OLD NEWS

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Lindbergh Takes Off On Transatlantic Flight

By Rick Bromer

In 1926 Charles Lindbergh was an airmail pilot who carried letters between St. Louis and Chicago for the United States Postal Service. One night towards the end of September, the twenty-four-year-old Lindbergh was alone in the cockpit of his government airplane, flying over Illinois, when he decided to start planning an attempt to fly from the United States to France. If he succeeded, he would win a twenty-five-thousand-dollar prize that had been offered by Franco-American hotelier Raymond Orteig to the crew of the first airplane to complete a nonstop flight in either direction between New York and Paris.

Several teams of aviators were already competing to win the Orteig prize. René Fonck, a French World War One flying ace, had tried to fly from New York to Paris on September 20, but his large and expensive biplane, overloaded with gasoline for the long flight, had failed to take off and had crashed and burned at the end of the runway. Fonck had survived, but two members of his crew had been killed.

Lindbergh thought that Fonck had failed because he had weighed down his airplane with redundant equipment and extra crewmen in a misguided attempt to make his flight safer. Fonck's plane had two sets of wings and three engines. It had carried three copilots, a bed, long-wave and shortwave radios, and special bags for flotation in case of a landing at sea.

Lindbergh believed that a simpler plane with one set of wings, one engine, and one pilot would have a better chance of taking off with enough gasoline to cross an ocean. In his 1953 memoir, *The Spirit of St. Louis,* Lindbergh wrote: "A plane that's got to break the world's record for nonstop flying should be stripped of every excess ounce of weight."

Lindbergh estimated that he could have the right sort of airplane built for less than fifteen thousand dollars. He had about two thousand dollars in savings, and he raised the rest of the money from businessmen in St. Louis who hoped that publicity from their sponsorship of a successful transatlantic crossing could turn St. Louis into an aviation hub.

In February of 1927, Lindbergh went to San Diego, California, to look into ordering an airplane from the Ryan Aeronautical Company. Donald Hall, the company's chief engineer, seemed shocked when Lindbergh told him of his plan to fly alone.

"I thought you'd need somebody to navigate and be the relief pilot," Hall said. "I thought it would be much too long for one pilot."

Lindbergh replied, "I'd rather have the extra gasoline than an extra man."

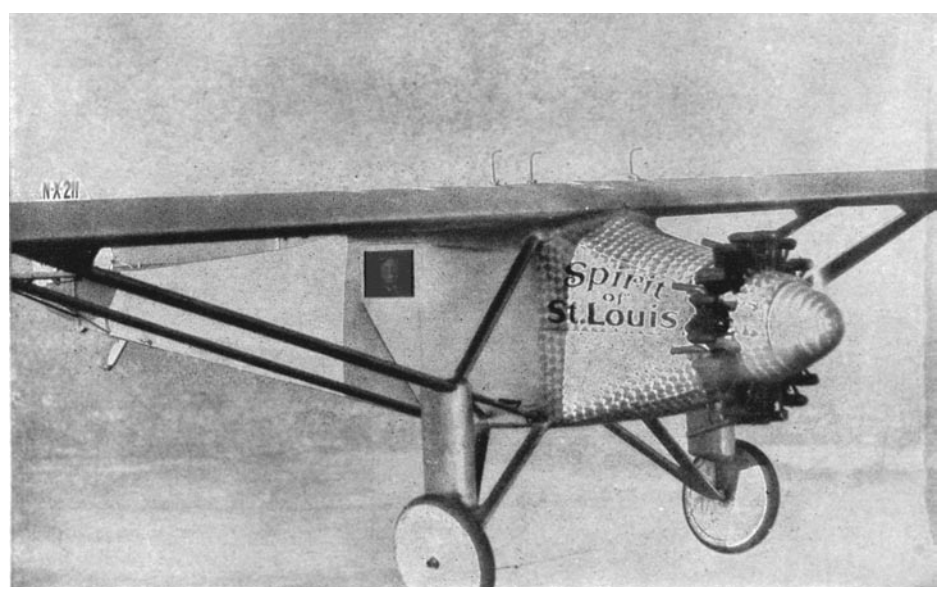
Hall considered that idea for a moment and then nodded. Flying alone would lower the plane's weight and boost its range, Hall agreed. He began making sketches on the back of an envelope.

