

CHAPTER 8: The Transcontinental Railroad; Moving Out West

The Wedding of the Rails

Back in Year Three, we read how people poured into California during the Gold Rush. Before 1849, there were hardly a thousand U.S. citizens living in all California. After the Forty-Niners came, there were about 100,000— with more coming all the time.

How did all those people get all the way across North America? In those days, a person who wanted to move out west had two choices. First, he could go by land— pulling a wagon over the



California Trail. The California Trail was actually several trails, each following a different route through the many mountains out west. They all split off from the **Oregon Trail**, which had just opened in the 1830s.

Second, he could go by sea— most of the way. He started by sailing down the east coast, then through the Gulf of Mexico and the Caribbean Sea. He was aiming for a place where North America was much narrower— usually Panama. A hired wagon took him from the Caribbean coast to the Pacific coast, where he caught a ship to San Francisco.

Both ways were long, hard and risky. By 1850, Americans were already wishing for a **transcontinental** railroad— in other words, one that stretched all the way across North America.

Transcontinental means
“across the continent.”

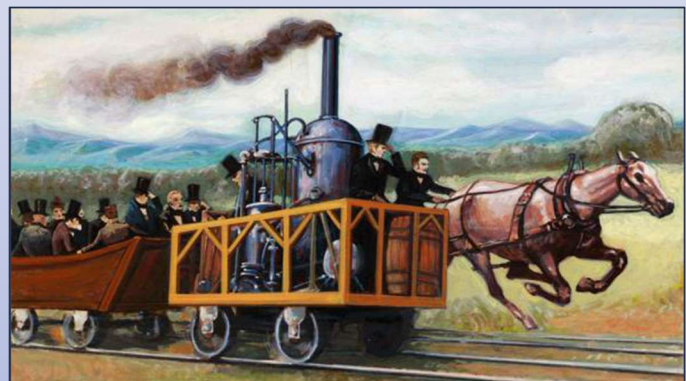
What stopped them from getting one was the old argument between North and South. Both sides wanted a transcontinental railroad; but they wanted it in different places. The North wanted it to start from a northern city like Chicago. The South wanted a southern route, through Texas. What with all the arguing, Congress couldn’t decide which way to go.

In the meantime, the east coast needed a way to communicate with the west. California became a U.S. state in 1850, the year after the Gold Rush. The federal government needed to talk to the new state government; and people back home needed to stay in touch with family out west. But how could they, when the road between them was so long and hard?

One answer was a new business that opened in April 1860: the **Pony Express**. It worked like a relay race, with mail passing from one galloping horse to the next.

The first railroads used horses to pull their cars. The change to steam locomotives started with an inventor called Peter Cooper, who built the first one in America: tiny *Tom Thumb*.

One day in 1830, the B&O Railroad hosted one of the strangest races ever. *Tom Thumb* pulled a car on one set of rails; while a horse pulled a car on the set beside it. At first, *Tom Thumb* easily outran the horse. But then one of its belts flew off, slowing it down enough for the horse to win. Even so, everyone could see that steam power would win in the long run.



Tom Thumb racing a horse on the Baltimore & Ohio Railroad (1830)

The Pony Express was incredibly fast for its day. It started at St. Joseph, Missouri, and ended at Sacramento, California. The distance between was almost two thousand miles, with a lot of those miles through mountains. Yet the Pony Express could make the trip in just ten days!



There were three secrets to all this speed: fast horses, light riders and plenty of stations. The Pony Express hired about seventy-five riders, all weighing 110 pounds or less. It also built about 190 stations along its route, averaging about ten miles apart. A rider pushed his horse hard for ten miles, grabbed a fresh horse at the next station, and then galloped on. He went through six horses, or about sixty miles, before a fresh rider took his mailbag and rode on.

Alas, the Pony Express was nowhere near as fast as the next business to come along: **Western Union**. Where the Pony Express used horse relays, Western Union used electrical relays!

Oddly enough, Western Union owed its electrical genius to a painter. **Samuel Morse** started as a portrait artist from Connecticut. He was down in Washington D.C., working on a portrait of the Marquis de Lafayette, when he received two letters from his father. The first said that Morse's wife had been sick, but was getting better. The second, which came just a day later, said that his wife had died! By the time Morse got home, he had missed his own wife's funeral.

