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CLYDE IRON WORKS, DULUTH, MINNESOTA: CLYDE SKIDDERS AND MCGIFFERT LOG LOADERS

CHUCK LIND

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Long Leaf, LA 71448
Website: forestheritagemuseum.org

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Author:
Chuck Lind, Long-term volunteer and Trustee, Southern Forest Heritage Museum, Long Leaf, LA, 71448.

Cover photo:
The photo of a McGiffert log loader in operation is courtesy of The History Center at DiBoll, TX. It was taken by J.D. Cress in 1907 for use in the *American Lumberman* magazine.

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Abstract:
It was the Clyde Iron Works equipment that facilitated the rapid harvest of the South's longleaf pine (*Pinus palustris*) forests during the early 20th century. Development of railroad systems and tram lines into forests was a great achievement, but there were still limits on the size of production that a sawmill could reach due to its ability to move timber from the woods to the mill. The use of oxen and mules to skid logs to the track and load them on the rail cars limited production. It was the Clyde Iron Works Clyde skidder and McGiffert log loader that resulted in sawmills that could produce a million board feet of lumber per day. Even much smaller mills used the equipment because it increased the efficiency of lumbering operations. This paper will provide information about the history and capability of these machines.

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Chuck Lind

In the early 20th century, the "golden age of lumbering" began in Louisiana and the South. Between 1904 and 1929, over 327 billion board feet of southern pine yellow lumber was shipped to the markets of the world, with nearly 62 billion board feet coming from Louisiana alone (Caldwell 1975). Most of this timber was harvested with a cut-out and get-out policy with total disregard for the regeneration of the magnificent resource. But these effects were not realized or dealt with until years later (Barnett and Carter 1917).

How was such an enormous feat accomplished? Only a few years earlier, access to these timberlands had been difficult. But in the late 1800s, the development of railroad technology became available across the nation, and it was quickly adopted by lumbermen. With a reasonable investment, access to almost any location of timberland became feasible. As a result, thousands of sawmill towns were created to provide the workforce to cut, transport, and mill the forest resources to produce marketable lumber (Barnett and Lueck 2020).

Robust equipment was needed to efficiently move cut logs to the railroad track and load them on log cars. The use of oxen and mules made the process difficult and time consuming. Soon the Clyde Iron Works developed efficient and powerful mechanized equipment to overcome this problem. Following is the description of the development of the Clyde skidder and the McGiffert log loader, equipment that transformed the lumbering industry of the early 20th century.

BRIEF HISTORY OF THE CLYDE IRON WORKS

Northwest Manufacturing was founded October 21, 1899. In 1901, it became Clyde Iron Works. It was one of many heavy industrial fabricators in Duluth, Minnesota, a factory town, and port city. With the demand for lumber increasing each year, loading log cars was a slow and dangerous process done with cables and mule or ox teams. In 1901, J. R. McGiffert figured out a way to speed up the loading process with a self-propelled log loader. The McGiffert log loader became one of the first products of Clyde Iron Works. This steam powered, self-propelled log loader was just what the lumber industry needed. With it, log cars could be loaded quickly and safely so the mills would have a ready supply of timber. The success of the log loader drove the construction of their first dedicated building in 1907 (Clyde Iron Works 2021).

This was the assembly building of the Clyde Iron Works in Duluth, MN in the early 20th century (from Clyde Iron Works 2021).

Clyde Iron Works continued to produce various pieces of equipment for use in the woods from Maine to Washington State, but the McGiffert log loader and the Clyde skidder became the backbone of the company's production for many years. Almost 1,300 McGiffert log loaders were manufactured at Clyde Iron Works before the era of railroad logging ended. Clyde continued to expand its business and built some of the largest cranes in the world at the time. It was instrumental in completing well known projects such as the Panama Canal, Empire State Building, and the Golden Gate Bridge.

Workers developing patterns for equipment development in the Clyde Iron Works facility (from Clyde Iron Works 2021).

