The Power of Steam

Think about blowing a whistle. It takes lung power to do it. With that same power you can blow up a balloon or push a toy sailboat in the bathtub. Early in the 18th century it seemed to occur to several people that boiling water—steam—produced the same effect, and might be used as a source of power.

Have you heard a teakettle blow a whistle? Have you ever seen a teakettle blow off its spout? Steam is powerful stuff. Picture a huge boiler filled with water that is boiling furiously. The steam that it makes can move a boat or a train.

Some people—those with curious minds—began to think of ways to do that. Some Englishmen started the process, but quite a few Americans worked on the problem. William Henry, John Stevens, and John Fitch were American inventors—each built a steamboat—but each had some bad luck and the country wasn’t quite ready for their ideas.

It was ready when Robert Fulton came along. Fulton was an artist, a good one, who had studied painting in London. Fulton was also an inventor. Some people called him an American Leonardo da Vinci. (Leonardo was one of the world’s greatest artists: he was also an inventor.) People were exaggerating—Fulton’s paintings weren’t as good as Leonardo’s—but his inventions were more important.

In 1807, Fulton’s steamboat, the North River, steamed up the Hudson River the 150 miles from New York to Albany. It made that voyage in 32 hours, and that seemed astonishingly fast. (How fast? Do some arithmetic and find out how many miles per hour it went.)

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Dance the Boatman

The boatman he can dance and sing And he’s the lad for any old thing. Dance the boatman, dance! Dance the boatman, dance!
He’ll dance all night On his toes so light And go down to his boat in the morning. Hooray the boatman, ho! Spends his money with the gals ashore! Hooray the boatman, ho! Rolling down the Ohio!

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When I hear the iron horse make the hills echo with his snort like thunder, shaking the earth with his feet, and breathing fire and smoke from his nostrils (what kind of winged horse or fiery dragon they will put into the new mythology I don’t know), it seems as if the earth had got a race now worthy to inhabit it.

— Henry David Thoreau, Walden
Fulton’s Paragon (above, on the Hudson in 1808) was so grand—it had a paneled dining room and real bedrooms—that passengers unused to traveling in such style had to be reminded not to sleep in their shoes.

You have to understand that before the steamboat, boats floated down a river on the river’s current. Can you figure out how they could go upriver against the current?

There was no easy way. Most traffic on a river was one way. If you really wanted to go in the other direction, you could use poles and push yourself (hard), sail (if there was enough wind), or be pulled by horses on a towline (many problems). On the Mississippi River, boats could sometimes make a mile an hour going upriver.

Fulton’s boats were soon chugging up the Mississippi at 10 miles an hour (easily). By 1820 there were 60 steamboats on the Mississippi; by 1860, there were about a thousand.

Steamboats were efficient, fast, fun, and—dangerous! If steam is trapped in a boiler and for some reason can’t get out, the boiler will explode. That happened to a number of steamboats. They blew their lids and killed people when they did.

The same thing happened when steampower took to the rails. Now that was a good idea! Take a steam engine and have it pull a set of wagons rolling on a track. Hold on to
Boiler explosions were common; safety devices were often inefficient, sometimes nonexistent. In 1871 New York's Staten Island ferry blew up, killing 60 people.

your hat: we're going to whiz at 20 miles per hour. As steam engines improve, trains will go faster and faster.

But talk about dangerous! Besides exploding, the engines jump their tracks, and trains crash into each other. The trains are called "iron horses" and "teakettles on tracks." The engines are made of iron and have tall smokestacks and fireboxes. Passenger cars look like stagecoaches, and, like fancy coaches, are painted with bright designs. Because the cars are wide open, the colorful paint is soon covered with soot, and so are the passengers. And soot isn't the only thing the riders have to worry about: the engines give off sparks that fall on their clothes and get into their hair. On the first train in New York, passengers are kept busy putting out fires in each other's clothing.

But soon the design is improved, and the passenger car becomes a long, enclosed room with a aisle down the center and seats on either side. The first steam engines were fired with wood, but coal was found to produce a hotter flame. Either way, a fireman is kept busy lifting wood or shoveling coal to keep the fire blazing and the water boiling.