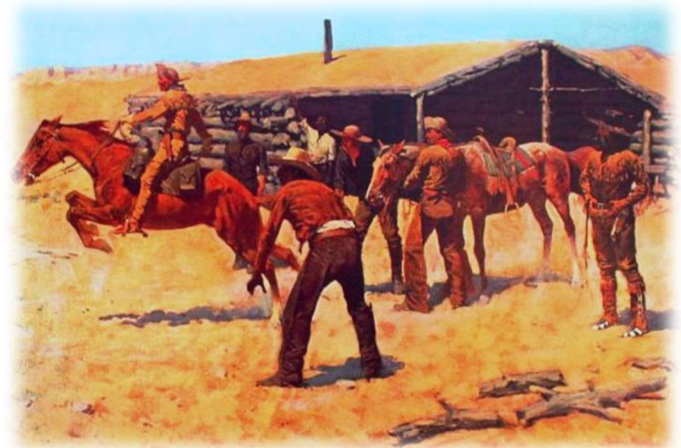
From then on, Morse was always looking for ways to send messages faster. He found one in 1837, when he invented one of the world's first working **telegraphs**.

Morse wasn't the first to send messages by wire; but he was the first to do it well. He noticed that electrical signals grew weaker as they passed through long wires, making them hard to read. His answer was to boost the signal every so often, using a kind of circuit called a repeater.

Besides the telegraph itself, Morse also helped invent a code for using it. **Morse Code** turned the whole alphabet into just three electrical signals: short ones, long ones and spaces. That way, Morse could send messages with just one wire— where earlier telegraphs used several wires.



Samuel Morse (1791 – 1872)



"Coming and Going of the Pony Express" by Frederic Remington



The first working telegraph line in America stretched thirty-eight miles, from Washington D.C. to Baltimore, Maryland. It opened in 1844, when Morse transmitted these famous words from Numbers 23:23: "What hath God wrought!"

Right away, telegraph companies started planting poles and stringing wires. Bigger companies started buying smaller companies, until most telegraph lines were owned by just a few big companies. The biggest, Western Union, was the one that put the Pony Express out of business.

By 1860, the country had two separate sets of telegraph lines: one in the east, and one in the west. The eastern set stretched as far west as Omaha, Nebraska. The western set stretched as far east as western Nevada. Congress wanted someone to connect the two— by building the first **transcontinental telegraph**.

The work started in July 1861, a year after Congress passed the **Pacific Telegraph Act**. One crew built from the east, and another from the west. Wagon trains rode across the long miles in between, carrying all the supplies they needed.

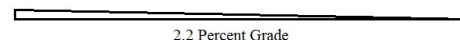
Hard as it was, the job took less than six months to finish. The crews met at Salt Lake City, Utah on October 24, 1861. Between the two of them, they had planted tens of thousands of poles, and stretched about 2,000 miles of wire. The Pony Express shut down on October 26th, two days after the transcontinental telegraph made it **obsolete**.



The **Transcontinental Railroad** was much harder, for many reasons. Where a telegraph needed thousands of poles, a railroad needed millions of railroad ties— all laid on solid road beds, and topped with heavy iron rails. Where a telegraph needed a few poles to cross a river, a railroad needed a bridge that could carry hundreds of tons. Where a telegraph wire could climb over a mountain, a railroad might have to blast through it— for heavy trains could only climb so high, so fast. The most they could manage was a 2.2-foot climb in 100 feet of track.

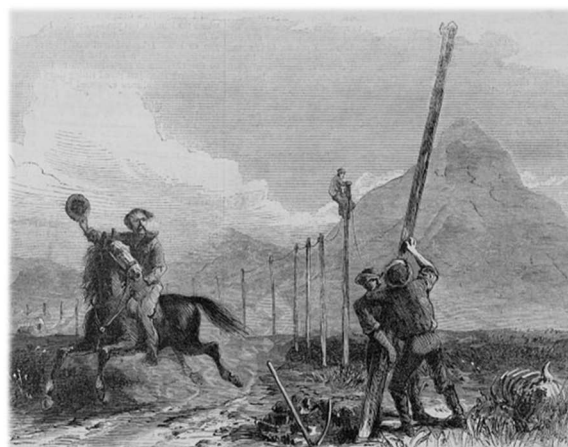


As we read above, the first problem was deciding where to put the railroad. But the Civil War solved that problem. After the Southern states pulled out of the Union, there was no more talk of a Southern railroad. The Transcontinental Railroad would start as far north as possible, to stay away from the fighting.