After World War II, they produced fewer amounts of forestry equipment but continued to produce cranes; derricks; electric, gasoline, and diesel hoists; as well as other pieces of equipment used in the construction, mining, and shipbuilding industries. In 1986, Clyde Iron Works closed their doors in Duluth and moved to St. Paul, where they merged with the marine division of American Hoist & Derrick to become the AmClyde company.

This building in Duluth, which housed the Clyde Iron Works lumbering manufacturing equipment, has been repurposed into restaurants and professional offices (from Clyde Iron Works 2021).

CLYDE SKIDDING MACHINES

Clyde Iron Works made a variety of skidding machines, which were known as ground skidders because the logs were skidded across the ground. The machines were constructed for use in several ways. They could be wheel mounted for use on railroad tracks. Other models were mounted on large timbers called skids, and in later years they were adapted for crawler traction.

This Clyde skidder in operation shows the extent of the cabling extending out in four directions. Logs could be pulled from a 40-acre area when located at one setting on the rail track.

Clyde self-propelling steam skidders operated on the railroad track. This style of skidder consisted of a steel platform mounted on railroad trucks of four to six wheels each, depending on the size of the skidder ordered. The trucks could be either standard or narrow gauge. The engines with proper sized boilers were mounted on the skidder platform. The engines were connected to the trucks by steel sprocket chains and sprocket wheels, which allowed it to be propelled along the track under its own power.

A steel or wood “A frame” style boom was mounted on the end of the machine frame in the case of the single end style, or on each end for the double end style. The top end of the boom legs was connected to the steel boom head using a buffer spring arrangement that absorbed the shock caused in skidding the logs across the ground.

The single end style had one double cylinder engine with the boiler placed at the rear. The double end style has two double cylinder engines placed back-to-back with the boiler placed in the center of the frame between the engines. The engine area of the skidder was covered with a skeleton steel cab with a sheet metal roof.

Logs skidded to the rail track by a Clyde skidder are ready for loading on log cars with a McGiffert loader. Photo by George Gerhart of the U.S. Forest Service in March 1939 (Everett 2021).

These machines were classified as follows:

- Four-line double end, operating two skidding lines from each end, equipped with two double cylinder engines.
- Two-line double end, operating one skidding line from each end, equipped with two double cylinder engines.
- Two-line single end, operating two skidding lines from one end, equipped with one double cylinder engine.

Each of these styles was built either for horse outhaul or cable outhaul of the cable to the wood crew. Using horses for outhaul of the skidding line was limited to the speed of the horse, which was about 300 feet per minute. With the cable outhaul of the skidding line, the speed was increased to between 600 to 750 feet per minute. The skidder was able to pull logs back to the skidder at a rate of between 1,000 to 1,500 feet per minute.

Each skidder came with 1,000 feet of cable, so the most common way of skidding in the South was to lay tracks into the area 1,000 to 2,000 feet apart. Tracks laid closer together, which allowed for skidding a shorter distance, produced the best results. Stumps and other obstructions added to the difficulty in bringing in the logs, with the possibility of snagging the log. Whenever

possible, loggers would fall the trees away from the tracks. This allowed the larger end of the log to be facing the skidder and therefore made it easier to pull in the logs on a straight path. Since the logs were pulled at a rapid rate, it also made it safer for the person setting the tongs. A log that had to be turned would jerk quickly toward the skidder.

Men of the skidder crew watch a from a safe distance as it works. Note the cable between the trees in the foreground, this is a rehaul skidder. Men and animals did not have to pull the cable out to the logs—they did have to set the tongs. Working the skidder was hazardous duty. Photo by George Gerhart of the U.S. Forest Service in March 1939 (Everett 2021).

The Clyde Skidders commonly were used in the southern woods through the 1930's and into the early 1940's. These skidders were very tough on the land and left scars on many areas that can be seen today. All standing timber in its way was destroyed. Use of the skidders usually eliminated the possibility of natural forest regeneration. Because of this, some states passed legislation to prevent their use. However, most of the harvesting was completed before the legislation passed.

