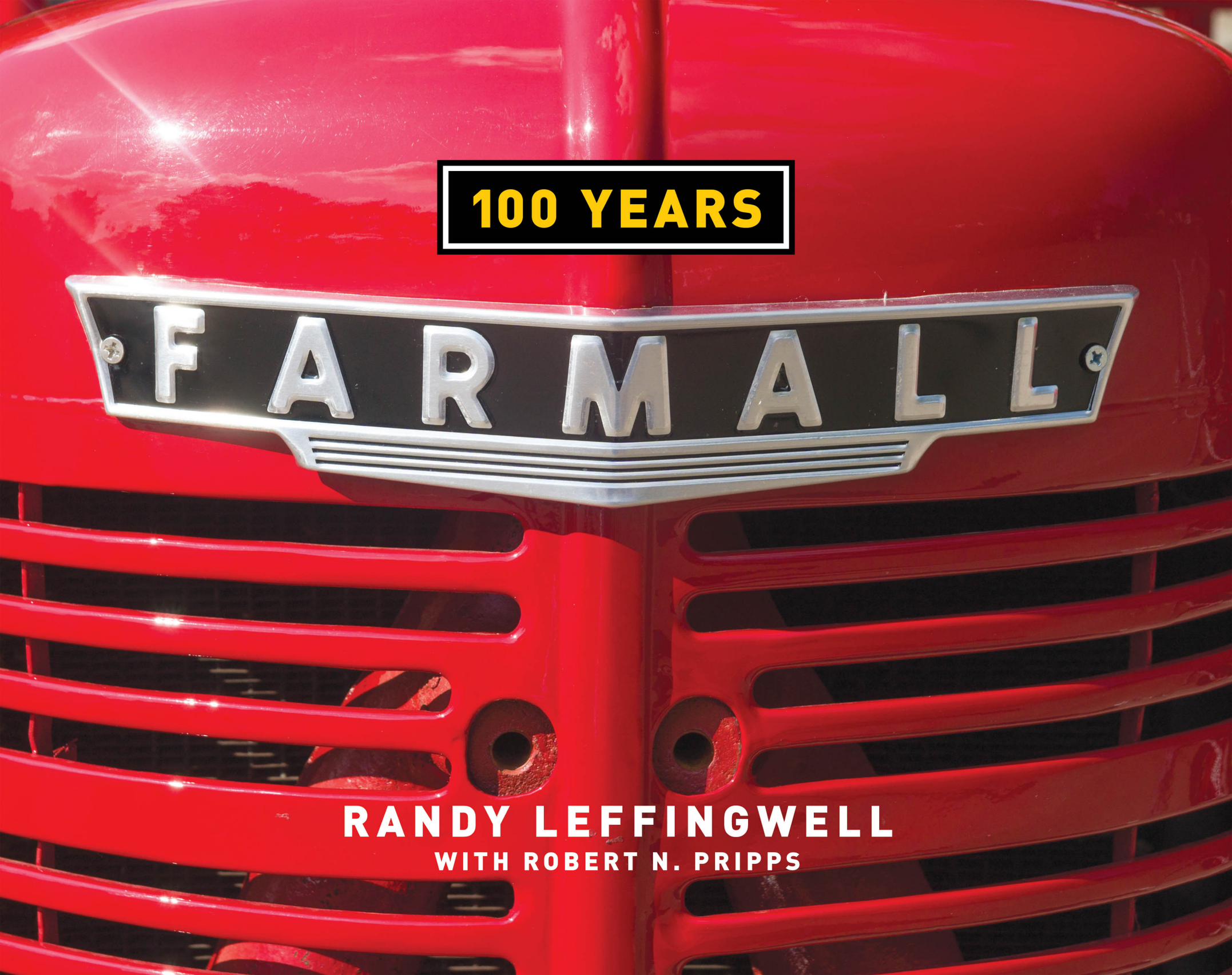

RANDY LEFFINGWELL

WITH ROBERT N. PRIPPS

100 YEARS

FARMALL


FARMALL
240
FARMALL
340
FARMALL

100 YEARS

FARMALL

RANDY LEFFINGWELL

WITH ROBERT N. PRIPPS


INTERNATIONAL
INTERNATIONAL HARVESTER CORP.
TRACTOR WORKS
CHICAGO
ILL.
INTERNATIONAL
8-16
KEROSENE
TRACTOR
INTERNATIONAL
8-16
KEROSENE
TRACTOR

CONTENTS

ACKNOWLEDGMENTS

As with my first tractor book in 1999, I must thank my friend and colleague Guy Fay. He has practically made the study of International Harvester Corporation (ICH), and its tractor and implement development, his life's work. His insight and understanding of how IHC and Farmall have affected the history of mechanized farming are second to none.