By February 24, Hall had designed a $10,580 aircraft that would carry four hundred gallons of gasoline, more than enough to complete the 3,600-mile transatlantic flight. Lindbergh's backers sent the money to California, and the Ryan Aeronautical Company rushed to construct the single-engine monoplane as fast as possible.

Lindbergh decided to call his new airplane the *Spirit of St. Louis*. He insisted that no nonessential weight be added—no gasoline tank gauges, no radio, no parachute.

While the *Spirit of St. Louis* was under construction, two officers of the United States Navy, Commander Noel Davis and Lieutenant Stanton Wooster, announced their intention to fly from New York to Paris. Their aircraft, *The American Legion,* was equipped with three Wright J-5 Whirlwind engines that were rated at 220 horsepower each and would burn a lot of gasoline on a transatlantic flight. Both Davis and Wooster were killed on April 26, when their aircraft

Charles Lindbergh and the Spirit of St. Louis.



The Spirit of St. Louis *on a test flight in California.*

crashed near New York while trying to take off with a huge load of fuel on their final test flight.

Two days later, the *Spirit of St. Louis* was completed in California, and Lindbergh made his first test flight in his new airplane. Fuel tanks took up so much interior space in the cockpit that they blocked Lindbergh's forward vision. The only way that he could see directly ahead while flying was by sticking his head out one of the side windows, or by peeking through a periscope installed through the cabin roof. During takeoff and landing, Lindbergh had to judge his altitude by looking out the side windows, which he found easy to do. Very pleased with the *Spirit*'s performance, Lindbergh boasted that it was "one of the most efficient airplanes ever built."

While Lindbergh was still testing his plane in San Diego, yet another team of fliers tried to win the Orteig prize. On May 8, French pilots Charles Nungesser and François Coli took off from Paris and headed for New York in an airplane called *L'Oiseau Blanc* (the *White Bird*). The plane and its pilots vanished during the flight.

On May 10, Lindbergh flew the *Spirit of St. Louis* from San Diego to St. Louis. The next day he flew to New York. He planned to take off for Paris as soon as weather conditions were favorable, but bad weather delayed him for more than a week.

Finally, on the evening of May 19, Lindbergh learned that an unexpected change in the weather would create perfect flying conditions over the Atlantic the next day. After making some last-minute mechanical preparations to his airplane, he went to a hotel to rest but found himself too excited to get much sleep.

Lindbergh estimated that it should take thirty-five and a half hours to cross the Atlantic. Hoping to maximize the amount of daylight during his flight, he rose before dawn on the morning of May 20, after less than two hours of sleep. By sunrise he had pumped four hundred gallons of fuel into his airplane at Roosevelt Airfield near New York.

At 7:54 a.m., Lindbergh began his takeoff run for his flight to Paris. Rain had muddied the runway at Roosevelt Airfield, and the soft ground slowed the wheels of the *Spirit of St. Louis,* which failed to become airborne as quickly as Lindbergh had expected. Although he could not see directly ahead, he knew that he would have to clear a telephone wire at the end of the runway.

When Lindbergh finally managed to coax his ship into the air, he was dangerously close to the end of the runway. He looked out his side window and saw the telephone wire twenty feet beneath his landing gear. He promptly turned hard to the right to avoid some trees, and then gained sufficient altitude to avoid all other obstructions.

He next headed northeast at an altitude of five hundred feet. The air was calm, which pleased him, because he was afraid that turbulence might break the wings off a plane loaded with so much fuel.

Lindbergh felt alert until the third hour of the flight, when he became drowsy after passing over Boston and beginning a tedious passage over the featureless waters of the Gulf of Maine. To clear his mind he dropped down to within ten feet of the water and watched the waves until he spied the coast of Nova Scotia, Canada, looming ahead in the eyepiece of his periscope.

Lindbergh had no trouble staying awake when he was flying over the forested hills of Nova Scotia, where he studied the landscape with fascination and daydreamed about what it would be like to hunt and fish there. But after passing over Cape Breton and beginning the flight over the Atlantic Ocean to his next landfall, Newfoundland, he again became sleepy. His clock, set to New York time, informed him that it was only 4:00 p.m., but he felt very tired—and bored. There was nothing to see but ocean outside the windows, and his only task was to watch his compass needle and keep it on the right mark. He later described his sensations at that time: "My eyes feel hard and dry as stones. The lids pull down with pounds of weight against their muscles. Keeping them open is like holding arms outstretched without support."