When the Baltimore & Ohio Railroad opens 13 miles of railroad track in 1830, horses are used to pull carriages on wheels. On a track, one horse can pull as heavy a load as 10 horses off the track. But the railroad's directors are not satisfied. They are forward thinkers. They want to try a new steam engine. British engineers who come and look at the track say sorry, the Baltimore & Ohio track has too many curves for a steam engine. No engine can stay on that track, they say. Peter Cooper thinks differently. He is a Baltimore inventor and he owns an iron foundry. Later, he wrote, "I had naturally a knack at contriving, and I told the directors that I believed I could knock together a locomotive that would get around that curve."

Which is just what he did. He found a small engine, took the barrels from two muskets (for

Peter Cooper (above) was a New Yorker who began with a grocery store and a glue factory. He built many machines besides gaily painted Tom Thumb (right).
pipes) and some other odds and ends, and built a little steam locomotive he named Tom Thumb, after the children’s fairy tale. Then he invited the directors for a ride. “We started—six on the engine, and thirty-six on the car. It was a great occasion... We...made the passage to Ellicott’s Mills in an hour and twelve minutes.”

Tom Thumb worried a Baltimore stagecoach company. They didn’t want competition from iron engines. So they challenged the owners of the train to a race. Their best horse-pulled railroad against Tom. Well, the horse was soon in the lead; then the engine built up power and pulled ahead. It was way ahead when an engine belt slipped out of place. The steam pressure fell and the train came to a stop. The people in the horse-drawn train laughed at they gobbled by. They wouldn’t laugh for long. Trains were the future.

Canals had a problem: they froze in winter. Stagecoaches and horse-pulled trains had problems, too: they were small, and couldn’t carry heavy freight. Besides, horses get tired and need replacing. Trains could be used year round. They could carry very heavy loads. By 1840, more than 3,000 miles of track had been laid.

Charles Dickens came to America in 1842 and rode on a train. Dickens was a famous English novelist and the author of the story of Scrooge and Tiny Tim called A Christmas Carol. This is part of what Dickens wrote about an American train ride.

On it whirls headlong, dives through the woods again, emerges in the light, clatters over frail arches, rumbles upon the heavy ground, shoots beneath a wooden bridge... suddenly awakens all the slumbering echoes in the main street of a large town, and dashes on haphazard, pellmell, neck-or-nothing, down the middle of the road. There—with mechanics working at their trades, and people leaning from their doors and windows, and boys flying kites and playing marbles, and men smoking, and women talking, and children crawling, and pigs burrowing, and unaccustomed horses plunging and rearing, close to the very rails—there—oh, on, on—tears the mad dragon of an engine with its train of cars; scattering in all directions a shower of burning sparks from its wood fire; screeching, hissing, yelling, panting; until at last the thirsty monster stops beneath a covered way to drink, the people cluster round, and you have time to breathe again.

By 1850 there were almost 9,000 miles of track in America; by 1860—the year before the Civil War—there were 30,000 miles of track. Traveling by train, at an unbelievable 30 miles an hour, you could go from New York to Chicago in only two days.

Cartoons like this one poked fun at teakettle power, but the artist didn’t realize what was ahead. Steam power was changing the world.

Before Steam Power There Was Horsepower

If you were in school in the 1830s, you would probably be reading Peter Parley’s First Book of History. This is what it said in its chapter on Maryland:

The most curious thing at Baltimore is the railroad. I must tell you that there is a great trade between Baltimore and the states west of the Allegheny Mountains. The western people buy a great many goods at Baltimore, and send in return a great deal of western produce.

Now, in order to carry on this business more easily, the people are building what is called a railroad. This consists of iron bars laid along the ground, and made fast, so that carriages with small wheels may run along them with facility... A part of the rail road is already done, and if you choose to take a ride upon it, you can do so. You will mount a car, something like a stage, and then you will be drawn along by two horses, at the rate of twelve miles an hour.
If you thought Vietnam was a nasty little war, you should have seen the Mexican War. For the first time in America’s short history, the nation didn’t go to war with a foreign power over independence, foreign provocation, or global politics. It was a war fought unapologetically for territorial expansion. One young officer who fought in Mexico later called this war “one of the most unjust ever waged by a stronger against a weaker nation.” He was Lieutenant Ulysses S. Grant.