The Civil War was in its second year in 1862, when President Lincoln signed the law that got the Transcontinental Railroad started. The first **Pacific Railroad Act** named two companies to build it. The **Central Pacific Railroad** would build eastward, starting from Sacramento, California. The **Union Pacific Railroad** would build westward, starting from Omaha, Nebraska.

Why Omaha? Because Omaha stood just across the Missouri River from Council Bluffs, Iowa. Council Bluffs would soon be connected to Davenport, on the far side of Iowa. Davenport stood just across the Mississippi River from Rock Island, Illinois, which was already connected to Chicago. When it was all finished, the rails would stretch from Sacramento to Chicago and beyond.



A Pony Express rider tipping his hat to pole-setters working on the transcontinental telegraph in 1861. Note the buffalo skeleton at the pole-setters' feet.

To become **obsolete** is to be replaced by something new and better.



Once the starting points were set, the next problem was paying for the railroad. There were two kinds of payments: loans and land.

The loans were a kind of **investment** called **bonds**. Each company sold government bonds to get the money it needed to start building. The amount of money was set by the Pacific Railroad Act. For each mile of track laid through flat land, the companies could sell \$16,000 worth of bonds— about \$300,000 in modern-day money. A mile through foothills was worth twice as much, and a mile through mountains three times as much.

In the long run, the companies would have to pay all those bonds back— with **interest**. By then, though, they would have a money-making railroad to help them pay.

The other kind of payment didn't have to be paid back. For every mile of track they built, the government gave the companies 6,400 acres of land— half on one side of the railroad, and half on the other. The government kept the other half, another 6,400 acres per mile. All land within ten miles of the railroad was split between the companies and the government, unless it had already been claimed.

The size of this gift was staggering. In all, the government gave the companies about 275 million square miles of land— more than there is in all Texas! Parts of it weren't worth much, where the railroad passed through mountains or deserts. Other parts were worth a fortune— especially after the railroad came through, making them easy to reach. For a long time to come, railroad companies would be some of the richest companies in the whole United States.



The Union Pacific had the easier job, at first. It laid track through the Great Plains, where hills were few and far between. Flat land meant a lot less **cutting** and **filling**. There were places where a crew could simply set railroad ties, spike rails to them and then move on.



Railroad spikes

A train rolled along behind, carrying more ties, rails and spikes. Kitchen cars kept the crew fed. Bunk cars gave the crew places to rest, especially in winter.

The Central Pacific was a different story, for two reasons. First, it had hardly left Sacramento when it ran into a huge mountain range called the Sierra Nevada. Instead of sailing across the Great Plains, the company had to either cut or fill for almost every mile of track it laid.

Investors are businesspeople who risk their money in hopes of gaining more.

A **bond** is a kind of investment governments use to raise money. Investors trade money for bonds, giving the government the money it needs to build something. The government promises to pay the bonds back later, with interest.

Interest is the price investors charge for letting others use their money.



A stretch of Union Pacific track in Wyoming, cut through granite

A **cut** is a place where earth is dug away to level a road.

A **fill** is a place where earth is piled up to level a road.