Lindbergh tried letting his eyes drift shut for only a few seconds at a time. For a while he thought that he could rest his eyes in this way without actually falling asleep, but then he checked his clock and discovered that his eyes had actually been shut for several minutes, not seconds.

Lindbergh knew that if he fell deeply asleep, he would fail to reach France. His plane was not stable, and it would not fly straight without constant correction. In addition to the risk of crashing into the sea, he faced the certainty of running out of gasoline if he strayed off course or wasted fuel flying in circles.

Just when he felt that he could not stay awake another minute, he looked out the window and saw something that woke him with a start. The ocean had changed color, turning dazzling white. He was flying over an ice field. He later wrote: "Any change, I realize, stimulates the senses. Changing altitude, changing thought, even the changing contours of the ice cakes help me to stay awake. . . . Similarity is my enemy, change, my friend."

When he reached Newfoundland during the tenth hour of his flight, Lindbergh recovered his alertness. He felt fine during the next two hours, as he flew over Newfoundland's unspoiled mountains and forests.

At twilight he passed above the port of St. John's and resumed flying over the Atlantic Ocean. He did not expect to see land again until he reached the coast of Ireland.

As stars appeared through the overhead window of his cockpit, Lindbergh was delighted to notice white icebergs floating on the darkening sea beneath him. Watching the fantastically shaped icebergs helped to keep him awake.

Although the air was getting quite cold, Lindbergh left the windows open in hopes that the blast of air on his face would keep him awake.

During the dark hours of the night, Lindbergh once again had to fight fatigue. He tried to stay alert by bouncing on his seat and by stamping his feet until they ached, but after three hours of darkness, he felt so drowsy that he began using his thumbs to prop his eyelids open. He was not carrying any coffee or other stimulants. He distrusted caffeine, thinking that its temporary effects were enervating, and that drinking coffee would ultimately leave him more tired than drinking plain water.

Because his route was taking him through sub-arctic latitudes, the May night was mercifully short. Dawn appeared at 3:00 a.m. local time over the mid-Atlantic, but on Lindbergh's clock, set to New York time, the light returned at precisely 1:00 a.m.

Lindbergh hoped that dawn would make him wakeful, but the increasing light seemed to have the opposite effect. He had been flying for over eighteen hours, and he had hardly slept for two days. He later wrote:

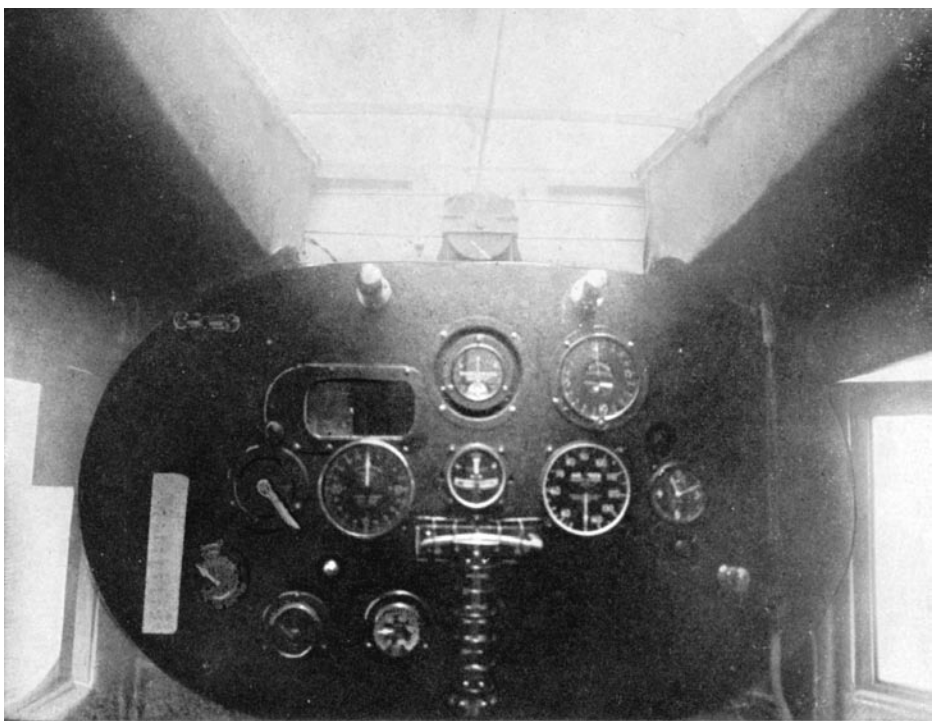
"I've lost command of my eyelids. When they start to close, I can't restrain them. They shut, and I shake myself, and lift them with my fingers…. My back is stiff; my shoulders ache; my face burns; my eyes smart…. All I want in life is to throw myself down flat, stretch out—and sleep."

