reaper in 1831, with the consequent release of farm labor and the development of industry, something like that situation would probably
exist today. At least, in connection with the world-wide centennial of
the reaper this year, it suggests a most interesting picture of the condi-
tions and environment of 1831 carried over to the present.

Looking at the picture first statistically, one sees that in 1831
80 per cent of all persons employed in the United States were engaged
in farming. Apply that ratio to the 41,614,000 people now working for a liveli-
hood in the United States, according to the United States Census, and it
shows that 33,291,000 would be required to raise sufficient food to keep
the nation alive. But under modern conditions of mechanized agriculture
following McCormick's invention of the reaper, only 10,819,000 actual
workers are required to till the soil. The difference is 22,472,000,
representing the number of workers actually released by the reaper and
other improvements from farming for other pursuits.

Suppose America were still garnering its grain harvests with
sickle and cradle. Suppose it were still plowing with the crude imple-
ments of a century ago, and still threshing with the flail. It is easy
to see that millions, now engaged in producing comforts and conveniences
without which modern life would not seem worth living, would be required
to go to the fields to keep from starvation. It would require the labor
of these 22,472,000 men to produce food enough for America to live.

A study of occupations in the United States shows that 12,818,000
are engaged in manufacturing and mechanical pursuits. These men who make
the motor cars, radios, household goods, and the thousands of articles that
enter into modern life would be little more than half enough to meet the
shortage in farm labor if the old conditions prevailed at the present time.
All factories would have to close except those producing absolute necessities,
while other lines would have to fill the places of those retained in the
crippled industries. Transportation, including railroads, motor trucks, and
other forms, would have to yield up to its roster of 3,063,000 with the
exception of those absolutely needed for hauling necessities. The ranks of
clerical workers, numbering 3,126,000, would have to be drained; likewise
the domestic servant field, totaling 3,404,000.

From the professions, including doctors, teachers, ministers,
bankers, and lawyers, enough of a farm force would have to be recruited to
make up the deficit due to retaining sufficient workers in the occupations
already listed. Thus it is seen that America would be thrown back to the
days of the log cabin and the clearing—to the time when most people spent
their lives within the radius of a few miles of their birthplaces, and
when civilization as it is today was absolutely unknown.

Perhaps the contrast of 1831 and 1931 might be presented in a
vivid way by comparing the productive capacity of individual farm laborers
of the two periods. With the sickle, which was the harvesting tool for
many centuries, a man could cut one-half an acre of grain a day. With the
cradle he might cut two acres a day. One man could rake and bind two acres
a day. The very first reaper that McCormick put in the field had a capacity
of 10 acres a day, replacing 5 cradlers or 20 men with sickles. Today
one man with a 10-foot tractor binder can cut and bind 35 acres a day.
In 1831 it would have taken 17 men to cut that much with cradles and 17
men to bind. Thus, one man today does the work of 34 a century ago.
If the sickle were used, it would take 87 men to cut and bind in a day what
one man does today with a tractor binder.
But that isn't the limit. Two men today with a 10-foot harvester-thresher can cut, thresh, and clean 35 acres a day. These two men do the work of 87 in cutting the same crop with sickles and binding it, and 50 more men in threshing it with flails. The ultimate in labor saving is represented in two men working with a 16-foot combine which will cut, thresh, and clean 50 acres a day. These two men do the work of 200 men under the ancient methods of harvesting and threshing. In other words, it would require 100 men with sickles to cut a 50-acre field, 25 to bind, and 75 to thresh the grain with flails.

This ratio of labor saving does not apply in all the fields of agriculture. One reason is that the high speed and intensive work of the harvest does not prevail throughout the year. Yet, the fact remains that only one man is engaged in farming today where four were so engaged before the reaper was invented, and that one man today is producing two or three times as much as those four did then. So it is safe to say that one man's farm work today, in consequence of the invention of the reaper and all the improvements that have followed, is equal to that of 10 or 15 men under the old regime of hand labor.

The Birthplace of Industry

Reprinted from the Pennsylvania Farmer, March 14, 1931.

It's a "long, long trail" from the factory to the farm. The busy manufacturing plant in a congested district of a great city seems as far from the quiet countryside as the north pole from the south. Though the path may go "a-winding" and seem far indeed, yet it runs with absolute certainty from urban centers to rural regions.

There is a reason—the factory comes from the farm. The country is the birthplace of industry. Not only does it give forth the products to feed the city, where industry is, and the raw materials which the factories use, but it also cradled the dreamer and the dream which preceded modern industry. Without a certain epoch-making machine which a farmer spent his lifetime in vainly trying to design and which his son finally did invent, there would be—there could be—no industry in the sense that the twentieth century knows it, and there would be and could be no such cities as there are today.

Journey, if you will, to the historic state which has been called the "Mother of Presidents." Amidst the rolling hills and beautiful valleys of Rockbridge County, Virginia, you will find a farm called "Walnut Grove." It is a rustic setting, indeed, for the "birthplace of industry," yet here it was that a century ago the reaper was invented and the whole course of civilization was altered. It was the first step in setting mankind free from the slavery of farming by hand and making possible the surplus of labor which resulted in the development of the cities and of industry.