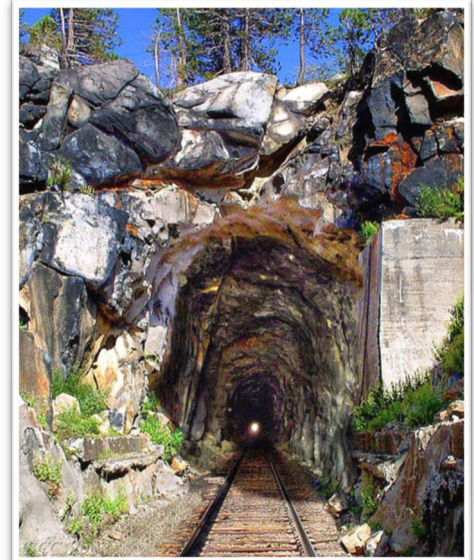
One of many big bridges on the Union Pacific side

Second, the West didn't have factories yet— which meant no modern supplies. So far, the only supplies made on the west coast were railroad ties. Everything else had to be shipped through Panama— every rail, spike, locomotive and car. Anything big had to be taken apart in the east, shipped west and then put together again. The company had to order months in advance to get all the supplies it needed.

The worst problem was all the tunnels. Even with the best route it could find, the Central Pacific still had to drill thirteen tunnels through the Sierra Nevada. The longest, Tunnel #6, was more than 1,600 feet long— about one-third of a mile, all through solid granite.

The work was painfully slow. One man held a hand drill, while two others took turns hitting the drill with heavy sledgehammers. When the hole was deep enough, the crew stuffed it with blasting powder, lit the fuse and ran. At best, the blast might break off a few wheelbarrow-loads of rock. Then it was back to the drill and sledgehammers.

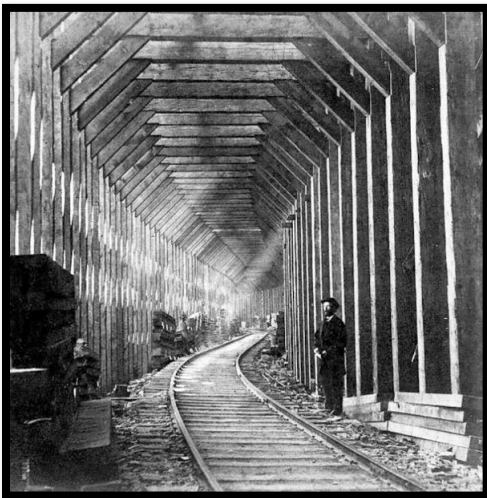
Even with crews working around the clock, the tunnels grew by less than a foot per day. To speed things up, the Central Pacific blasted both sides at once. Sometimes, it even drilled down and blasted from the middle.



The west entrance of Tunnel #6, a.k.a. the Summit Tunnel, at Donner Pass

Besides the mountains themselves, the Central Pacific also faced a problem that was common in the mountains:

snow. One never knew when a storm might dump a few feet of snow on the tracks. To keep going through winter, the Central Pacific built snow sheds over the worst parts of its route. In all, the company put about thirty-seven miles of track under roof!



Inside a Central Pacific snow shed

Who did all this drilling, blasting and building? On the Central Pacific side, it was mostly Chinese. Tens of thousands of Chinese had moved to California, running from big trouble in their homeland (Chapter 13). They turned out to be the best help the Central Pacific could find— hard-working, honest and courteous.

On the Union Pacific side, the work was divided. It started with mostly Irish, who came running from trouble in their own homeland (Chapter 19). When it got to Utah, it switched to mostly Mormons. The Mormons had moved to Utah in the 1840s, running from troubles back east. Almost everyone who worked on the Transcontinental Railroad had run from trouble somewhere.

Mile by mile, both sides worked closer to their goal: the **Wedding of the Rails**. The Central Pacific laid almost 700 miles of track, starting in 1863. The Union Pacific laid almost 1,100, starting in 1865. They planned a big meeting at Promontory Summit, Utah on May 8, 1869.

At the last second, a surprise gummed up the works. The vice president of the Union Pacific, Thomas Durant, was riding out to the meeting— when all of a sudden, his train



A replica of *Jupiter*, the Central Pacific engine at the Wedding of the Rails. The Union Pacific engine was Number 119.



The Wedding of the Rails (May 10, 1869)

stopped. Some of his own workers had piled railroad ties across the track, blocking it. When Durant asked what was wrong, the workers answered that he hadn't paid them in months. Unless he came up with the money right now, he could forget his precious meeting!

Durant

needed time to scrape together the hundreds of thousands of dollars he needed. As a result, the Wedding of the Rails was late. It happened on May 10th, two days after the date etched into the **Golden Spike**.