As the sun rose, Lindbergh ran into some storms, which helped to keep him awake for an hour or two. Then he flew into blinding white fog. Cut off from any visual reference, he began to suffer the illusion that his aircraft was not moving. He stared at his instrument panel, watching the gauge needles move as he adjusted the airplane's controls. He later wrote: "How fantastic it is to think that if I just sit here long enough, jiggling these needles, France will lie below—like a child's imaginary travels in a parlor chair. Over and over again I fall asleep with my eyes open, unable to prevent it."

The difference between being awake and dreaming became blurred for Lindbergh. He was sometimes awakened by noticing movements of the gauge needles. He would correct the course of the airplane, and then drift back to sleep while still staring wide-eyed at the gauges.

During the twenty-second hour of the flight, at about 5:00 a.m. New York time, Lindbergh felt that the fuselage behind him had filled with spirits. He could see these phantoms without turning around, and he could hear them speaking to him with human voices. They drifted in and out of his airplane, sometimes discussing problems of navigation among themselves and sometimes giving Lindbergh advice about his flight, as well as "messages of importance unattainable in ordinary life."

Lindbergh decided that the spirits were friendly "emanations from the experience of ages, inhabitants of a universe closed to mortal men."



The view from the cockpit of the Spirit of St. Louis. *Lindbergh could see the stars through an overhead window, but to see forward he needed to either use a periscope or else stick his head out one of the side windows.*

Lindbergh leans out one of the side windows of his plane. He kept the windows open during his entire transaltantic flight.

He felt that he was on the border between life and death, and that he might soon join the spirits forever. He asked himself: "Am I now more man or spirit? Will I fly my airplane on to Europe and live in flesh as I have before, feeling hunger, pain, and cold, or am I about to join these ghostly forms, become a consciousness in space, all-seeing, all-knowing, unhampered by materialistic fetters of the world?"

Suddenly the *Spirit of St. Louis* burst from its white shroud of fog into blinding sunlight, and the spirits departed. Looking at spray-lashed blue waves, Lindbergh was filled with hope and joy. He felt that he had been awakened from a near-death experience.

"I'm ten hours out from Newfoundland," he thought. "In less than eight hours more, if the wind holds and I'm not too far off course, I should strike the Irish coast."

But soon Lindbergh resumed drifting off to sleep at the controls. Usually he managed to wake up every few minutes to keep the airplane on course, but during the twenty-fourth hour of the flight, when the sun was high overhead in a blue sky, Lindbergh suddenly realized with panic that he had lost consciousness and could not regain it. His eyes were open but everything was getting dark. He thrust his head out the window into the slipstream of air. The wing, the sky, and the ocean were all turning black. He told himself: "Breathe deeply. Force the eyes to see. . . . God give me strength."

Then his terror seemed to wake him up. Color began returning to the world, and Lindbergh thought, "No, I'm not going over the precipice. The ocean is green again. The sky's turning blue. Clouds are whitening. . . . Consciousness is coming back."

After that experience, Lindbergh suddenly felt wide-awake. The sun and sea looked incredibly beautiful, and he felt confident that he would not fall asleep again.

On the twenty-seventh hour of his flight, Lindbergh saw fishing boats. He glided down to within fifty feet of one boat, closed his airplane's throttle, and shouted, "Which way is Ireland?"

Lindbergh expected to see men crowding the decks of the boats to point and wave at him, but only one pale face appeared at the porthole of one boat. The lack of response from the boats seemed inexplicably strange and dreamlike. Lindbergh decided that the man peering out the porthole probably did not speak English. He left the boats and resumed flying east.

Sixteen hours from Newfoundland, Lindbergh saw the coast of Ireland. He was two hours ahead of schedule.

While flying over Ireland and then England, Lindbergh did not feel even slightly sleepy. His interest in the landscape beneath his wings kept him alert.

