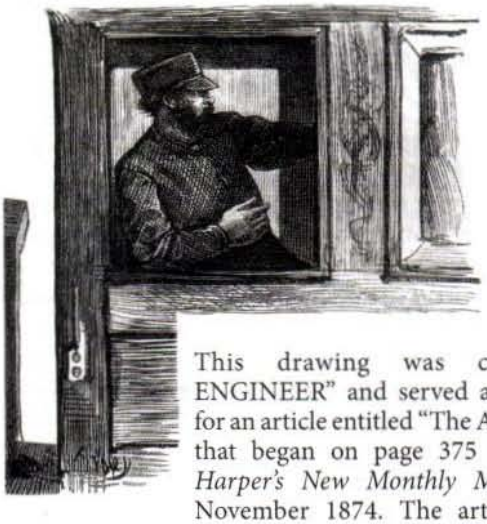


This drawing was captioned "THE ENGINEER" and served as a corner border for an article entitled "The American Railroad" that began on page 375 of Volume 49 of *Harper's New Monthly Magazine*, June to November 1874. The artist was the well-known Edwin Austin Abbey (1852–1911). Railroads contributed greatly to the Panic of 1873, a financial downturn that lasted throughout the remainder of the decade.

The Panic of 1873 and Farm Steam Power

By Robert T. Rhode

According to Encyclopedia.com, *financial panics* are events during which bank depositors attempt to withdraw their deposits, equity holders sell stock, and market participants in general seek to liquefy their assets. On page 154 of her book entitled *The Romance of the Rails* (New York: Robert M. McBride, 1929, 2 vols.), Agnes C. Laut says, "There has never been a panic in America from 1837 to 1921–22, which has not been helped unexpectedly by a huge crop—corn or wheat—which brought back gold from the rest of the world." Laut makes the case that, far earlier than anyone might expect, agricultural trade beyond the borders of the United States helped rescue the country from panics. Of particular interest to readers of *Engineers and Engines Magazine* is the downturn of 1873, which occurred simultaneously with a rapid upswing in production of steam engines for agricultural purposes. Could national financial difficulty have somehow *instigated* development of such engines and related implements?

The 1873 economic decline is usually attributed to a slump in Europe, the Franco-Prussian War, the Civil War in the U.S., and runaway growth in industry and agriculture. We will explore one facet of industrial and agricultural growth.

During Reconstruction, a railway boom occurred, but a feature peculiar to the development of railroads was the long delay in returns to investors from capital that had been sunk in building rail lines across vast distances. Land grants and subsidies to railroads by the federal government drew speculators to create an investment "bubble." As debts took a long time to repay, businesses in general found themselves less and less able to finance growth. Stresses and strains in the financial sector were beginning to appear. Suddenly, Jay Cooke & Company, a principal player in U.S. banking that was poised to receive a $300 million federal loan, could not sell Northern Pacific Railway bonds, in which the firm was heavily invested, and the rumor that Cooke's credit was worthless spread like wildfire. The loan fell through, and, on the 18th of September in 1873, Jay Cooke went belly up. Banks failed, briefly closing the New York stock market. Many railroads went under and construction of new lines dwindled. Numerous businesses declared bankruptcy and farms were lost. Unemployment soared as real estate values plummeted. The financial lethargy ensuing after the initial panic persisted some six years. The 1870s came to be called the Black Seventies, and the financial downturn came to be known as the Long Depression.

Several records about agricultural steam engine production exist for the 1890s. Some exist for the 1880s, but relatively few production records—almost none, in fact—exist for the 1870s; thus it is difficult to prove whether builders of steam engines, threshers, and other machines helplessly fell victim to bad economic conditions or proactively initiated good economic patterns.

In a speech before the Indiana State Board of Agriculture on October 7, 1874 (published in the *Twenty-Fourth Annual Report* in 1875), Governor Thomas Andrews Hendricks praised the annual fair: "Here the scientist, the artisan and the farmer stand face to face, and come more thoroughly to know and understand their mutual dependence and welfare. From the farmer, the machinist may learn defects in his machinery, which experience has developed; and from the scientist he may receive suggestions which will enable him to economize space and power. And in return the farmer learns the uses and advantages of implements and machinery not heretofore tried or used by him. And all, the farmer and the artisan alike, go away with more comprehensive views in respect to the assistance which the laws of nature will give them if wisely invoked. The dependence of modern agriculture upon improved implements and machinery was never so thoroughly demonstrated as during the war. More than a million of men were called from the pursuits of peace. The requirements of the army made an increased demand upon the productions of the farm. The increased supply of improved machinery took the place of the absent labor. With the old style plow, and the sickle and scythe, the work could not have been done. Without the improved plow, the drill and cultivator, the fields could not have been cultivated, and without the reaper, the mower and the thresher, the crops could not have been harvested nor the meadows mown. The machines never tired, but went on, each doing the work of many men. Improved machinery supplied the places and did the work of many hundreds of men." Although Hendricks would become the Vice President of the United States in 1885, he would pass away eight months after taking office; back in 1874, when he was in good health, he gave what is surely one of the earliest and most insightful expressions of the ways that a war can impel rapid technological and mechanical advances. According to Hendricks, the incessant drive to push agriculture onto a mechanized foundation had started as early as the Civil War.