If it had not been for the vision of Cyrus Hall McCormick and his persistence in bringing it to a realization, America might today be the primitive land of the eighteenth century. This is because without modern labor-saving machinery on the farm, 85 per cent of our population would have to be agricultural in order to maintain life.
Take a glance at the Orient. Except for political upheavals now going on—which, incidentally, may presage great industrial development—India and China are today much as they have been during the past 5,000 years. Cities are few. Organized industry does not exist. The vast majority of the people live in villages or on tiny farms, eking out the barest kind of a living from the soil by hand labor. It takes 90 per cent or more of the 700,000,000 people—nearly half the population of the earth—to produce even the food that their miserable existence demands. It is only too common in these barren countries for people to have just one wish, a full meal before they die!

There was a time when 95 per cent of the population of the United States lived on farms and had to work very hard to produce enough for their own requirements. From colonial days until 1850 or 1860, when reaper production grew larger, cities were only an incident in our national life. The people were scattered throughout the valleys and forests and plains, knowing no limit on their working hours as they grubbed for a living. There was scarcely any such thing in those days as export of food in wholesale quantities.

How different things are today! Only about 25 per cent of America's population actually are farmers; yet our overproduction of food is an embarrassment to us. It has been said that another nation with the same population as ours could live frugally on the food that we waste or throw away. As it is, we have for decades been exporting enough food to supply scores of millions of people.

Even though America's farm population has steadily dwindled, its production of foodstuffs has gone forward. There is only one answer to this—increased efficiency in farming, due in turn to advance in machinery. And the great era of farm machinery began with the reaper in 1831.

It took many years, of course, to produce and market the harvesting machine in such quantities as to increase farm efficiency to the point of setting labor free in noticeable quantities. By the Civil War, however, thousands of reapers were being manufactured annually at the Chicago plant—McCormick was compelled to move there early in his manufacturing career in order to reach his market most effectively—and the prologue to the modern industrial drama was being written. It was temporarily stayed by the western migration after the Civil War, but along in the seventies it began in earnest.

By 1880 the United States was 29 per cent urban and only 71 per cent rural, whereas in 1860 it had been 16 per cent urban and 84 per cent rural. Continuing the comparison, in 1890 the figures were 35 per cent urban and 65 per cent rural; in 1900, 40 per cent and 60 per cent; in 1910, 46 per cent and 54 per cent; in 1920, 51 per cent and 49 per cent; and in 1930, 62 per cent and 38 per cent. Thus in the last decade the shift of the United States from a rural nation to an urban nation took place. The census of 1830 showed that 93 per cent of the people of the United States lived in the country and only 7 per cent in the city. This proportion had remained practically stationary for half a century, at least. What would have happened if the reaper had never been invented is only speculation, of course; yet it is beyond question that the vast majority of the people would have had to remain chained to the soil.
Young McCormick's genius enabled farmers to get much more results from much less work. The resultant release of labor started the migration to the cities, with the consequent development of new enterprises. The necessity of work became the Mother of invention, and modern industry came into being.

Today it is as quiet on Walnut Grove Farm in Virginia as a hundred years ago. The farmhouse where Cyrus Hall McCormick as a boy lived and dreamed stands today practically unchanged. The farm forge shop where the reaper was born is now as it was in that fateful midsummer; and so, too, is the small field where in July, 1831, the boy dreamer gave his harvesting machine its first public trial. What a feverish, anxious, yet eager hour that must have been for him! Neighbors gathered out of curiosity. The young inventor walked behind his machine, while a negro servant, who had helped him build it, carried a rake to keep the platform clear of the cut grain. Farm hands with sickles, scythes, and cradles were there. These were the instruments of the harvest, many centuries old; they were idle as the men who carried them watched the new machine at its work, little realizing that they were witnesses to the beginning of a new age of farming out of which modern industry was to grow.

Cyrus Hall McCormick, the Inventor

Cyrus Hall McCormick was born and reared on Walnut Grove Farm, the old McCormick homestead, near Steele's Tavern, Virginia, and knew full well that the harvest season brought the most strenuous work of the year. When but a boy of fifteen, the scarcity of good cradlers demanded that Cyrus take his place beside the men in the fields. However, the heavy cradle was too much for his young muscles and he found relief by making a special light cradle for his own use.

Cyrus' father, Robert McCormick, attacked more directly the problem of cutting grain by building a machine to be drawn by horse power. Robert made his first attempt in 1816, when Cyrus was seven years old, and his last effort was made early in the harvest of 1831, after Cyrus himself had begun to take considerable interest in the problem. After the unsuccessful trial in 1831, Robert McCormick concluded that the reaper problem could not be solved and discarded his experimental machine.

Perhaps young Cyrus had helped his father build the last machine which failed so utterly that the elder McCormick abandoned the idea entirely—perhaps not. The fact remains that the young man had the courage and tenacity to keep on trying. He had ideas of his own, entirely different from any used by his father. He believed that a machine could be built to reap grain faster and better and more cheaply than it could possibly be done with the cradle.