The sun was setting when the *Spirit of St. Louis* crossed the English Channel and flew over the port of Cherbourg, France. Despite the gathering darkness, Lindbergh felt wide-awake, full of excitement.

By the time he reached Paris, it was so dark that he needed a flashlight to read his instrument panel. Lindbergh felt not the slightest desire to rest, and he wished that he could stay airborne longer. Because he was ahead of schedule, he estimated that he still had plenty of fuel. He described his feelings as follows: "I want to prolong this culminating experience of my flight. I almost wish Paris were a few more hours away. It's a shame to land with the night so clear and so much fuel in my tanks."

Lindbergh circled the Eiffel Tower, and then headed for Le Bourget airfield, which had been floodlit for his benefit. He landed, taxied to a halt, and suddenly found his airplane surrounded by a gigantic, hysterically cheering crowd. Men lifted Lindbergh from the cockpit and carried him on their shoulders as the crowd chanted "Vive!" Lindbergh tried to persuade his admirers to set him down on the earth, but there wasn't room in the crush of people, and everyone wanted to carry him.

"My feet still haven't touched the ground," he thought.

The flight had taken thirty-three and a half hours, and Lindbergh had been awake for most of the last fifty-eight hours.

After an hour, Lindbergh was finally released from the mob and was driven to the American embassy in Paris. There he cheerfully gave a press conference before finally going to bed at 4:15 in the morning, wearing the ambassador's pajamas, after sixty-three hours without rest.

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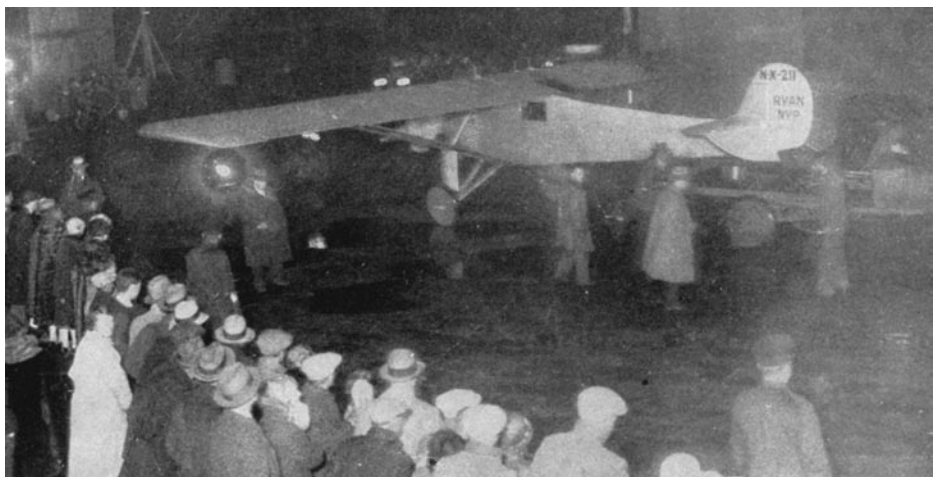

Predawn preparations for Lindbergh's flight.

Lindbergh's route to France.

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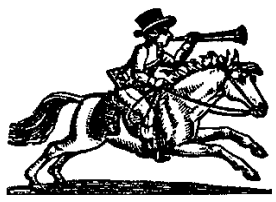

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Stage Actor Charlie Chaplin Tries Making Movies

By Dorothy Patricia Brewster

Charlie Chaplin was a young English comic actor who toured the United States with a British music-hall revue from 1910 to 1913. His most popular role was that of a drunken old man—a part that required him to wear heavy makeup to disguise the fact that he was in his early twenties.

In September of 1913, Chaplin signed a one-year contract with a film company in Los Angeles called the Keystone Pictures Studio, whose founder, Mack Sennett, had been favorably impressed by one of Chaplin's vaudeville performances. The contract promised Chaplin one hundred fifty dollars a week—far more than he had ever earned before.

Charlie Chaplin in 1920.

Having grown up in poverty in London, Chaplin could hardly believe his good fortune; but he knew nothing about filmmaking, and he secretly doubted his ability to act in movies. Films were silent in 1913, and he was accustomed to using dialog to achieve comic effects.