On pages 165-66 of his seminal book entitled *From Prairie to Corn Belt: Farming on the Illinois and Iowa Prairies in the Nineteenth Century* (Ames: Iowa State University Press, 1963; reprinted 1994), Allan G. Bogue writes, "In American agriculture as a whole, productivity, defined as outputs in relation to inputs, increased by 32 per cent between 1870 and 1910. Such national figures reflected the addition of fertile new lands to the nation's farm acreage, the increased use of fertilizers, improvements in plant and animal strains, and transportation developments as well as the new horsepower technology." On pages 284-85, Bogue writes, "Undoubtedly declining prices did press hard upon prairie farmers during the thirty years after the Civil War. But at the same

time horsepower technology was allowing them to increase their productivity greatly. Farmers who exploited machinery effectively could and did prosper. It is clear, too, that the man who studied his markets and was alert to relative changes in the prices of farm products could outstrip his neighbor. ... Almost invariably ... during these years the relationship between corn and hog prices made it almost always profitable to feed hogs. One hundred pounds of pork was worth less than 10 bushels of corn in only three years between 1861 and 1900 in Iowa." It is significant that, in 1874, Mennonite immigrants from South Russia brought Turkey Red hard wheat into Kansas: arguably one of the most important improvements in plant strains to which Bogue refers.

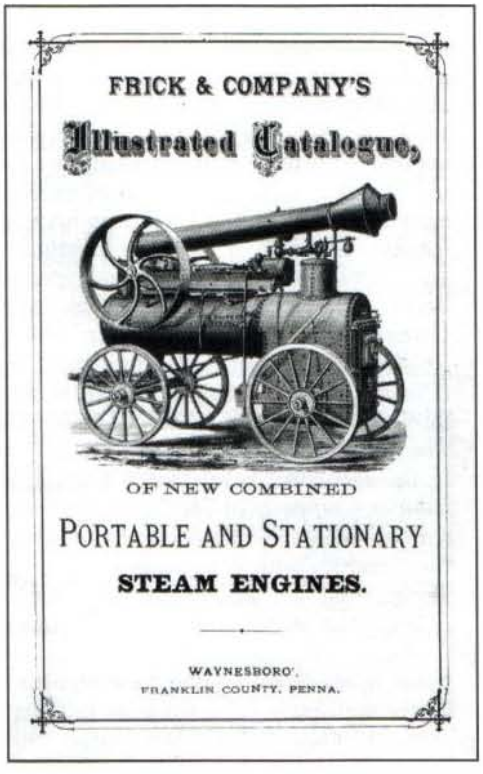
On page 93 of his book entitled *Success in Farming: A Series of Practical Talks with Farmers* (Springfield, OH: R. S. Thompson, 1881), Waldo F. Brown says, "In large areas of our country wheat is the most important crop to the farmer. It is easily stored, with but little risk of damage if he wish to hold it for an advance, and is always in demand and brings the cash in market. It is not as bulky as corn, and as its average price is more than twice as much per bushel, a team will draw to market about four times as many dollars' worth of wheat as of corn in a given time. ... I have examined the statistics of Ohio, as it is one of the best winter wheat States, and I see that for eight years, beginning with 1858, there was a succession of poor crops and a great falling off in the yield per acre. Then for five years there was a large gain, there being a series of favorable years. From 1872 to 1876 we had a series of unfavorable seasons, the crop of 1876 in Ohio aggregating, in round numbers, but 15,000,000 bushels, with an average of 10 bushels per acre. In 1877, we grew 27,000,000, with an average per acre of nearly 16 bushels. 1879 gave us 35,000,000, with an average per acre of 16 bushels. I have referred to these statistics simply to illustrate one fact, which is this: A series of good years leads to the sowing of a large acreage of wheat, and much is badly put in and on poor land; and when an unfavorable year comes, the average yield per acre is cut down largely by the crops on these poor, badly prepared fields. On the other hand, a series of poor crops not only causes a falling off in acreage, but leads to a more careful preparation of the soil."