History tells us that within six weeks after the last failure of his father's machine in May, 1831, Cyrus developed his own new set of principles, made one or more models to satisfy himself that he was on the right track, then built a reaper for public trial which proved that the greatest farm problem had at last been solved. The first public test was held in a small field of late wheat in July, 1831. The new reaper worked well, though Cyrus was alone in believing that it would some day come into popular favor.
It is interesting to note that in this first reaper, built one hundred years ago, McCormick combined in their true balance and proportion seven basic principles which have to this very day been considered essential in grain-cutting machines. The seven principles include the straight cutting knife with reciprocal motion, fingers or guards extending in front of the knife, the reel, the platform, the main wheel, the divider, and forward draft from one side. True, these principles have been improved upon from time to time; but none has been added, none has been dropped.

McCormick was always the sternest critic of his own reaper, and he worked constantly to improve it. This desire to perfect the reaper before offering it for sale accounts for the fact that he did not apply for a patent until 1834. It was 1840 before he was sufficiently satisfied with his machine to seek a wide market for it.

The invention of the reaper marked the beginning of a new era in agriculture. As soon as farmers saw that they could harvest more grain than they could plant, the demand for better plows, for tillage tools, and for grain drills arose. Inventors answered these demands, and thus began the long list of machines which followed in the wake of McCormick's reaper.

Cyrus Hall McCormick, the Manufacturer

In July, 1831, Cyrus Hall McCormick invented, built, and displayed in a public trial the world's first successful reaper. Other men, both in America and England, had attempted to build a mechanical grain-cutting machine, but few of them had ever gone beyond crude plans submitted to the patent office. None of them had ever built a reaper that proved a success in the field. Young Cyrus spent three years in further experimentation before he was sufficiently satisfied with his machine to apply for a patent. The McCormick reaper was patented June 21, 1834.

Unlike most men gifted with true inventive genius, Cyrus Hall McCormick devoted the rest of his long and busy life in perfecting his one great invention, the reaper, and making it more and more available to farmers. The harvest season in Virginia offered but a short period each year for testing improvements; so development of the reaper was of necessity slow. New machines were built almost every year, and the young inventor incorporated his latest changes in each new model. By 1840 Cyrus believed his reaper was sufficiently perfected to seek a wider market for it.

The little log forge shop in which the first reaper was built served as the only factory until 1843. On the McCormick homestead were timber, a sawmill, and a carpenter shop, as well as the forge shop. The steel cutting knives required especially fine workmanship, and they were made for a time by John McCown, a local blacksmith who operated a tilt-hammer shop, and later by Selah Holbrook, of Port Republic, twenty miles away. Robert, the inventor's father, and Leander, a brother, and a few farm helpers formed the factory personnel as long as the reapers were built at home.

Winter and spring at Walnut Grove were busy seasons. During these periods reapers were built and orders were solicited. Farmers would not, as a rule, order machines until they were assured of good crops and fair prices. Also the improvements made from time to time were of doubtful
value until they actually could be tested in the harvest fields. Building reapers for anticipated sales was entirely too speculative at that time; so production was limited to actual sales.

The first reaper sales were made in 1840, when two machines were sold for the harvest of 1841. In the latter year important changes were made in the cutting apparatus, including the reversing of the angle of serrations on the knife every inch and a half. After 1841 McCormick was for the first time satisfied with the operation of his machine. He advertised that from that time on "purchasers would run no risk since, if the reapers for 1842 were not strong and durable, and would not cut fifteen acres a day and save one bushel of wheat per acre, ordinarily lost by shelling when the cradle was used, they could be returned." Seven reapers were sold for the harvest of 1842. Sales jumped to 29 in 1843 and to 50 in 1844.

This sudden demand for reapers created a new problem for the little factory on Walnut Grove Farm. How could so many machines be built? Perhaps McCormick realized from the very beginning that ultimately he must have a big factory in a wheat-growing country where he could supervise both production and sales and at the same time avoid heavy transportation charges. Such a move at that time was impossible because of limited capital; so Cyrus contracted with various firms—first in Brockport, New York, and Cincinnati, Ohio, and later in other cities—to manufacture reapers for their respective communities. Some of these contracts provided that a certain number of machines should be built for which McCormick was to pay the manufacturer a stipulated sum; others were licensed to build an unlimited number of reapers for a specific territory, the manufacturer to pay McCormick a royalty on each machine built. Length of the contracts varied from one to five years. During this time Cyrus' father and brothers continued production at home in the little log forge shop, while Cyrus himself was busy traveling over the country, spreading the reaper gospel generally and selling machines to anyone whom he believed financially able to buy.

Arrangements with licensed manufacturers were never very satisfactory. McCormick insisted upon quality above all things and those not as interested as himself in the reaper used inferior materials, poorly put together. Unexpected orders coming in from the new western plains, combined with trouble with his licensed manufacturers, led to his move to Chicago in 1847. He established a small factory on the north bank of the Chicago River just east of the present Michigan Boulevard bridge. One by one his contracts with manufacturers expired and were not renewed. McCormick preferred to forge ahead alone, with the reapers built under his personal supervision by men whom he could trust.

The new Chicago home, known as McCormick's Reaper Factory, was a marvel of that pioneer day. It was a three-story brick building, 100 feet by 30 feet in ground area. A steam engine operated saws, lathes, planing machines, and grinding stones. There were six forges in the first factory building and 33 men were employed. Cyrus' younger brothers, William S. and Leander J., came to Chicago with him and later joined him as partners. This was just the beginning of a manufacturing plant that was to grow by leaps and bounds. Within eight years the factory had a daily capacity of 40 machines. Four thousand reapers were built in 1856.