Chaplin was so fearful that he might fail as a film actor that on the day that he was supposed to report for work at the Keystone Pictures Studio, he was afraid to enter the grounds. After watching costumed "Keystone Cops" and other employees come pouring out of the gate to buy hot dogs and sandwiches at a store across the street, Chaplin returned to his hotel. He later wrote:

> The problem of entering the studio and facing all those people became an insuperable one. For two days I arrived outside the studio but had not the courage to go in. The third day Mr. Sennett telephoned and wanted to know why I had not shown up. I made some sort of excuse. "Come down right away, we'll be waiting for you," he said.

Chaplin then worked up the courage to enter the Keystone premises, where Sennett seemed glad to see him. Chaplin was immediately enthralled by the ethereal quality of light on the movie sets, where fluttering screens of windblown white linen diffused the sun, enhancing the way human faces looked on film. Beautiful women, including starlet Mabel Normand and the extras known as the Sennett Bathing Beauties, wandered among the sets. The male actors were a mixture of odd-looking comedians and rugged stuntmen like the Keystone Cops, many of whom were ex-prizefighters with battered faces.

"It was a strange and unique atmosphere of beauty and beast," Chaplin wrote.

He was fascinated to find that movies were made piecemeal. "In one set," Chaplin wrote, "Mabel Normand was banging on a door shouting: 'Let me in!' Then the camera stopped and that was it."

No one gave Chaplin any work to do for ten days, which made him nervous. His nervousness increased when Sennett informed him that he would have to improvise his own parts. Sennett said, "We have no scenario—we get an idea, then follow the natural sequence of events until it leads up to a chase, which is the essence of our comedy."

Chaplin did not like the Keystone brand of humor, which relied on actors fighting with pies or chasing each other. He preferred humor based on personality—but that was easier to achieve with dialog on stage than with manic action on the silent screen.

Chaplin's first attempt to act in a movie left him feeling frustrated. He had a minor role and he quarreled with director Henry Lehrman.

On the day after Chaplin finished the film with Lehrman, Sennett was standing peering at the set for a new film. There was no script yet for the story. In his autobiography, Chaplin recalled that Sennett said, "We need some gags here." Turning to Chaplin, he said, "Put on a comedy make-up. Anything will do."

On the way to the wardrobe room, Chaplin wondered what to wear. Based on his experience in the theater, he decided to "make everything a contradiction." At the wardrobe room he picked out a small hat, large shoes, baggy pants, and a tight coat. Sennett had liked Chaplin's vaudeville role as an old drunkard, so Chaplin looked for props that would make him look older. He added a cane and an abbreviated mustache that he figured was small enough to allow the camera to see his facial expressions.

Once he was dressed in these clothes and makeup, a character suddenly came alive for him. The character was a penniless tramp who tries to act like a wealthy gentleman. Chaplin strutted out onto the film set, swinging his cane, with ideas racing through his mind. For ten minutes, he described his character to Sennett:

> You know, this fellow is many-sided, a gentleman, a poet, a dreamer, a lonely fellow, always hopeful of romance and adventure. He would have

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you believe he is a scientist, a musician, a duke, a polo player. However, he is not above picking up cigarette butts or robbing a baby of its candy. And, of course, if the occasion warrants it, he will kick a lady in the rear—but only in extreme anger!

Sennett laughed, and then he said, "All right, get on the set and see what you can do there."

The plot of the movie called for Chaplin to accidentally meet a glamorous lady played by Mabel Normand. With little instruction as to what to do, Chaplin entered the set, an elegant hotel lobby, where his character, the Tramp, felt like an imposter among the wealthy guests. He tripped over a lady's toe and apologetically tipped his hat to her. He next tripped over a cuspidor and tipped his hat to it. He then ran into the Mabel Normand character, got tied up in her dog's leash, and fell down.

The scene ran seven times longer than Sennett had planned, but the extras who were watching were roaring with laughter from start to finish, so Sennett decided to keep the whole routine.

Chaplin played the Tramp in subsequent movies. He wrote: "As the clothes had imbued me with the character, I then and there decided I would keep to this costume, whatever happened…. With the clothes on I felt he was a reality, a living person. In fact he ignited all sorts of crazy ideas that I would never have dreamt of, until I was dressed and made up as the Tramp."

Chaplin's Tramp quickly became so popular that department stores began selling toys and statuettes of the character. In New York the Ziegfeld Follies girls donned mustaches, derby hats, big shoes, and baggy pants for a Chaplin number.