I wish to thank John Harper at CNH America LLC for access to information and photographs of the new Farmall model D and DX tractors. I am grateful to Jeff Walsh, former CNH Director of Communications, for making available QC-503.

Tractors inspire loyal legions of collectors. Among the most loyal are the enthusiasts I met and worked with while researching and photographing tractors for this book. A number of people opened their barns and sheds to me, washing up and pulling out a grand array of International Harvester's Farmall history.

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The 1939 Model H was the right tractor at the right time. It would share a wheelbase with the larger Model M so that Bert Benjamin's implements functioned interchangeably. This meant that farmers didn't have to purchase two sets of tools if they owned both an M and an H.

Batesville, Indiana; Neal and Shirley Stone, Wisconsin Dells, Wisconsin; Lawrence Terhune, Princeton, New Jersey; Martin, Marsha, and Matt Thieme, Noblesville, Indiana; Stew and Pat Thomet, Alto, Michigan; Bill Tyner, Westfield, Indiana; John Tysse, Crosby, North Dakota; Denis and Linda Van de Maele, Isleton, California; Mike and Paul Van Wormer, Frankenmuth, Michigan; John and Barbara Wagner, White Pigeon, Michigan; Gary and Judy Walton, Imlay City, Michigan; Norm and Ardeth Walton, Imlay City, Michigan; Warren and Janice Walton, Imlay City, Michigan; Louis, Linda, and Tim Wehrman, Reese, Michigan; and Bob, Kathy, and Randy Zarse, Reynolds, Indiana. Lastly, I am deeply grateful to my partner in life, Carolyn, for her love and encouragement and for so much more.

—Randy Leffingwell

1870–1919

PREPARING FOR THE FUTURE

The "Famous" engine turned a 12-inch (30.5 cm) diameter pulley. Operators moved a lever that shifted the engine to bring the pulley into contact with the 51-inch (130 cm) diameter friction drive wheel.

At the dawn of the twentieth century, dozens of inventors in the Midwestern United States were determined to put "Old Dobbin" out to pasture permanently.

Men with names like Olds, Buick, Maxwell, Ford, and even Studebaker—one of the largest horse-drawn wagon manufacturers—were hard at work to replace the horse with

This was John Steward's experimental tractor, at work in 1910. His clever rear-axle configuration allowed the operator and the tractor to ride level while running a lowered wheel in the freshly plowed furrow. The engine drove the front wheels by a chain. IHC records suggest they produced ten of these. *State Historical Society of Wisconsin, WHi (X3) 52038*

the automobile on the nation's roads. Likewise in Chicago, the rival Deering and McCormick companies merged together in an effort to dethrone the horse from America's farms. They founded the International Harvester Corporation (IHC) and their efforts eventually led to the birth of the much beloved Farmall brand some hundred years ago.

On August 12, 1902, McCormick, Deering, and three other harvesting equipment makers consolidated under the name International Harvester Company. The merger brought an end to the so-called "harvester wars" of the 1890s where McCormick and Deering engaged in intense competition that hurt every maker. Deering and McCormick had attempted to merge their operations several times, including in 1891 and 1897, but mutual distrust had derailed the previous deals. The merger brought together complementary organizations.

Deering Harvester Company had a strong sales organization and owned steel mills and foundries. One of America's most advanced manufacturers of farming equipment, Deering had introduced the three-wheel, self-propelled "Automobile Mower" in 1894. Created by George H. Ellis and John Stewart, the prototype machine was powered by a 70-pound (32 kg), 6-horsepower two-cylinder engine.

McCormick Harvester was known for its production efficiency thanks to the adoption of precise manufacturing techniques and the concept of interchangeable parts. Instead of using skilled blacksmiths and machinists to make one or two products at a time, this "American system" used craftsmen to make patterns. Then semiskilled workers produced and finished thousands of parts while less skilled laborers assembled the final products dozens at a time. McCormick's annual farm implement production had risen from 17,500 units in 1880 to more than 100,000 by 1889.

An example of the intense competition and one-upmanship between Deering and McCormick involved the Paris Exposition World's Fair of 1900. Deering alone was nominated to represent American makers of harvesting machinery. Its centerpiece was an improved version of its Auto Mower prototype, which sported a 16-horsepower engine.

Although uninvited, Cyrus McCormick was determined to be among the 1,600 exhibitors at the Paris fair. His key engineer,

left: The 1900 Auto Mower. Cyrus McCormick learned that rival William Deering was showing a self-powered mowing machine at the 1900 Paris Exposition World's Fair. Not to be outdone, he quickly assigned engineer Ed Johnston to create one for their own display.