The skidders improved the efficiency of the harvesting operation and shortened the time sawmill owners took to cut their forest resources. Typically, lumbermen purchased enough timber land for their sawmill to operate for about 20 years. By then, the timber was harvested, the mill equipment had worn out, a profit had been made, and the mill closed, hence the term cut-out and get-out (Barnett and Carter 2017).

Logs have been pulled to the railroad track for loading on log cars with the McGiffert loader. Note the disturbed ground where the logs were pulled to the track by the Clyde Skidder. Photo by George Gerhart of the U.S. Forest Service in March 1939 (Everett 2021).

The Second World War ended the use of the Clyde Skidders. With the large amount of steel in them, they were prime targets as the United States ramped up for the war and needed as much steel as possible. According to Clyde records, there were 368 skidders made. The only skidder that is still known to exist is located at the Southern Forest Heritage Museum. It is number 321 and was built in 1919.

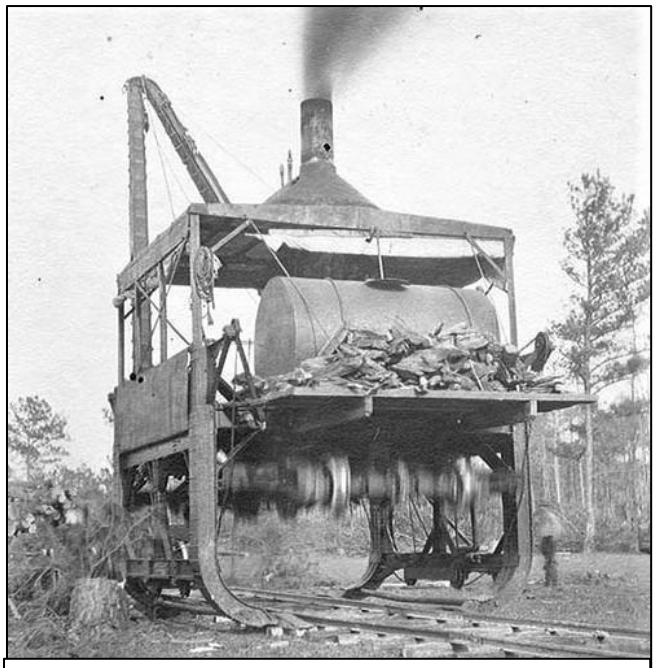
This Clyde skidder at the Southern Forest Heritage Museum is the only one known to exist. The booms that extended from both ends have been removed. It was a massive piece of equipment.

MCGIFFERT LOG LOADERS

When the McGiffert log loader was introduced, it was the only loader that allowed empty cars to pass through it to allow faster loading of the log cars. While Clyde Iron Works made several different log loaders, the McGiffert was by far their most popular model, with approximately 1,300 made.

Since logging operations were usually located far away from metropolitan areas where they could be easily serviced, J. R. McGiffert felt the construction of any logging equipment should be easy to operate in order to reduce training time for operators. It also should be able to withstand unusual and unexpected strains and maintain its working position under all conditions within normal logging operations (Clyde Iron Works 2021).

The common method of operating the McGiffert log loader was to have the machine travel to the logs under its own power and, in many cases, pull empty log cars with it. When it arrived at the loading site, the trucks (with wheels) would be raised up under the loading deck. A line, called the spotting line, would be carried back several car lengths and attached to one of the log cars. This made it so they would not lose time attaching it to each individual car. The car moved forward with the spotting line, and a car positioned under the boom to be loaded. When the car was loaded, it was pushed forward and out of the way of the next empty car as it moved forward. With a small crew of 3 to 5 men, the McGiffert log loader could load 120,000 to 130,00 board feet of lumber in a normal day. The only variable in this was the size of the logs to be loaded and whether or not there was a constant supply of logs in the loading area.