As a result of his rising popularity, Chaplin was able to gain creative control of his films, at first by improvising his own scenes and later by directing whole movies for Keystone. He deliberately slowed the pace of his comic movies, allowing his character to create surprising moments of irony and pathos that did not quite fit the simple Keystone formula of slapstick humor. During the filming of *The New Janitor*, when the Tramp was threatened with being fired, Chaplin pleaded desperately, in pantomime, that he had a family and many mouths to feed. As the scene ended, he looked up and noticed that an actress who had been watching was in tears. He was pleased when she told him, "I know it's supposed to be funny, but you just make me weep."

During the rest of his fifty-year career in cinema, Chaplin made many films centered on his Tramp character. The character became an internationally beloved and universally recognized icon of comedy, and many of Chaplin's movies are still popular throughout the world.

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The Keystone Cops.

Mack Sennett.

Charlie Chaplin in his Tramp costume.

The Mack Sennett Bathing Beauties.

Mabel Normand.

Charlie Chaplin wears a tuxedo in A Night in the Show, *a movie made in 1915.*

Robert Bruce Claims Crown of Scotland

By Matthew Surridge

On March 25, 1306, thirty-two-year-old Robert Bruce, Earl of Carrick, was crowned as the successor to King John of Scotland. Bruce's claim to the throne was supported by a majority of the Scottish nobility but posed a direct challenge to English King Edward I, whose army had invaded Scotland in 1296, deposing King John and exiling him to France.

In June, Bruce marched with about four thousand supporters in an attempt to liberate the English-held fortified town of Perth. Bruce decided to camp outside the town at a place called Methven, expecting to engage in a traditional battle of mounted knights the next day. At dusk, however, the English launched a surprise attack, hitting Bruce while his men were setting up camp. Bruce barely escaped from the battlefield. He fled to Rathlin Island, off the north coast of Ireland, where he remained for several months. While living there as a fugitive, he learned that his younger brother Niall had been captured and executed by the English, while his sister, his wife, and his twelve-year-old daughter had been taken prisoner.

In February of 1307, Bruce came out of hiding and traveled south by sea with a force of about sixty men to Carrick, his ancestral homeland, on the west coast of Scotland. Anchoring offshore, he sent scouts to the mainland to determine if the area was occupied by the English. When Bruce saw what he believed to be a signal fire lit by his scouts, he led his men to the mainland, only to find that the scouts had not lit the fire. The scouts warned him that a strong English force was garrisoned at nearby Turnberry Castle, and that the area was teeming with English soldiers.

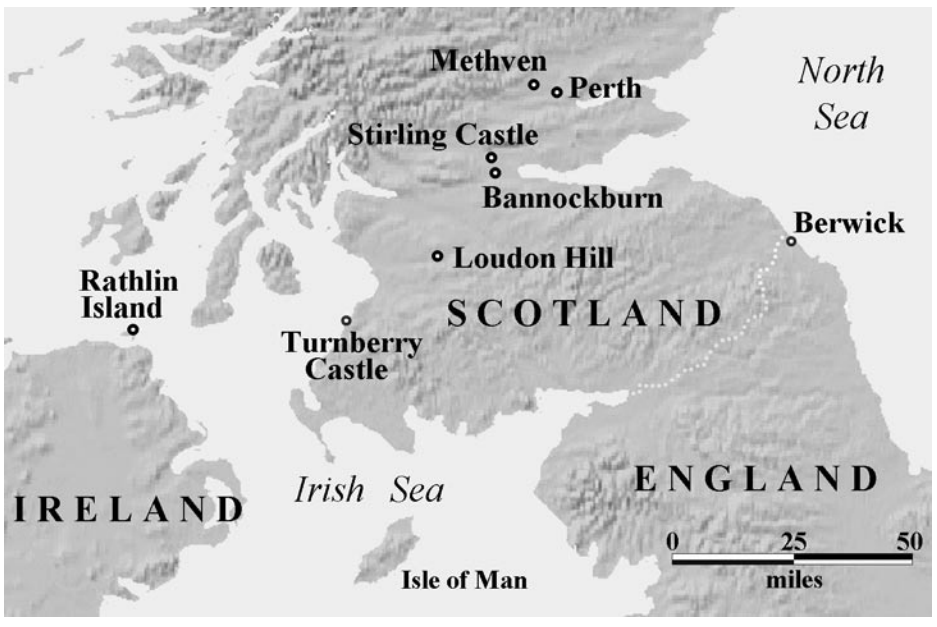
Robert Bruce.