Johnston's machine looked simple but it represented sophisticated thinking and engineering. This machine provided its operator with a power take-off (PTO) that could be disengaged if the mower bogged down in thick grass.

This piece of history is one of the jewels of the Wisconsin State Historical Society's collection at Stonefield Village.

right: Johnston's first one-cylinder model wasn't strong enough when it came time for practical tests. He completed a two-cylinder version by August 1900, and, in new tests, his machine won against Deering's model.

Edward A. Johnston, mounted one of his two-cylinder engines on a Bert Benjamin–strengthened cutter. Christened as "Auto-Mower," the similarly named McCormick machine outperformed Deering's Auto Mower during one test cutting a heavy growth of alfalfa.

Both Johnston's (McCormick) machine and Ellis/Steward's (Deering) version were innovative. It was an early form of a power take-off (PTO), which used one motor to propel the mower and power the cutters. While neither prototype was ever put into production, they showed the promise that machinery could soon replace the working horse.

After the Paris show, in February 1902, the chairman of United States Steel pitched a plan to McCormick, saying that his company should consolidate its operations with Deering to cut costs. McCormick accepted the idea. But only the outside intervention of George W. Perkins, a partner at J.P. Morgan and Company, paved the way for the Deering-McCormick merger.

The "House of Morgan" convinced the two harvester manufacturers that consolidation meant self-preservation. Perkins avoided the controversy of whether the Deering or McCormick families controlled the company by creating a voting trust where he was the tiebreaker. The newly minted International Harvester Corporation (IHC) named Cyrus McCormick Jr. as president and appointed Charles Deering, William's son, as chairman. Morgan and Perkins capitalized the new company at $120 million.

McCormick's growing sales force throughout Europe and beyond motivated Morgan to add the word "International" to the group's new name. IHC controlled nearly 90 percent of grain binder production and about 80 percent of the mowers in the United States. Sometime in 1905, IHC's Executive Council (EC)

The 1908 20-horsepower Friction Drive. Born out of Morton's Traction Trucks manufactured in Upper Sandusky, this line of gas traction engines became a successful product for IHC. The corporation installed its big single-cylinder "Famous" engines on them and sold 14 in 1906 and 153 in 1907.

The 20-horsepower version used a single-cylinder engine with a 9-inch (22.9 cm) bore and 15-inch (38.1 cm) stroke. IHC moved the industry forward with this machine, and in 1908, it manufactured 629 in 10-, 12-, 15-, and 20-horsepower variations.

right: The Friction Drive's big flywheel served both to keep engine momentum going and also to govern engine speed. Production in 1908 came not only from the original Akron plant but also from IHC's facilities in Milwaukee, Wisconsin.