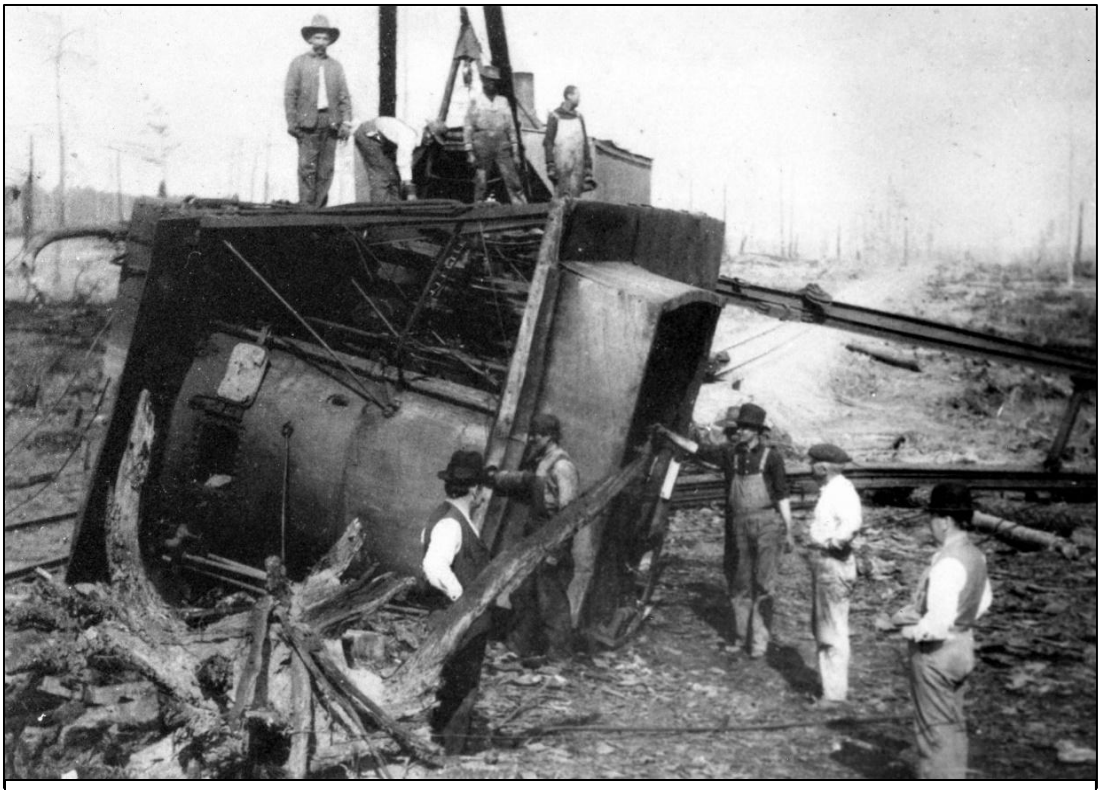


This loader has its wheels raised to allow log cars to be pulled through it (from Forest History Society).

The machine was designed to have its loading mechanism directly over the tracks and with enough clearance to not interfere with the ability of log cars to pass through under the loading equipment. The legs or standards supporting the loading platform had to be spaced far enough apart to allow for passage of the empties, and they were curved in at the base to give the loader a solid footing on the ends of the ties outside of the rails. The legs were built to be able to support a load of up to fifty tons each. On the ends of the legs, there was a long steel shoe that had enough length to permit it to rest on several ties at the same time, which would assure the loader a stable foundation while also having minimal vertical height so the lowest logging car truck could pass through with no obstructions. The trucks were equipped with either two or four wheels. These wheel frames were swung from a vertical to horizontal position, which allowed the empty log car to pass under them. As the wheels were raised to their horizontal position, the leg and shoe would slowly settle onto the ties under them.

This operation loader has its wheels raised to allow log cars to be pulled though for loading (from the History Center at DiBoll, TX).