McCormick knew but one standard by which to measure the efficiency of his reapers—quality. He used the best materials obtainable and built
the machines to give years of service to the farmer. He had provided as a background for his reaper a new kind of factory where, though he doubtless knew it not, he was putting into practice the first steps toward standardization and mass production, with a sternly enforced code to insure quality in the finished product.

During the fifty years following the invention of the reaper in 1831, McCormick saw his original machine grow into the steel-frame twine binder. Slowly but surely it had progressed through the self-rake reaper, the Marsh harvester, the wire binder, and the wood-frame twine binder. The inventor had watched his reaper evolve from a machine replacing four or five cradlers in the harvest field into one which enabled one man to cut and bind twenty acres or more in a day.

The McCormick Reaper Factory on the Chicago River was completely destroyed by the great Chicago fire in 1871. Here again the inventor's indomitable courage was not to be downed. A few days before the fire he had acquired a new factory site on the southwest side of the city—far away from the crowded center of Chicago. To insure plenty of room for growth, he bought a wide expanse of prairie land where his vacant acres might serve first as testing fields and then for the expanding industry he foresaw. On this new site was built McCormick Works, which soon became and ever since has been the greatest farm implement factory in the world.

Cyrus Hall McCormick, the Advertiser

In July, 1831, Cyrus Hall McCormick, a young Virginia farmer, invented and displayed at a public trial the world's first successful reaper.

During 1832 and 1833 McCormick made important changes and improvements in his reaper and successfully exhibited it at several public trials in the vicinity of Lexington. In 1833 the new machine attracted the attention of the editor of the Lexington Union and the September 14 issue carried a long account of the trial. The article included a complete description of the construction and operation of the reaper, along with certificates from Colonel James McDowell, of Cherry Grove, and other influential citizens of Rockbridge County. This was the first published account of the reaping machine which was to take the country by storm. The favorable notice was soon reprinted by the Farmers' Register and several New York papers.

McCormick was quick to realize the value of journalistic recognition. Soon he was spreading the good word of his reaper in such prominent publications as the Prairie Farmer, of Chicago; the Ohio Cultivator, of Columbus; the Michigan Farmer, of Detroit; the Genesee Farmer, of Rochester; and the Cultivator, of Albany. He had cuts made of the reaper for the information of farmers who had not the opportunity of viewing the actual machine. Because these early farm periodicals attempted to keep their subscribers informed about new machines, the editors published interesting accounts of the reaper—often adding their own endorsements. Public trials were news events, and the glowing reports which followed made interesting reading. In addition to this type of publicity, McCormick used column after column of space for long advertisements in which he loudly proclaimed his "Patent Virginia Reaper" the first in the field, and therefore the model after which all others were copied. McCormick was a firm believer in advertising. "To sell, I must advertise," he said. Thus he
began, nearly a hundred years ago, a campaign of steady, consistent advertising in the leading farm and commercial periodicals—a practice which has been closely followed by efficient companies right to the present day.

Advertising was far from being an art in McCormick's early days. His task was to educate a nation of farmers, accustomed to look upon new things with skepticism, to the use of a mechanical grain cutter. He had first to demonstrate the utility of his reaper, then show how it could be purchased by a class of people with whom money was scarce.

As a result, his advertisements usually consisted of an illustration showing a reaper being pulled at a trot by a pair of high-stepping horses and a man dressed in Sunday clothes raking the platform, and this was followed by a long mechanical description of the machine and numerous testimonials of prominent men who might or might not be farmers. The idea was to convey the impression that the McCormick reaper was a light draft machine and that raking off the cut grain was a much easier task than swinging a heavy cradle.

Testimonials often came from men of social or political prominence, who had never seen a reaper operate but who believed that it should be a boon to agriculture generally. Small type was used in order to pack more words into each column. We of today would never stop to read such wordy advertisements, but to the farmer of nearly a hundred years ago they were sources of much information. In the illustrations the parts of the machine were almost invariably numbered to make it easier to follow the mechanical description.

One of the practices of the day, followed by McCormick as well as other manufacturers, was to appoint an influential newspaper or farm magazine editor as sales representative. These special salesmen were expected to do nothing more than forward orders or inquiries for reapers and keep machines on display where farmers could examine them. It followed naturally, of course, that such an editor would favor the machine in his paper.

Competitive field trials were a source of amusement and were closely followed by farmers and editors alike. Somehow this form of competition appealed to the sport-loving nature of rural people who had little that was exciting or unusual to look forward to. Heralded long in advance by newspapers and agricultural periodicals, those trials were interesting and exciting, though the outcome meant little in proving the actual worth of the machine. However, publicity was needed in order to popularize the reaper and, for that reason, if no other, competitive trials were worth while.