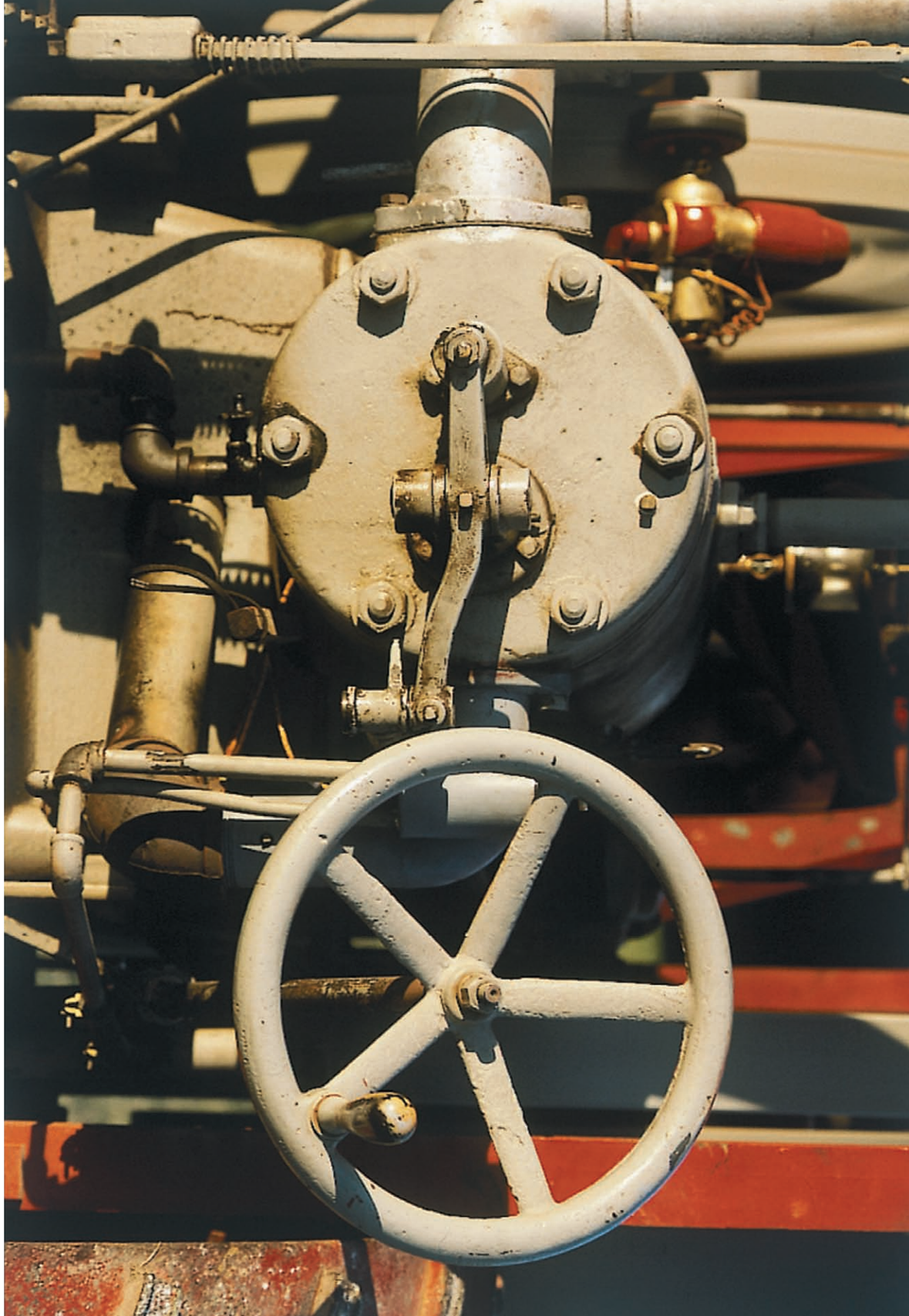
created a product planning and review group informally called the New Work Committee (NWC).

By 1906, the word *tractor*—which is attributed to Hart-Parr Gasoline Engine Company—began replacing the term *traction engine*. IHC fielded tractors under the Reliance name before calling them Titans, after the mythical divine beings in Greek mythology "of gigantic size and enormous strength."

The McCormick Works began making a large tractor named the Mogul. The similar Titan and Mogul lines demonstrated that the Deering-versus-McCormick rivalry died hard. One of the most significant of these models was the prototype 1914 Mogul 20-40, the first mass-production application of the unitized tub. It had an impact on later Farmall designs.

The Sales Department supported the bewildering assortment of similarly named, identically performing machines. Events in the next few years would end the confusion.

The creation of the new company came at a pivotal moment in America, where tractors became very important. Farmers had faced nearly three decades of hard times from the 1870s into the 1890s. They had a resurgence thanks to several factors, including the completion of the Transcontinental Railroad in 1869. Additionally, America had more people to feed thanks to an influx of a quarter million immigrants from Europe and Asia.



The 1911 22- to 45-horsepower Mogul. This was one of IHC's first products from its Chicago Tractor Works, the facility that began life as a big tent in the winter of 1910. By 1911 the reliability and popular demand of this tractor led IHC to manufacture 583 that year.

Fewer people, per capita, were working in agriculture by the time of IHC's foundation. In 1850, for example, some 70 percent of the 23.1 million people living in the United States toiled in agriculture. By 1910, the nation's populace grew to 92.2 million but only about a third, 33 percent, worked on farms. Working horses were unable to keep up with farming demands. To plow an acre (0.4 ha) of land with a horse took many hours.

International Harvester grew in Canada and America while expanding European sales. By 1910, to avoid European protective tariffs on agricultural implements and tractors, IHC opened factories in Sweden, France, Germany, and Russia. It was the first U.S. maker to sell a tractor in Russia. It also sold tractors in Argentina, South Africa, Austria, Mexico, Romania, Brazil, Turkey, Italy, Uruguay, Spain, Peru, Switzerland, Chile, Norway, and Serbia.

Just after Thanksgiving in 1910, the Executive Committee of IHC, which then included its general manager, Alexander Legge, looked at the market ahead that called for lighter tractors in the 8- to 12-horsepower range. Instead, Johnston had designed a 25-horsepower tractor that weighed 2,000 pounds (907 kg) less than the full-size Mogul. Using kerosene fuel and called the Mogul Jr., it was not the "light" tractor as envisioned, but it had a drawbar pull of about 4,500 pounds (2,041 kg).