"Go West, Young Man!"

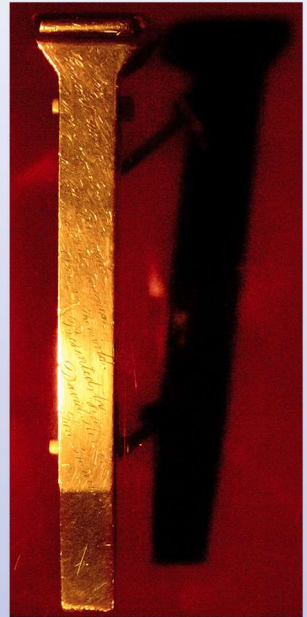
The Transcontinental Railroad was more than just a link between the east coast and the west coast. It was also a way to claim everything in between. Congress wanted to fill the whole continent with settlers, so that the whole world would know: All this land belonged to the United States of America.

Six weeks before he signed the Pacific Railroad Act, President Lincoln signed another law that helped fill the continent. The **Homestead Act of 1862** promised something everyone wanted: free land! Almost anyone could own land out West, if he was willing to do three things:

- First, he had to live there. The land would only be his after he lived on it for five years. If he left the land for more than six months, then it would go back to the government.
- Second, he had to use the land for himself and his family— no one else. Congress didn't want big businesses using the Homestead Act to buy up all the best land out West.
- Third, he had to file his claim at a government land office— which meant paying a \$10 fee.

Once he did those three things, he would own one **quarter section** of land— in other words, 160 acres. Congress decided that one quarter section was enough for one farmer to earn a living.

Settlers took their time getting started, for a few reasons. First, the Civil War was still going on. Second, the Transcontinental Railroad wasn't finished yet. Third, Native Americans fought for their homeland— as we'll read in Chapter 14.



The Golden Spike was the spike that finished the Transcontinental Railroad. The gold was for show, of course. After the pictures were taken and the champagne drunk, workers pried up the Golden Spike and pounded in an iron one.

A **homestead** is a house and farm together.

A **section** of land is one square mile, which equals 640 acres. Surveyors had been marking out land in square sections ever since 1785, when Thomas Jefferson helped write the Land Ordinance (Year Three).



Square sections carefully laid out in Indiana

There was also a fourth reason, for a while: **buffalo**. These cow-like creatures had no idea what a quarter section was. They roamed the Great Plains by the millions, eating everything in their path— including settlers' crops. They also knocked down telegraph poles, and blocked railroad tracks for hours on end.

Besides all that, buffalo also helped the settlers' enemies: the Native Americans of the Great Plains. Tribes like the Comanche, Sioux, Cheyenne and Arapaho depended on buffalo for everything. They used their meat for food; their hides for clothing and shelter; their tendons for bowstrings; and much more. If the government wanted to drive out Native Americans, then killing buffalo was a great way to do it.

At first, killing buffalo was easy. For some reason, most buffalo didn't run at the sound of gunfire! A careful hunter could kill many buffalo before the herd took fright and ran off. Then the skinners moved in, using teams of horses or mules to strip off the buffalo hides. The rest of the animal was wasted; for the hunters had no way to preserve that much meat.

Killing buffalo was also big business. For a while, one buffalo hide sold for three whole dollars— in a time when a hard day's work paid only one dollar.

With prices like that, it didn't take long. The buffalo were gone from the Great Plains by 1889, twenty years after the Transcontinental Railroad opened.



The Homestead Act was terrible news for one kind of businessman: the cattleman. Since the early 1800s, Texas cattlemen had been letting their herds wander wherever they could find grass and water. Once their cattle were fat enough, they hired extra cowboys to

drive them to market. A lot of cattle drives followed the **Chisholm Trail**, which ended at the closest train station to Texas: the one in Abilene, Kansas.

The Homestead Act ruined all this. As soon as settlers moved in, they started complaining about cattle eating their crops. When the cattle kept coming, settlers started fencing off their land. This got a lot easier after 1874, when Joseph Glidden invented a cheap fencing material called **barbed wire**.