The forerunner of present direct-mail advertising methods dates back to the early days of McCormick. The need for information on operating the reaper made it necessary to print complete instructions to go with each machine sold. Those pieces were more detailed than the regular newspaper and periodical announcements and were often mailed or delivered personally to prospective purchasers. Local agents who had territories too large to permit visiting each farmer frequently mailed personal letters and enclosed printed descriptions of the reaper. McCormick also prepared large handbills which were posted throughout the towns and countryside and were used by village merchants for wrapping the purchases of their farmer customers.
As the competition among reaper manufacturers became more keen, McCormick attacked his rivals openly and in no uncertain terms. He often wrote letters to editors for publication, in which he stated, "I warrant my reapers superior to Hussey's and all others. I have a reputation to maintain. Let a farmer take both and keep the one which he likes best." Little was left for the imagination of the reader. McCormick's challenges to competitors and his statements as to the merits of his machines were set forth in the high-flown language characteristic of the day, but they carried a tone of sincerity that was bound to be convincing.

McCormick's harvesting machines carried off highest honors in every World's Fair at which he exhibited, from 1851 to 1873. These included the Exhibition in London, 1851; Paris, 1855; Hamburg, 1863; and Vienna, 1873. Catalogs and newspaper advertisements carried illustrations of the Medals of Honor won, with the intent of adding Old World prestige to his American machines.

With no system or service of advertising campaigns to guide him, McCormick worked out by trial and error the methods that would serve him best. It is interesting to note that his methods of publicity were so forward-looking that many of them are in use today without essential change except for the advancements and refinements which time has brought.

Cyrus Hall McCormick, the Salesman

The invention of the world's first successful reaper in July, 1831, would have meant little to agriculture if a method of making that machine widely available to farmers had not also been devised. Cyrus Hall McCormick invented a machine which, if put to work upon the farms of America, would break the bottle neck in existing grain-production methods. He then went further and developed a manufacturing system whereby his reapers could be produced in large numbers. His next step was to work out a method of advertising by which he could tell many people in a short time about the advantages offered by his invention. However, all this work would have been in vain had not McCormick taken the final step of introducing a new and aggressive system of selling direct to the farmer on a liberal credit basis.

Except for the purposes of discussion, the manufacturing, advertising, and selling of McCormick's reapers cannot be separated. All three were developed and grew together. During the early days, when the log forge shop on Walnut Grove Farm was the only reaper factory, the inventor himself was the only salesman. In 1844 an unexpected order for eight reapers coming in from the West caused McCormick to investigate his vast new market. He traveled through New York, Ohio, Wisconsin, Illinois, and Missouri, his pockets filled with order blanks, explaining to farmers the value of his reaper. His eyes were opened, his imagination was challenged. He wrote to his family that while reapers were luxuries in Virginia they were absolute necessities in Ohio, Illinois, and on the great plains of the West.

It was after this Western trip that McCormick began preparations for his ultimate move to Chicago. His contracts with licensed manufacturers were but preliminary movements which were to carry him over until the time when he could build a big factory of his own, strategically situated in the grain-producing regions.
The first licensed manufacturers were also the first selling agents. After 1846, and more particularly following McCormick's move to Chicago in 1847, the development of a new manufacturing method and an effective sales system progressed hand in hand. Gradually production increased at the new Chicago factory, and gradually agents and subagents were appointed to sell reapers in every section of the country where grain was grown. By 1855 most of the states in the Union and much of Eastern Canada were covered by a network of McCormick agencies.

Pressing work at the factory left Cyrus and his brothers less and less time for traveling in the field. Cyrus spent much time in developing and testing improvements to make his reaper increasingly valuable to the farmer, while his brothers supervised production of the machines. During the harvest season, however, they traveled over the grain country, helping agents to defeat competitors in field contests, studying their machines in operation, and talking to farmers to get their views on possible improvements. These trips also gave McCormick an opportunity to see what advancement his competitors were making and to detect possible infringements upon his patents. As the reputation of the McCormick reaper became more widespread, the name of Cyrus Hall McCormick became familiar in every rural community. Farmers considered it an honor to have Cyrus or one of his brothers visit them and after such visits were usually sold on his machine for life.

It was not until about 1848 or 1849 that written contracts began to be made with appointed agents. There was no common basis for these contracts, each usually containing an entirely different, even though similar, arrangement with the agent. The salary or commission depended upon the territory, the strength of the competition in that particular region, and the ability of the man to sell reapers and make collections. It was required that agents have sufficient mechanical skill to assemble harvesting machines and start them out for the farmer. Agents also carried stocks of repair parts and had to be able to repair machines in the field in case of breakdown. Quite naturally, too, the agents were the principal distributors of advertising material, the better and more eloquent ones often supplying suggestions for new advertisements and new sales arguments to be used in the printed "sales talks" sent out periodically to all men in the field.

The first reapers built at Walnut Grove were sold for cash, but a liberal credit system was soon adopted. The farmer was required to pay the freight and one-third of the purchase price upon delivery of his machine, the remainder to be paid December 1 with interest from July 1. It often occurred that a responsible farmer paid only the freight upon delivery and payment for the machine was taken care of in the fall or winter when wheat, corn, or livestock could be sold. Although each agency contract clearly stated that suit should be started immediately upon a farmer's failure to pay his reaper notes, it is a fact that for many years never a case was brought into court. The general good will of the farmers meant too much to McCormick to run the risk of lessening it by legal procedure.