Titan and Mogul 45s weighed 20,000 pounds (9,072 kg). The 18-horsepower, two-cylinder Universal tipped the scales at 9,000 pounds (4,082 kg) and featured sturdy 10-inch (25.4 cm) long pistons mounted to a beefy 3.5-inch (8.9 cm) diameter crankshaft. These behemoths ran steadily, but smaller farmers needed a tractor that would fit within their fences. Many Midwestern and Southern farms were only 5 acres (2 ha) and few were larger than 40 (16 ha). Most farmers wanted to work faster than a horse's walk, but they had already paid for their draft animals.

By 1910 farm journals urged tractor manufacturers to offer machines farmers needed: better built, more maneuverable, more reliable, easier to start, less cumbersome to operate, and less costly to purchase. It was not major manufacturers who answered magazine cries for lightweight tractors. Small makers such as Bull Tractor of Minneapolis, Minnesota, produced a 5,000-pound (2,268 kg), 5- to 12-horsepower tricycle. The Little

IHC's Ed Johnston conceived and directed manufacture of this two-cylinder giant. Early photographs show these tractors pulling as many as fifteen or eighteen plows, turning over a swath of earth 20 feet (6.1 m) wide or more. Such plow loads sometimes broke the frames of these tractors in the early days. The starting engine was one of Milwaukee Works' innovations with this big machine. One cylinder burned gas while the other compressed air. The operator pulled a lever and injected the air into the main engine to begin moving the large pistons.

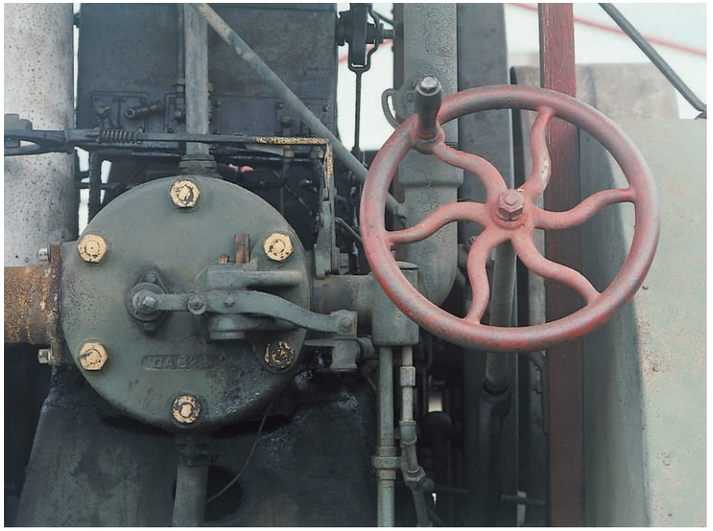
Bull retailed for $335 and, by the end of 1914, the company had sold 3,800 of them; IHC slipped to second place in sales.

Robert Hendrickson and Clarence Eason of Wallis Cub took credit for introducing the "unit-frame" tractor that resisted twisting motions while in operation. This design improved torsional rigidity while cutting weight, complexity, and costs. Although only 660 Cubs were built over six years, Wallis led the way to other revolutionary products such as Fordson and Farmall.

While Harry A. Waterman at McCormick Works and Johnston made competing prototype machines in an apparent internal competition, Deering Works hired independent designer Harry C. Waite. He devised a finely engineered lightweight machine that immediately went into farm testing near Lewiston, Montana. He revised his three-speed transmission to two forward gears and reduced the tractor's weight, cutting initial $1,500 manufacturing costs to $850. His machine became the Steward-Waite tractor. The air intake for the carburetor was strained through water to protect from dust while all moving parts were covered.

During this time, Steward, who was IHC's expert on patents, saw reports of crawler-type tractors. While the idea of crawlers had been present in farming for more than twenty years, the name *Caterpillar* came from Ben Holt's machines. By the early 1920s, nearly two dozen manufacturers were producing crawlers or half-tracks.

IHC soon faced a new threat—an antitrust lawsuit by the U.S. Department of Justice (DOJ). By mid-1914, the DOJ was



left: The 1913 Mogul Junior. By June 1, 1911, IHC knew it had another success coming. Ed Johnston's latest idea, this 25-horsepower, single-cylinder tractor, had come in weighing 15,400 pounds (6.985 kg), about 2,000 pounds (907 kg) less than its target. Introduced in 1911, the Junior remained in production into 1913. IHC manufactured 812 of them.

right: The engine for Johnston's Mogul Junior was one cylinder of the two he used in his Mogul 45. Bore and stroke remained the same, at 9.5 x 12 inches (24.1 x 30.5 cm).

opposite: The 1911 Mogul Type C. Ed Johnston first conceived this 25-horsepower model based on earlier Akron, Ohio, developments. But other manufacturing problems pulled him off development. IHC's Executive Committee transferred the project to Milwaukee Works for Charles Longenecker to complete.