Cattlemen shouted that the settlers were fencing off too much. They were free to fence their own land, although the cowboys might not like it. But they were also fencing land that still belonged to the government! Furious cowboys started cutting fences, deliberately driving their cattle through settlers' crops. The settlers fought back— starting a **Fence Cutting War**.



Heaps of buffalo hides waiting to be sold



Scene from a winter cattle drive. Cowboys who handled cattle were "drovers," and cowboys who handled horses "wranglers." Cowboy cooks carried supplies in a specially designed "chuck wagon."

The Fence Cutting War lasted only about two years, from 1883 – 1884. By then, railroads connected Texas to the rest of the country— which meant no more need for cattle drives. The cowboy way of life was already dying out.



Meanwhile, the Homestead Act started losing steam. The farther west settlers went, the drier the land grew. A quarter section of land might be enough for a farmer in eastern Nebraska; but it was nowhere near enough for one in Wyoming. When the best land ran out, settlers shouted for more— including some that was supposed to be off-limits.

Back in Year Three, we read how President Andrew Jackson signed the **Indian Removal Act**. Starting in 1832, the last Native American nations were forced out of their old homes in the east. They followed the **Trail of Tears** to the Indian Territory, in what is now **Oklahoma**.

Fifty years later, much of Oklahoma was still empty. Whatever land the tribes didn't use, they usually rented to big cattlemen from Texas. Some of it was better than anything a settler could still get out West. Settlers wanted that Oklahoma land; and they soon found a way to get it.

Around 1879, Congress started getting visits from a kind of people called **Boomers**. A Boomer was a settler who was excited about Oklahoma, and wanted Congress to open it up soon.

Meanwhile, Oklahoma was already open to **squatters**. A squatter was a settler who didn't wait for Congress. He simply moved in and started farming, in hopes that Congress would let him keep the land— under a shaky law called **squatter's rights**.

The Oklahoma Land Runs (1889 - 1895)

The Boomers wound up getting their way; but not the squatters. In March 1889, Congress announced that settlers could soon claim quarter sections in a certain part of Oklahoma. It would all start a few weeks later, on April 22nd. Before that day, the U.S. Land Office cleared out every squatter it could find. That part of Oklahoma became a “no man's land”— a place where no man was allowed to go.

Allowed or not, some settlers went anyway. As the big day drew near, settlers started sneaking into Oklahoma and picking out the best places to settle. These cheaters got there sooner than everyone else— which is why they are called **Sooners**. Oklahoma is still called the “Sooner State,” after those

cheating Sooners.

The big day finally came. On April 22nd, about 50,000 settlers lined up just outside that part of Oklahoma. They would have to move fast; for there were only 12,500 quarter sections to claim— enough for one in four settlers. The rest were going to be badly disappointed.



A “soddy,” or sod house, on the Great Plains. Settlers built with sod because so much of the Great Plains had no trees.



“The Oklahoma Land Rush” by John Curry

Most families chose a fast rider to go ahead, while the rest followed in a wagon. When the cannon went off at noon, every rider spurred his horse and galloped off at top speed.

Inside Oklahoma, the Sooners also galloped. They wanted their horses to look tired, so that honest settlers wouldn't guess what they'd done. The fastest riders were stunned when they reached the best sections— and found that Sooners had already claimed them!

What a madhouse it must have been. By the end of that first day, the United States had two brand-new towns: Oklahoma City and Guthrie, both with thousands of tents.



Before telegraphs and railroads, people from different towns rarely noticed an interesting problem: Their clocks were all different. In those days, each town set its clocks by the sun. In other words, each used a sextant or sundial to find its own noon— the exact time when the sun stopped rising, and started setting. Since the globe was always rotating, noon in the east came before noon in the west. When noon came to Chicago, it was only 11:27 a.m. in Omaha.

Sun time caused big problems for railroads. Stations had to keep several clocks, one for each town along their line. Engineers struggled to tell their passengers what time it would be when they pulled into each station. Passengers were always changing their watches, losing track of the time back home.

The answer, the railroads decided, was something called **standard time**. They divided the United States into four time zones: Eastern, Central, Mountain and Pacific. Each station would set its clocks to the standard time in its time zone. From now on, a clock in Chicago would read the same as one in Omaha— even though the sun rose thirty-three minutes later in Omaha.