The war with Mexico was the centerpiece of the administration of James K. Polk, the most adept of the Presidents between Jackson and Lincoln. Continuing the line of Jacksonian Democrats in the White House after Tyler’s abbreviated Whig administration, Polk (1795–1849) was even dubbed “Young Hickory.” A slaveholding states’-rights advocate from Virginia, Polk slipped by Van Buren in the Democratic convention and was narrowly elected President in 1844. His victory was possible only because the splinter antislavery Liberty party drew votes away from Whig candidate Henry Clay. A swing of a few thousand votes, especially in New York State, which Polk barely carried, would have given the White House to Clay, a moderate who might have been one President capable of forestalling the breakup of the Union and the war.

It was a “Manifest Destiny” election. The issues were the future of the Oregon Territory, which Polk wanted to “reoccupy,” and the annexation of Texas, or, in Polk’s words, “reannexation,” implying that Texas was part of the original Louisiana Purchase. (It wasn’t.) Even before Polk’s inauguration, Congress adopted a joint resolution on his proposal to annex Texas. The move made a war with Mexico certain, which suited Polk and other expansionists. When Mexico heard of this action in March 1845, it severed diplomatic relations with the United States.

Treating Texas as U.S. property, Polk sent General Zachary Taylor into the territory with about 1,500 troops in May 1845, to guard the undefined “border” against a Mexican “invasion.” After months of negotiating to buy Texas, Polk ordered Taylor to move to the bank of the Rio Grande. This so-called army of observation numbered some 3,500 men by January 1846, about half of the entire U.S. Army. Escalating the provocations, Polk next had Taylor cross the Rio Grande. When a U.S. soldier was found dead and some Mexicans attacked an American patrol on April 25, President Polk had all the pretext he needed to announce to Congress, “War exists.” An agreeable Democratic majority in the House and Senate quickly voted—with little dissent from the Whig opposition—to expand the army by an additional 50,000 men. America’s most naked war of territorial aggression was under way.
May 3 An indication of the war’s course comes in the first battle. At Palo Alto, 2,300 American soldiers scatter a Mexican force twice their size. In the ensuing Battle of Resaca de la Palma, 1,700 Americans rout 7,500 Mexicans. Accompanied by a group of Whig newspapermen, General Taylor is made an immediate national hero and is touted as the next Whig President. President Polk orders a blockade of Mexican ports on the Pacific and the Gulf of Mexico.

June 14 American settlers in California, also a Mexican possession, proclaim the independent Republic of California. On July 7, Commodore John Sloat lands at Monterey and claims California for the United States. In August, California is annexed by the United States, and Commodore David Stockton establishes himself as governor there.

September 20–24 General Taylor captures the city of Monterey, Mexico, but he agrees to an armistice allowing the Mexican army to evacuate the city, earning President Polk’s great displeasure.

1847

January 3 General Scott orders a force of 9,000 of General Taylor’s men to assault Vera Cruz by land.

February 22–23 The Battle of Buena Vista. Ignoring Scott’s orders, Taylor marches west to Buena Vista and, after refusing to surrender to a superior Mexican force commanded by Santa Anna, Taylor’s 4,800 men, mostly raw recruits, defeat a Mexican army of 15,000 largely untrained peasants. One of the heroes on the American side is Jefferson Davis, who leads a Mississippi infantry regiment in a counterattack using eighteen-inch Bowie knives. With loyal Whig newspapers trumpeting another triumph for Taylor, his run for the next presidency seems assured.

1848

February–March The Treaty of Guadalupe Hidalgo, ending the war with Mexico, is signed and then ratified by the Senate. Under its terms, the United States receives more than 500,000 square miles of Mexican territory, including the future states of California, Nevada, Utah, most of New Mexico and Arizona, and parts of Wyoming and Colorado, as well as Texas. The border with Mexico is set at the Rio Grande. In return, Mexico is paid $15 million and the United States takes on claims against Mexico by Americans, totaling another $3.25 million. One Whig newspaper announces, “We take nothing by conquest. . . . Thank God.”