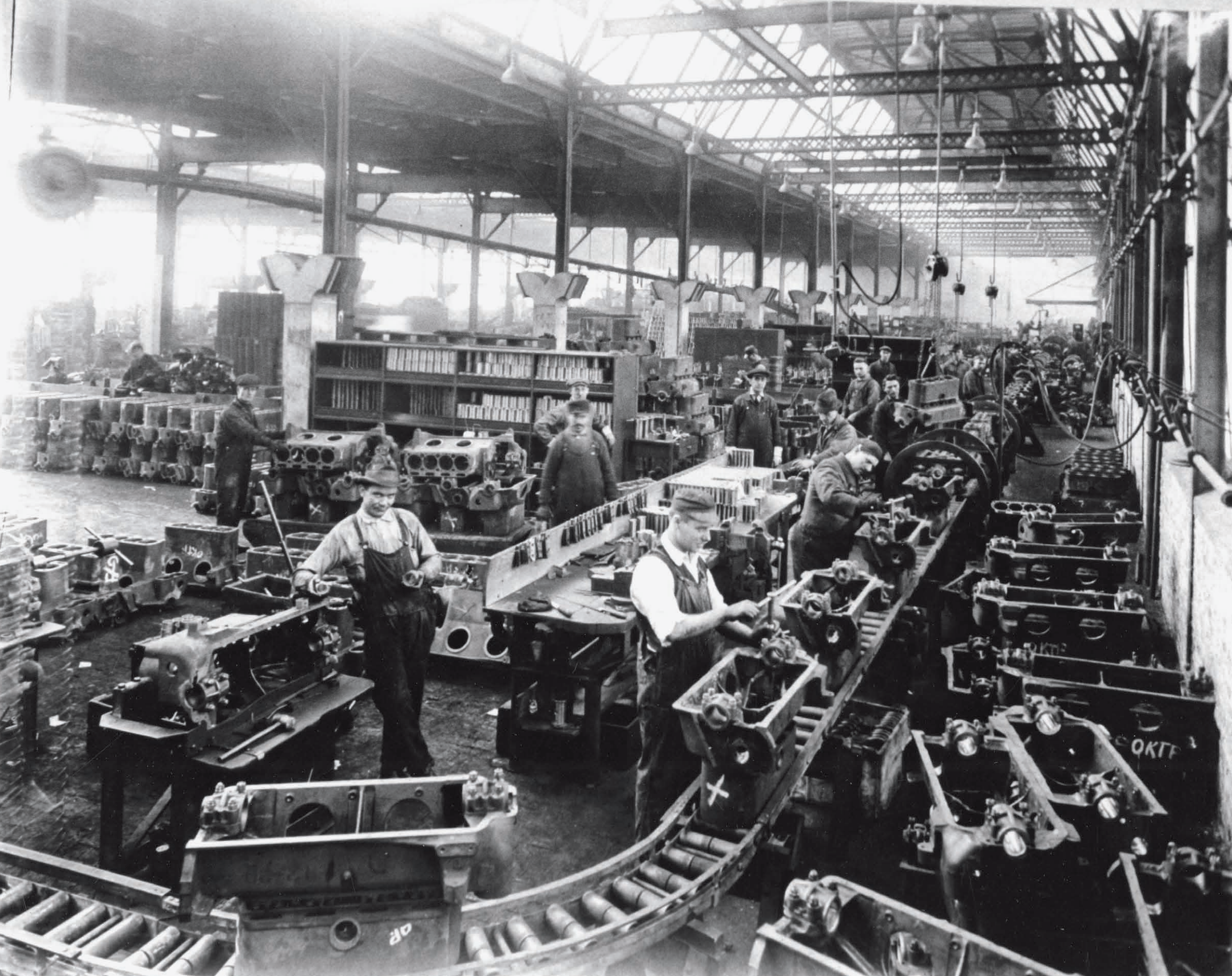
This tractor, moving from one factory to another like a vagabond, earned the long internal nickname of the Johnston-Longenecker-Akron tractor. It was IHC's first true tractor product, moving well beyond what McCormick's earlier efforts had accomplished.

hounding the conglomerate. IHC had assets worth nearly $173 million and ranked as America's fourth-largest company. As courtroom procedures occupied corporate time and resources, Henry Ford jumped into the tractor business.