Standard time started at noon on November 18, 1883, when all stations changed their clocks at the same time. Most towns changed theirs too, even though no law said they had to. For people in the eastern part of their time zones, that Sunday was a “Day of Two Noons”— one for sun time, and another when they turned their clocks back to standard time. People in the western part of their time zones lost a few minutes as they turned their clocks ahead.



The start of another Oklahoma Land Run in 1893

Two inventors made the hard job of raising wheat a lot easier for settlers. The first was **Cyrus McCormick** (1809 – 1884), who patented his first **reaper** in 1834. Before the McCormick reaper came along, everyone cut wheat by hand. A man with a hand scythe needed four to eight hours to cut one acre of wheat. A man with a horse-drawn reaper could do the same job in one hour.

Jerome Increase Case (1819 – 1891) didn't actually invent the **threshing machine**. He just made threshing machines work better, starting in 1844.

The only part of wheat that's fit to eat is the kernel. To thresh wheat is to separate the kernels from the parts that aren't fit to eat: straw and chaff. Before threshing machines, farmers threshed wheat by hand. In other words, they beat dried wheat with a flail until the kernels fell off the straw.

The threshing machine did the same job in a lot less time— when it was working right. Case's contraption shook the wheat until the kernels fell off, and then collected them at the bottom. The problem was, the machine had to be adjusted for different-sized kernels. Let it be off in one direction, and kernels would go out with the straw and chaff. Let it be off in the other, and kernels would come out mixed with chaff. Only farmers with skill and patience bought threshing machines. Everyone else hired the machines once a year, at harvest time.



One of J.I. Case's wooden-framed threshing machines

Ruther-fraud

Reconstruction was the process of rebuilding the South and bringing it back into the United States.

To be **occupied** is to be controlled by troops.

In Chapter 6, we read how the Radical Republicans handled **Reconstruction**: by sending soldiers into the South. Starting in 1867, the South was **occupied** territory. Congress divided it into five military districts, each run by a Union general.

Starting in 1869, these generals all answered to a new president: **Ulysses S. Grant**. Grant had already led the North to victory in the Civil War. Now that he was president, he wanted to make sure his troops hadn't sacrificed their lives for nothing. One way he did that was by making sure blacks could vote.

The story starts with the terrorist group we met in Chapter 6: the **Ku Klux Klan**. The Klan was never stronger than it was when Grant took over. Klansmen were doing all they could to keep blacks from voting— even killing them. Grant's generals couldn't stop them; for every time they arrested a Klansman, the judge let him go. Why? Because many Southern judges were secretly Klansmen themselves!

The answer was to write special laws just for the Klan. The

Enforcement Acts gave Grant the power to hold Klansmen without a trial, so that judges couldn't let them go. It worked so well that within a few years, the Klan was finished— although it would spring up again years later.

Now that blacks were free to vote, Republicans started winning elections in the South— including black Republicans. The U.S. Senate got its first black senator: Hiram Revels of Mississippi. The U.S. House got several black representatives.



The first group of black senators and representatives elected to Congress

As soon as a state was safe for black voters, Grant pulled his army out of that state. This was good news for the South, but bad news for the Republican Party. The moment the armies left, Republicans started losing elections again!

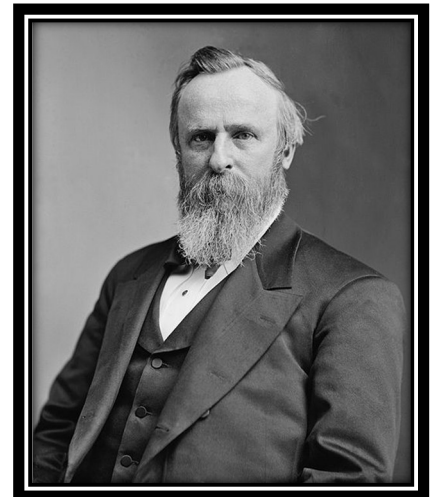
Why? First, because white Democrats found other ways to stop black Republicans from voting— as we'll read in Chapter 11. Second, because Republicans shot themselves in the foot. Grant's eight years in office were full of **scandals**— including a big one called the **Whiskey Ring**. Southerners already believed that Republicans were dishonest; and now Republicans gave them proof.