On pages 70-71 in his groundbreaking book entitled *Steam Power on the American Farm* (Philadelphia: University of Pennsylvania Press, 1953), Reynold M. Wik says, "A few engineers in the seventies realized that self-propelled steam engines would never reach the average American farm unless several objectionable features could be eliminated. The farmers living in the great grain-producing areas needed the improved agricultural engines, but they were the very people who were least able to pay high prices for the new machinery. Emerging from the panic of 1873, discouraged by low agricultural prices, burdened with debts, and fighting railroad monopolies, these people were unable to pay five thousand dollars for self-propelled machines. On the contrary, they needed engines that were relatively cheap in price, selling around the thousand-dollar figure. In addition, the farm engineers had little interest in complicated machines constructed with intricate gears, a variety of chains, pulleys, and gadgets. Unless it were simple to operate, the new self-propelled steam engine would be limited to a few experimental machines operating within the convenient radius of a good repair shop. Furthermore, the prospective customers wanted self-propelled engines which were backed by a manufacturing company of good business reputation and one that could provide excellent repair services. ... Obviously, the self-propelled engines needed to be manufactured by reliable companies possessing engineering experience and skill, financial resources, and adequate distribution facilities. When these companies produced machines in large numbers, and standardized parts to provide repair services, then and only then would the self-propelled agricultural steam engines become a reality."

Wik implies that the decline in agricultural prices that occurred not long after the Civil War slightly delayed production of farm *traction* engines, already in development in the 1850s with traction engineering advances stretching back to the late 1700s, while encouraging production of farm *portable* engines. A review of verifiable dates available to researchers helps confirm Wik's implication.

Documented Events Involving Portable Agricultural Engines Soon After the Panic of 1873:

- In 1874, Birdsall began building portable engines and moved from Penn Yan to an expanded plant in Auburn, New York.
- The Buckeye portable engine of Salem, Ohio, was exhibited at the Inter-State Industrial Exposition of Chicago in the fall of 1873 and was listed in the catalog, which also advertised an Ames center crank portable (with a skid engine illustration).
- *Geo. H. Adams & Son's New Columbian Rail Road Atlas and Pictorial Album of American Industry* (Asher & Adams, copyrighted in 1874) carried a cut of a Blandy portable engine.
- In 1875, Erie City was building portable engines and skid engines.
- Before the panic began, thirteen men formed a partnership to run the Frick Company; after the panic occurred, the thirteen came to be known as "the lucky 13."
- In 1874, the Hagerstown Steam Engine and Machine Works were founded, as was Southern Engine & Boiler, of Jackson, Tennessee.
- In 1874, the Harrison Machine Works in Belleville, Illinois, added partners and built the firm's first steam engine.
- In 1875, Heald portables were manufactured in California.
- In that same year, Edward Huber and Lewis Gunn bought Holmes & Seffner; in 1875, the Huber Manufacturing Company was incorporated.
- In 1874, Sabin & Seymour began manufacturing agricultural implements; the firm later evolved into the Northwest Thresher Company.



Despite the Panic of 1873—or possibly to alleviate it—firms such as Frick & Company vigorously advertised portable engines for agricultural purposes. Here is a catalog illustration from a booklet with testimonials dating to 1874. Increasing numbers of manufacturers built traction engines in the 1870s, but the less expensive portables dominated the market during the so-called "Long Depression."

- In the spring of 1875, J. O. Spencer bought a factory at auction from the administrators of the McFarland estate in Union Springs, New York; Spencer began to manufacture portable steam engines in 1877.
- The Upton Manufacturing Company was incorporated in 1874.
- The Waterous Engine Works incorporated in 1874 in Brantford, Ontario.
- From 1875 to 1876, the partnership of Wood, Taber & Morse emerged as a major producer of portable engines, which were widely imitated by other firms (certainly Joseph Hall Machine Works in Ontario, which produced Wood, Taber & Morse portables by license; obviously the Nichols & Shepard Company; possibly Hooven, Owens, Rentschler & Company [after 1880]; possibly the Empire Agricultural Works; possibly the Oneida Steam Engine & Foundry Company [around 1880]; and maybe Marshall, Graves & Company [around 1880]).