In the fall of 1913, the three-year-old Ford Highland Park Plant had its first working assembly lines. Production time to build a car fell from twelve hours to one hour and thirty minutes. In 1914, Ford produced more cars than all its competitors combined—some 308,162 units. The son of a well-to-do farmer, Henry Ford also wanted a share of the tractor market. After learning of the Wallis Cub, Ford engineers Joe Galamb and Eugene Farkas created the Fordson tractor in 1916. It was built under a new company called Henry Ford & Son.

The number of companies claiming to be tractor makers grew from about 50 in 1913 to 165 by 1916. Among these companies was Samson Tractor of Wisconsin. General Motors purchased Samson in 1917 in an ill-conceived attempt to counter Ford. Although sold under the GMC division, Samson failed by the early 1920s. While tractor makers produced heavy, ponderous units and others tried Ford-like automobile products, International Harvester followed a middle ground product strategy.

Overseas, World War I broke out in Europe in 1914. The need for food and cloth increased farmers' profits but also induced them to increase production. By 1916, the U.S. Department of Agriculture (USDA) reported nearly 34,371 tractors were working on American farms. Nearly 80 percent were two-plow machines rated to work at more than 2 miles (3.2 km) per hour. A tractor towing two, three, or four plows amazed newspaper writers who had never seen steam traction engines pull fifteen plows. Tractors would save America, the editors wrote, and they could save the world. North American makers turned out 62,742 machines in 1917, shipping 14,854 to Europe.

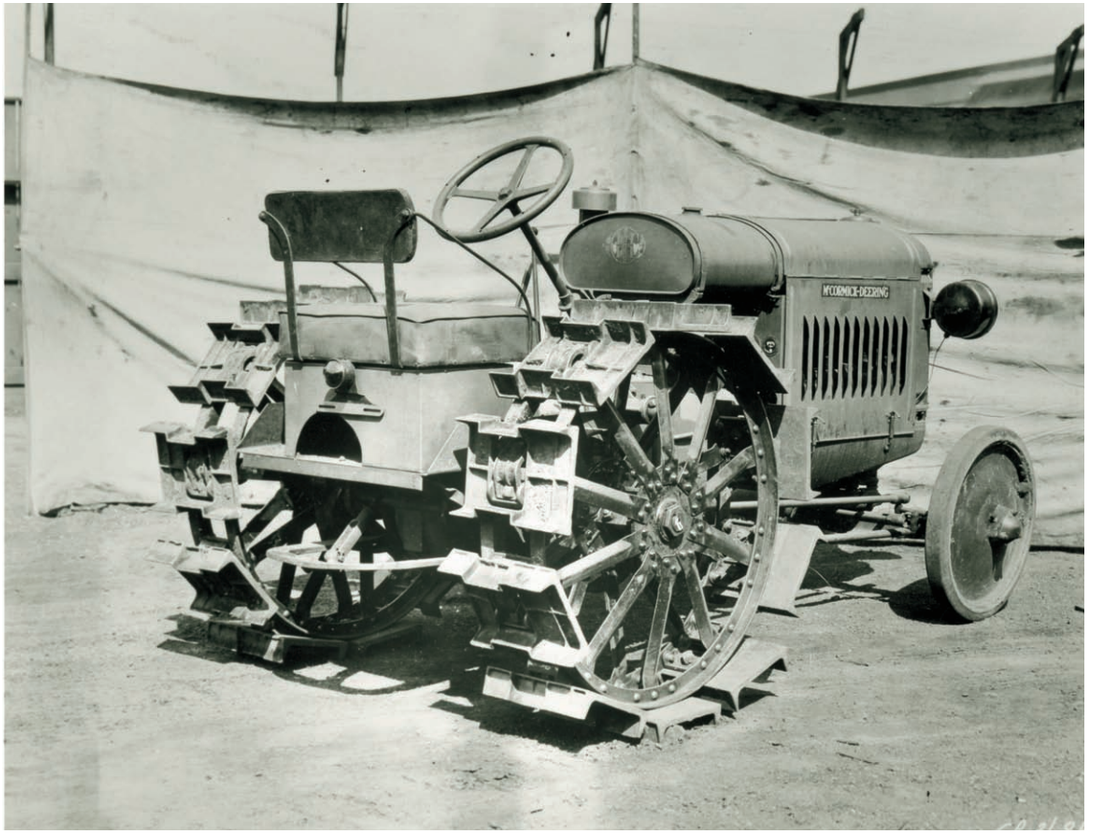

OKTF

IHC's implement genius Bert Benjamin spent some time on loan to Henry Ford to help the automaker develop implements for his Fordson tractor. While at Ford, Benjamin learned about assembly-line production and "high-speed" automobile-type engines. Both of these factors came into play when IHC introduced its remarkable International 8-16. This is the engine assembly line. *State Historical Society of Wisconsin*