As sales methods for the field force became more and more systematized, so also did the methods of the central directing force at the office in Chicago. Among other modern office methods, maps of the grain-producing areas of the United States and Canada were prepared. These maps were divided into sections or sales districts and carried the names of special and local agents as well as the machine sales in the different districts from year to year.
The position at the head of the long list of harvesting machine manufacturers which was gained and held by Cyrus Hall McCormick cannot be attributed solely to the fact that he invented the world's first successful reaper. The invention, it is true, was an achievement worthy of the world's praise; but McCormick's complete success was due to his exceptional ability to follow a job through. He alone was able to visualize fully the value of his invention to all mankind. While others saw only a limited trade, he set about to originate a means of putting a reaper on every farm. The fight against the inertia and skepticism of farmers and the prejudice of farm laborers was a hard one. Improvements over the original reaper were made as fast as experimentation proved such action wise.

This year, while the centennial of the reaper is being commemorated throughout the world, we honor McCormick the Salesman on an equal plane with McCormick the Inventor, McCormick the Manufacturer, and McCormick the Advertiser.

THE SONG OF THE REAPER

Greatest of all original American songs is the century-old song of the harvester. It echoes around the earth, singing of progress and plenty—a typical American theme, a simple neighborhood folk song now grown into a resounding world-wide chorus.

Every month in the year somewhere in the world the music of the American-made reaper, the binder, and the combine may be heard in the fields. In January the harvest goes busily on in New Zealand and is coming to a close in the Argentine. In February and March the song of the harvester is heard in East India, upper Egypt, and Chile; in April in lower Egypt, Asia Minor, and Mexico. In May it is heard in the United States for the first time in the year as Texas begins the harvest—at the same time as in Algiers, central Asia, China, and Japan. In June it is heard in Turkey, Spain, and southern France, and, moving northward in the United States, in California, Tennessee, Virginia, Kansas, Kentucky, Utah, and Missouri. The grain fields of Roumania, Austria, Hungary, southern Russia, Germany, Switzerland, France, southern England, eastern Canada, and the central United States lift the chorus in July. In August the harvesters are working in Holland, Belgium, Great Britain, Denmark, Poland, western Canada, and the Dakotas. In September and continuing in October they sweep on farther north into Scotland, Sweden, Norway, northern Russia, and Siberia. November finds the harvest on in South Africa and in Peru. And in December the never-ending song is heard in full concord in the Argentine, in Uruguay, and in Australia.

All this world-wide symphony of the modern harvest had a modest, unheralded beginning. It began as a simple melody conceived in a Virginia valley just one hundred years ago—a melody heard for the first time in 1831 by a group of friends and neighbors and workers who had gathered in a wheat-field near Steele's Tavern to watch the first public test of Cyrus Hall McCormick's new invention. Little did these people realize, as the steady click of the knife came to their ears while this machine successfully cut grain, that they were hearing a new song of American achievement, destined to resound to the ends of the earth.

Picture, for a moment, everyday life in 1831 in contrast with today. The age of machines had not yet arrived, nor even been foretold. No shrieking locomotive whistle pierced the ear, for only a few people in all the land had...
No hum and roar of giant factories, for there were as yet no factories. No whirl of the propeller blades of airplanes, for in 1831 such creations were far below the horizon of man's mind. No chugging motors, no warning auto horns, not even a dream of the machine age that was coming.

The quiet of the countryside—and practically all America was countryside—was broken only by such sounds as the songs of birds, the lowing of cattle, and the creaking of ox carts. Perhaps the men in the harvest fields broke the monotony of their labors with a song. Perhaps not! Harvesting was nothing to sing about in 1831. It was pushing labor. Day after day men with strong backs and strong arms swung the heavy cradle through the grain, laying it down for other men to bind into sheaves. They were working against time, these men, trying to save every wisp of precious wheat lest nature should suddenly decide to recall her bounty. Stooping and swinging, always swinging and stooping, while the harvest sun poured down its relentless heat to wilt strong bodies and hearts. But these workers were accustomed to this battle of the harvest. Had they not always garnered the grain in this way? Had not their forefathers thus for centuries made use of the flail and the reaping hook? Yes, long before the time when Ruth gleaned in the fields of Boaz. And were not practically all people compelled to work in the harvest field that they might have bread enough until the next harvest? The ways of the harvest in 1831 were ways known to all men, ways that had been tried by time immemorial.

Into this picture came the song of the reaper. Cyrus Hall McCormick, a young Virginia farm boy, had watched his father make several vain efforts to perfect a mechanical device that would cut grain. He somehow came to believe that he could solve the problem. He was only twenty-two. Gifted with natural mechanical ability and rare courage and perseverance, he started work on his reaper in May. The forge shop on his father's farm found him busy early and late. There, with the help of a faithful slave, he fashioned the wood and iron parts. John McCown, a skilled blacksmith on South River, made to the boy's order a knife with a saw-toothed edge. McCormick had a strange idea that if he could make this knife move back and forth fast enough and could hold the grain up to it, it would cut just as a saw cuts. To hold the grain up to the knife, and to lay it down smoothly after cutting, he planned a revolving device called a "reel." Back of the knife he built a platform of boards, which would catch the cut grain and from which it could be raked to the ground. He believed that he could make his knife vibrate and his reel revolve by gears and belts which would get their motion from one large wheel as it traveled over the ground.