Documented Events Involving Traction Agricultural Engines Through Early 1876:

- In 1873 and 1874, Oliver Henry Burdett was trying to bring his *traction* engine concept into reality in New Athens, Ohio.
- In 1874, the Phelps Steam Engine Company of Phelps, New York, was building the Monitor that transitioned into Cornelius Aultman's Canton Monitor by 1875 and 1876.
- The Doan Steam Wagon was developed in California by 1875. (I include this item as one of several examples of an interest in designing engines for hauling.)
- In 1874, Owens, Lane & Dyer of Hamilton, Ohio, won a gold medal at the Ohio State Fair for the firm's traction engine; the Hamilton manufacturer had experimented with a chain drive in 1873. In 1876, the Owens, Lane, & Dyer Machine Company applied for a receiver to try to sustain business. Ultimately, the old company transitioned into other engine-building works. In early June of 1879, Clark Lane, in his role as receiver, deeded to Ritchie & Dyer a factory location. Archibald Davidson and Frank Doellman purchased several more lots nearby to begin a boiler manufactory. Lane helped establish Hooven, Owens, Rentschler & Company in 1880.
- In 1874, Robert Crouch Parvin worked to perfect his steam plow. (I include this item as one of several examples of a decades-old interest in improving the use of steam power for plowing.)
- The Rogers patent that was filed in 1875 and granted in 1876 led to the successful bevel-geared traction engines of the C. & G. Cooper Company in Mt. Vernon, Ohio; Cooper bought many similar patents and licensed several other firms to produce traction engines with the patented gearing (notably, Aultman & Taylor, the J. I. Case Threshing Machine Company, the Nichols & Shepard Company, and Russell & Company).

Many other steam engine manufacturers were active from late 1873 through early 1876, the brief interval highlighted in the two paragraphs above, but the facts listed therein have dates that are precisely documented. As Wik suggested, traction engines for agricultural purposes slowly developed from chain drives to bevel-gear drives. More striking is the fact that so many companies were producing *portable steam engines* during the worst years of the Black Seventies! Didn't anyone tell these firms that a calamitous depression was underway?

While the panic was one of the factors that forced the well-established firm of Owens, Lane & Dyer into receivership, there were extenuating circumstances that compelled the Hamilton (Ohio) manufacturer to transition into other companies. (See "Surprises in Hamilton," published in *E&E* for February and March of 2014 and posted under Favorite Articles at roberttrhode.org.) Sources reveal that some firms in the farm steam engine business reorganized in response to the panic, but Owens, Lane & Dyer was about the only major agricultural engine business that we can consider to have failed.

We are led back to Laut's suggestion that panics were eased by agricultural production. It appears that steam engine companies and, by extension, agricultural implement firms in the U.S. deliberately strove throughout the panic years of the 1870s to increase farm productivity (which, admittedly, did fluctuate throughout the period); consequently, we may conclude that such firms were directing their energies toward alleviating the crisis, not merely reacting negatively to the panic by, let us say, reducing capacity or declaring bankruptcy. Before we leap to the conclusion that downturns are uniformly bad for business, let us remind ourselves that, where economics are involved, our expectations are often false. International financial downturns occur at the confluence of economic forces and governmental intervention in finance. Complicated by political dimensions, the interpretation of the meaning of the Panic of 1873 is so daunting that historians and economists are still debating the causes and consequences of what took place. Among the facets of the problem that we are not exploring in this brief article are international dimensions, contention over the gold standard, impediments to the money supply, seasonal availability of dollars, corrections to markets, errors in judgment by close advisors to President Ulysses S. Grant, Jay Gould's various machinations, and manifestations of industrial capitalism. Having merely nodded toward such complexity, we will observe that many economists say prices dropped but productivity increased after the panic because the downturn tended to reduce the impact of governmental meddling and to return the U.S. to a free market economy that, by its nature, encouraged greater productivity. Our close look at agricultural steam engine manufacturing, though, leads us to consider that such productivity was not entirely inevitable but somewhat deliberate.

In his autobiography entitled *The First Million the Hardest* (1922), engine builder Arthur Briggs Farquhar reported that, at the outset of the panic, he refused to give up hope. His factory stayed closed only four days after the panic began. On page 154, Farquhar said, "... it occurred to me that the whole world was not involved in the panic, that there certainly must be customers to be found somewhere." Farquhar may have reflected at least part of the thinking of his fellow industrialists engaged in the enterprise of agriculture. Looking back over his long career, Farquhar observed (on pages 234-35), "... in all these years, trading with thousands of farmers, I have never heard one admit that prices were satisfactory, and only one, in my recollection, admit that he was making money. I should regard a farmer who was not thoroughly dissatisfied with prices and who was not declaring that he ought to stop farming and cease putting out crops to rot in the fields as an exception. I should regard him as even more an exception if ever he did fail to plant to capacity."

We may conclude that agricultural business interests and companies that built steam engines, threshing machines, and related implements took a lead in helping the nation out of the deep economic hole into which it had fallen.

Laut published her book in 1929; the million-dollar question is whether she foresaw the Great Depression that ensued from the stock market crash of that year. She likely did, as many who were familiar with the rural American economy throughout the 1920s foretold catastrophe.

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