IHC's general-purpose Mogul was offered with grain drills, harvesters, and other implements, but it was still too clumsy and bulky to do delicate, precise row-crop cultivation. So in late 1915, engineer David Baker helped Johnston, Carl Mott, Philo Danly, and John Anthony complete the Motor Cultivator. IHC only tested two or three prototypes before producing the Motor Cultivator for 1917. Although the NWC ordered 300 to be built, IHC halted production at one hundred units for the year. By late 1917, the company recalled thirty-one cultivators so they could be retrofitted with a new engine governor, cooling fan, and heavier, cast-iron front wheels.

For the first time, IHC used its customers for final testing. Johnston had a good reason for hurrying production. He anticipated shortages in raw materials due to America's pending involvement in World War I. IHC reasoned that keeping existing machines in production was easier to justify than introducing a new one when rationing hit. Early buyers found the machine was top-heavy and prone to overturning, while its LeRoi engine was underpowered.

On April 6, 1917, the United States entered World War I. That same year, the DOJ's antitrust battle with IHC was nearly finished. The company had lost plants, sales branches, and products in Germany, France, and Russia, either to nationalization or bombing. To settle the lawsuit, IHC offered to sell three old-line harvesting machinery subsidiaries.



IHC's gear-drive 10-20 and 15-30 models represented a big advance in tractor engineering, manufacturing, and machine reliability. Here a prototype photographed on July 11, 1925, shows off an experimental articulated rear-wheel cleat for traction in soft soils and sand. *State Historical Society of Wisconsin, WHi (X3) 52028*

Sitting on IHC's new work committee or Executive Council in those days was akin to living in nearly constant turmoil. The corporation's new channel-frame tractor, the four-cylinder Mogul 8-16, conceived in 1914 was reborn later in 1917. Its problems required two engine transplants. The International 8-16 (the name ultimately given it on October 12, 1917) offered farmers America's first production power take-off. The 8-16 was used to test four-wheel and six-wheel drive and crawler tracks. Later—in June 1919—the tractor was given extra-wide, reinforced steel wheels for rice fieldwork.

left: The 1915 Mogul 8-16. IHC introduced this model in 1914. Its arched front framework allowed it to turn extremely tightly, for its time, within a 20-foot (6.1 m) radius.

right: The 1917 Mogul 10-20. As successful as the 8-16 was (IHC sold about 5,000 of them in 1915 and more than 8,000 in 1916), Ed Johnston felt they needed more. He increased engine-operating speed and added a second forward speed. IHC offered optional plow guides for 8-16s and continued with the new 10-20s. The horizontal single cylinder ran a planetary gear transmission to power the rear wheels using a left-side chain. The transmission provided only one forward and one reverse speed.

In September 1917, IHC engineer Bert Benjamin was in Nappanee, Indiana, watching three of his International 4-horsepower "Binder Engines" harvest hemp, a product in great demand by the military for a variety of uses. A Titan 10-20 pulled one binder, four horses pulled another, and an 8-horsepower competitor pulled a third through very tall hemp. Hemp dust and leaves choked the towed binder's auxiliary engine, which lost a quarter of its power. Yet, the tractors suffered no ill effects from the dust. Benjamin concluded that the tractor engine should drive the binder by PTO shaft. It took the company about a year to field a prototype PTO that operated the cutter bar of a mower attachment and a sweep rake lift.

In 1918 wartime uses of steel and other material threatened all domestic industry. The U.S. Government Priorities Board limited total production by all manufacturers to 315,000 tractors. In fact, the final count reached only 132,697, and the armistice in November brought an end to allocations in December. More than one hundred new companies entered the tractor business. Of these more than 250 tractor makers, only 98 produced a single tractor.

One of the tractor competitors was the Fordson. Henry Ford considered his real competition to be draft horses, so he asked IHC and Deere & Company for advice. Legge was then part of the U.S. War Production Board. When approached by Ford, Legge loaned the expertise of Benjamin for several months. While Benjamin designed a Fordson line of implements, he also studied Ford's assembly-line methods. When Ford dropped plans to sell implements, IHC provided them to Ford dealers instead.

Ford supplied 4,260 Fordsons to England before producing them for American farmers starting in April 1918. All the