By July his idea had assumed tangible form, and his reaper was ready for its initial trial. A field of grain had been left standing near Steele's Tavern—a few acres which the cradlers could quickly cut after the new contraption had failed, just as all other similar devices had failed.

But, miracle of miracles! McCormick's reaper moved down the field, drawn by one horse; the grain fell in a steady stream on the platform; a farm hand, stumbling and half running to keep up with the machine, raked the cut grain onto the stubble. The few assembled friends and neighbors heard the vibrating knife, the gears, and the reel singing for the first time the victorious song of the reaper—the song that was to become America's song of progress and plenty.
Not even McCormick could see the development that was to come in the wake of his invention, but he had faith in the future. He believed that he held the key to the mechanical harvest. He improved his reaper for the harvest of the following year, and in 1834 he took out his first patent. Fifteen years later the song of the reaper broke the silence of many fields in the United States, and in 1851 it was heard for the first time in a foreign wheatfield.

Today that is heard everywhere. The simple American reaper melody of 1831 has grown into a complex symphony in which the song of the flail, the song of the motor, and the song of the reaper are blended in the inspiring music of the harvester-thresher.
The sickle or reaping hook, as it was called, was for centuries the most efficient method of harvesting wheat. With the sickle or reaping hook one man could cut from one-half to one acre in a hard day's work. The cut grain was later bound by hand.

Illustration 1-20001
The scythe was the companion tool to the reaping hook or sickle. It was always used for mowing grass, but sometimes oats and barley were cut with it. It was not generally used for cutting wheat. With the scythe, a man could cut up to three acres a day.

Illustration I-25449
The cradle was the most efficient means of cutting grain before McCormick's invention of the reaper in 1831. The cradle consisted of a broad scythe with a light frame of four wooden fingers attached to it. The advantage of the cradle was that by a turn to the left the operator could throw the cut grain into a swath, ready to be raked and bound into sheaves. This implement was introduced in America about 1776, according to Professor Brewer of Yale, and was the common instrument of grain harvesting as late as 1840. In cradling grain, two acres was considered a day's work.
The McCormick home on Walnut Grove Farm, near Steele's Tavern, Rockbridge County, Va. Here lived Cyrus Hall McCormick when, as a young man of 22, he invented the first reaper in 1831.

Cyrus Hall McCormick conceived plans for his reaper, built and tested it, and then remodeled it for public trial, all within six weeks' time. None but a most determined and energetic man could have stood up under such strenuous labor. Far into the night McCormick toiled in order to complete the world's first reaper for the harvest of 1831. A trusted negro helper, Jo Anderson, assisted him in the shop.

The forge shop on the McCormick farm, Walnut Grove, near Steele's Tavern, Va., as it appeared in 1831 when Cyrus Hall McCormick invented his first reaper. In the foreground is to be seen the reaper in its early stage. This forge shop still stands.

Cyrus Hall McCormick (1809-1884), inventor of the world's first successful reaper and founder of the harvesting machine industry, McCormick was but 22 years of age when his invention was given its first public test in July, 1831, in a field near Steele's Tavern, Rockbridge County, Virginia.
Cyrus Hall McCormick's Reaper, invented on Walnut Grove Farm, the McCormick homestead, near Steele's Tavern, Va., in 1831, showing the wide master wheel which carried most of the weight of the machine and, through ground traction, supplied power to operate the reel and the reciprocal knife. In this, the world's first reaper, were incorporated the following seven basic principles which have ever since been found essential in virtually all grain-cutting machines: 1. the reciprocal knife; 2. fingers or guards; 3. the revolving reel; 4. platform; 5. the master wheel; 6. forward draft; and 7. divider. This machine with its two-man crew would cut as much grain in a day as 4 or 5 men with cradles or 12 to 16 men with reaping hooks.

Rear view of the World's First Reaper, invented by Cyrus Hall McCormick in 1831. While this new machine required only two people for operation, a man or boy to ride the horse and a man to rake the cut grain off the platform, it cut as much grain in a day as 4 or 5 men with cradles.

Cyrus Hall McCormick in his hour of triumph. The young inventor, tall, square-shouldered, purposeful, is striding behind his masterpiece, the World's First Reaper. A boy is riding the horse, and Jo Anderson, a slave, is raking the cut grain from the platform. Friends and neighbors are gathered in the field to witness this important test. In the distance are the Blue Ridge Mountains. The building on the left is Steele's Tavern. A covered wagon passes along the roadway, headed for the great West. This photograph is a reproduction of a painting by the famous artist, N. C. Wyeth.
Even though a crew of several men was required to bind the grain cut by Cyrus Hall McCormick’s Reaper, invented in 1831, the work of harvesting was greatly speeded up as compared with the old hand methods. The reaper, with its two-man crew, could cut as much grain in a day as 4 or 5 men with cradles or 12 to 16 men with reaping hooks, thus releasing the extra hands for binding and shocking the cut grain.

Illustration No. 277

The World’s First Reaper, invented by Cyrus Hall McCormick in 1831, at work in the field. This machine would cut 6 to 8 acres a day, and 4 or 5 hand binders were required to bind up and shock the grain. In addition, a man or boy was needed to ride the horse, and a man to rake the platform.