When it finished loading and needed to move further down the tracks, the wheels would be lowered, which caused the legs and shoes to lift off the ties, and in the vertical position, the wheels would then be firmly on the track, allowing the loader to propel itself along the track by means of a heavy-duty double link steel sprocket chain attached to the trucks. This allowed the loader to move to the next loading area under its own power, not requiring a locomotive in the moving process. While this was a big advantage for the logging operations, it also made the McGiffert a very top-heavy machine moving on less than perfect track conditions. Due to this, many McGiffert loaders tipped over during travel, but because of the heavy construction, they usually required minimum repairs when righted onto the track.



This is a McGiffert loader that has tipped over. Its status is being evaluated and likely it was righted and restored to use (from the History Center at DiBoll, TX).

The McGiffert loader was powered by a double cylinder horizontal engine built with the proven Clyde Iron Works dependability. It was designed with a working pressure of 200 pounds, and its gearing and bushings were all built to withstand the heavy work and rough use the company knew the loader would be subject to.

While it was possible to use the McGiffert as a skidder, it was limited to 500- or 600-feet skidding distance. Since Clyde sold both the skidder and loader, they promoted the option to use the Clyde skidder to move logs to areas next to the track and follow up with one of their loaders for loading log cars. Records show that most logging operations in the upper Midwest and throughout the South followed this practice of having separate skidding and loading operations. The average wooded area made it impossible to synchronize skidding and loading operations using a single machine. The skidders were used to bring and stack logs by the track, keeping with the objective of having about ten days of logs gathered ahead of the loading crews who followed.

The greatest use of the McGiffert log loader was in the upper Midwest area and throughout the South. They did make a few loaders that were referred to as Pacific Coast loaders. These were heavier and longer than the standard loader so they could manage the longer and heavier logs of the area. Most western companies used the spar tree method for skidding and loading of the logs.

This is the Southern Forest Heritage Museum loader #1229 which has been restored for exhibition purposes—its boiler is not functional. Although the wheels are not raised, the loader's legs are down and resting on the long steel plates called shoes.

Today, only six McGiffert log loaders are known to exist. One is located at the Lake Superior Railroad Museum in Duluth where they were built. The Southern Forest Heritage Museum in Long Leaf, LA, has two. Loader #1229 has been restored except for the boiler. It was purchased by Powell Lumber Company and later sold to the Crowell & Spencer Lumber Company at Long Leaf. The #1230 was purchased by the Crowell & Spencer Lumber Company directly from Clyde Iron Works and shipped in April 1919. The Crowell company is known to have owned at least two other McGiffert log loaders- #1002 was shipped in 1911 and #1222 in 1918 to Meridian Lumber Company for their operation in Meridian, LA.

CLOSING THOUGHTS

Interestingly, it was a company in Duluth, MN, which facilitated the harvest of the virgin longleaf pine forests of the South during the early 20th century. The Clyde Iron Works developed two pieces of equipment that made harvesting efficient. The forest stands of longleaf pine were cut with cross-cut saws by teams of timber cutters called flatheads. Rates of production could be increased by adding more wood cutters. The bottleneck that slowed production was skidding and loading the logs onto rail log cars. When this process was done with oxen or mules, it was not as efficient as needed.

It was the development of steam-powered and rail-mounted skidders and loaders that increased the rate and quantity of movement of timber to the sawmills. In Louisiana, two of the world's largest sawmills were built to take advantage of this new technology. Each of these mills could produce nearly a million board feet of lumber a day. Thousands of smaller mills began to use the same technology. This harvesting capability resulted in the rapid harvest of most of the South's magnificent longleaf pine forests in a quarter of a century.

The effects of the harvest can be viewed in two different ways- the negative effects of the rapid destruction of a tremendous resource or the positive effects of the lumber industry in providing economic opportunities that brought the rural South into the developing industrial age (Barnett and Lueck 2020).

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