All this led to a strange situation in 1876, when it was time to choose the next president. The voters had two main options: a Republican called **Rutherford Hayes**, and a Democrat called Samuel Tilden. When the votes started coming in, Hayes was in trouble. He had lost some big states in the North— which meant that he couldn't win without Southern votes.

By this time, only three Southern states were still occupied by Union armies: Louisiana, Florida and South Carolina. All three states sent two vote counts to Congress: one Republican, and one Democrat. The Republican counts said that Hayes had won; while the Democratic counts said Tilden. Now Congress had to decide which counts to accept.

A **scandal** is anything that shocks or outrages a lot of people.

The **Whiskey Ring** was a group of whiskey makers who bribed government officers so that they wouldn't have to pay taxes.



Rutherford B. Hayes (1822 – 1893)

The president after Hayes, James Garfield, was the second to be assassinated— after Lincoln. The assassin, Charles Guiteau, had helped Garfield win the election of 1880. He was expecting a nice government job as a reward; and when Garfield didn't give it, Guiteau shot him. Garfield clung to life for almost three months before dying in September 1881.

The next president, Chester Arthur, was the vice president who took over for Garfield. Arthur was known for his taste in clothes. He owned about eighty pairs of pants, and changed them several times a day.

With nowhere else to turn, Congress set up a special committee to decide. It is said that Hayes made a secret deal with this committee. Hayes knew what Southern Democrats wanted most: to get those last three armies out of the South. Then Reconstruction would be over, and Democrats could start winning those three states again. Hayes may have offered to do just that: to pull his armies out of the last three Southern states. In exchange, Southern Democrats may have thrown the election to Hayes.

Whether or not this is true, all three states went Republican. Reconstruction ended in 1877, when Rutherford B. Hayes took over as president. But Northern Democrats didn't call him "Rutherford." Instead, they called him **Ruther-fraud**— saying he cheated Tilden out of the presidency.

The Wizard of Menlo Park



Thomas Alva Edison
(1847 – 1931)

The last year of Reconstruction was also a big year for one of the greatest inventors who ever lived: **Thomas Alva Edison**.

Edison was born in 1847, three years after Samuel Morse first showed off his telegraph (above). From the time he was a boy, Edison was always experimenting with something— and often getting in trouble for it. His parents got used to hearing little explosions from the basement all the time; but his bosses didn't. He was still a boy when he got his first job, selling candy and newspapers on a train. It is said that he lost this job after one of his experiments accidentally set a train car on fire!

Edison's next job was in the telegraph business; and it was here that he first made his mark. As the telegraph business grew, companies like Western Union (above) were always looking for ways to send messages faster. Edison invented a way to send two messages at once, and receive two more at the same time— all over the same telegraph wire.

Western Union paid a lot of money for that invention. Edison used the money to build a huge new laboratory for himself, and for other inventors he hired. The lab at **Menlo Park**, New Jersey was unlike any other lab in the world before it. The people who worked there did nothing but dream up new technology all day, every day.

Reconstruction was still going on in 1876, when Edison moved into Menlo Park. A year later, he invented a stunning machine called the **phonograph**. Edison was the first person in the world to record sound and play it back. His first phonograph used a needle to press sound waves onto a cylinder covered with tinfoil.

The phonograph was just one of many stunning inventions to come out of Menlo Park. Another stunner was a new kind of **electric light bulb**. Edison and his crew weren't the first to make electric lights; but they were the first to make ones that lasted long enough to be useful. The homes at Menlo Park were the first in the world to have electric lamps, instead of oil or gas ones. By 1882, Edison was lighting whole neighborhoods in New York.

Yet another stunner was moving pictures. Starting in 1891, viewers could watch short films on what Edison called a **kinetoscope**. He also produced some of the world's first silent movies.

Phono- means "sound," while *-graph* means "writing." In other words, the phonograph was a way of "writing" sound and playing it back.



An Edison phonograph