Illustration No. 275

A McCormick Patent Reaping and Mowing Machine built in 1857. This machine was manufactured between the years 1852 and 1865, with various improvements being made from time to time. Note that seats had been added for both the raker and driver. This machine also cut a wider swath than did McCormick’s first reaper, invented in 1831.

Illustration 1-64-S

A McCormick Patent Reaping and Mowing Machine of 1857 at work in the field. This machine, a combination reaper and mower, was built between the years 1852 and 1865. Chief among the improvements over McCormick’s first reaper, invented in 1831, were seats for the raker and driver, cutting knife made in sections instead of one piece, and an all-metal main wheel. This machine also cut a wider swath than the first reaper and was pulled by two horses.
The McCormick Automatic Self-Rake Reaper was originally patented in 1858 and was manufactured and sold in large numbers from 1862 to about 1875. This machine was known as McCormick's "Old Reliable." An automatic rake swept the cut grain off the platform, depositing it in neat gavels on the ground, ready to be bound into bundles by the hand binders. The "Old Reliable" was a one-man machine; thus another worker was released to aid in other harvest jobs.

Illustration I-1142-T
McCormick's "Old Reliable" Automatic Self-Rake Reaper of 1864 at work in the field. Note how the mechanical rake swept the cut grain off the platform and deposited it in neat gavels ready to be bound. A crew of 4 or 5 men was required to do the binding. This type of harvester was first manufactured and sold by McCormick in 1862. Its popularity among farmers continued until 1875 when it was replaced by a more efficient machine brought out by McCormick.

Illustration No. 182
The McCormick "Old Reliable" Automatic Self-Rake Reaper of 1867. An automatic rake, which swept the cut grain off the platform, replaced the man who formerly rode on the machine to do this work, thus releasing another man to help the hand binders. A crew of 4 or 5 persons was required to bind the grain into bundles as it was cut.

Illustration No. 276
The McCormick "Advance" Combined Reaper and Mower. This machine was manufactured and sold by McCormick from 1869 to 1879. The "Advance" was a combined reaper and mower, with the automatic rake built as part of the reel. Platform and reel were removable so the machine could be used as a straight hay mower. The illustration shows it as a reaper.
The McCormick Harvester of the Marsh type, built from 1875 to 1883, consisted of the same cutting mechanism as McCormick's earlier reapers, with an elevator and binding platform added. Two men rode on the platform, binding the grain by hand as it was delivered to them by the elevator. This machine was patented as early as 1858 but was not put into general use until 1875. With the Marsh type of harvester, two men bound the cut grain, while the earlier reapers had required a crew of 4 or 5 men to do the binding.

Illustration No. 440
McCormick Harvester and Wire Binder of 1876 at work in the field. This was the first practical self-binder ever built. People traveled miles to see the machine, controlled by one man, which cut and bound grain in a single operation. McCormick built and sold 50,000 of these binders between 1877 and 1885.

Illustration No. 103
McCormick Harvester and Twine Binder manufactured in 1881. This was McCormick's first binder which tied the bundles with twine. After the development of this machine only minor improvements, tending to give greater durability and lighter draft, were added.

Illustration 1-39494
The McCormick Light Steel Binder built in 1888. This was an improvement over the first steel binder of 1885. The knotter was improved for the first time since the twine binder came into existence. Improvements in the reel construction were made, and an adjustable canvas grain shield was added on the rear of the platform.
The McCormick tractor binder, which succeeded horse-drawn grain binders in the development of grain harvesting equipment, is pulled and power-operated by the farm tractor. Power from the tractor is transmitted to the binder by means of power-take-off shaft, attachable at the rear of all McCormick farm tractors. McCormick tractor binders do more work than earlier horse-drawn binders, because tractors travel faster and tractor binders are designed and built to operate at faster speeds.

In conditions where the grain crop is ripening unevenly, or where there will be a delay in threshing, the crop can be cut hours or days sooner and laid gently on the stubble with the McCormick power-operated windrower as shown here. In the fluffy windrows, the cut grain is protected against shattering by wind and rain, and it is permitted to ripen thoroughly for threshing. Then, when the grain is ready for threshing, the McCormick harvester-thresher, with pick-up attachment, moves into the field, lifts the windrowed crop gently into the machine and threshes it quickly and easily without loss.

Small acreages of threshable crops require relatively small harvester-threshers. Here a small McCormick harvester-thresher being pulled by a McCormick tractor is cutting and threshing a six-foot swath of standing wheat in one operation as it moves through the field. Before the days of the harvester-thresher, crops were threshed by a machine known as the stationary thresher. Then, the crop was first cut and bound in bundles by the grain binder. Bundles were manually arranged in shocks (shocked) in the field. Later the bundles were loaded on wagons and hauled to the thresher.

Self-propelled combines are the latest and most modern grain harvesting machines. Here one man is completing the harvest speedily and efficiently with the McCormick self-propelled harvester-thresher. Where once the harvest meant long days and weeks of back-breaking toil, the harvest now moves swiftly, smoothly, and surely across the land, thanks to the modern machines developed and supplied by American industry.