Rather than directly assaulting the castle, Bruce led his men in a series of successful ambushes against isolated groups of English troops before retreating. He moved to the nearby hills, where he was joined by old friends and supporters. He continued to launch guerilla-style attacks against small, isolated parties of English troops. He moved his camp frequently to elude the remaining English forces in the area.

As word of Bruce's exploits spread, men discontented with English rule found their way to Bruce's camp to join him. With growing support, Bruce decided to come down from the hills to the lowlands, thus gaining new recruits. His army soon doubled in strength, to a total of six hundred men. Expecting an English assault when news of his presence spread, Bruce chose to base his men on Loudoun Hill, roughly twenty miles east of the Ayrshire coast. There was a single path to the camp, and Bruce had trenches dug on either side to narrow it and make it impossible for the enemy to flank him.

On May 10, Bruce's scouts saw three thousand English cavalry approaching the hill. Bruce arranged his six hundred men, all armed with long spears, in a line across the path to the hill.

As Bruce had expected, the cavalry attempted to charge when they saw the line of men. They approached in two waves. As the first wave arrived, the ditches Bruce had dug forced them to bunch up into the one narrow path as they approached the Scottish position; the number of men and horses in the charge meant that the horsemen got in each other's way. The resulting confusion meant that their charge was disordered when it struck the Scottish spears. The Scots held, and a hundred Englishmen were unhorsed. The survivors of the first wave, unable to retreat due to the pits and the terrain, then blocked the oncoming second wave of cavalrymen. Bruce commanded his infantry to advance in a line, forcing the confused English to give ground and then to break completely. They fled to the nearby castle of Bothwell.



Map shows the locations of some notable events in the life of Robert Bruce, who was crowned Robert I, King of Scots.

Over the next several years, Bruce gained control over much of the Scottish countryside. The English continued to occupy the cities and castles, however, and in 1310 reports came that Edward II (the son of Edward I, who had died of illness in 1307), was leading a large army northward, intending to reestablish English control throughout Scotland.

That autumn, the English army crossed the border and marched into Scotland. Bruce quickly realized that he could not defeat the much larger English army in open battle. He ordered his men to attack them in a series of quick raids, and hoped that the English would eventually leave the field due to the high cost of feeding roughly ten thousand soldiers. The crop that year had been poor, so foraging for food was not an option for Edward's troops.

On October 28, Edward retreated to the town of Berwick, on the border between England and Scotland. From there, he directed a naval blockade of the eastern coast of Scotland. Bruce knew that this blockade would keep arms and food shipped from northern Europe from reaching him and his people, causing great distress and making it difficult to continue to fight.

In December, Bruce decided to spread false stories that he was planning an attack on the Isle of Man, between England and Ireland. English spies heard these rumors in the middle of the month and reported them to Edward, who ordered his ships to sail to the Isle of Man to fend off the rumored attack. With the English navy on the western coast, the blockade became unenforceable. Merchant ships from Europe soon returned to Scotland, bringing food and arms for Bruce's army.

Unable to blockade the country or come to grips with Bruce's army, the English retreated south in the late summer of 1311, leaving garrisons in several strongly built castles. The Scots had no siege engines—elaborate devices, such as heavy catapults or wheeled towers—with which to break down the castle walls and take the citadels by force. Bruce knew that as long as the English held the castles, they had a foothold in Scotland from which to launch further invasions. He had to come up with a way to use his tactics, based on quick attacks by small groups of men, against these well-garrisoned fortifications.

Late in 1312, Bruce once again ordered his men to attack the fortified city of Perth, where he had been so bitterly defeated in the Battle of Methven. The Scots besieged the city but could not breach the walls. Although they kept food from reaching the inhabitants, the supplies already in the town were so abundant that, after six weeks, it became clear that the city would not capitulate out of hunger. Bruce therefore developed a plan to take the city by stealth.

He sounded the depth of the city's moat during the night, until he found a shallow spot where he could cross on foot with water up to his shoulders. The next day, Bruce ordered his men to retreat to a nearby wood that concealed them from the city's view. There he had several rope ladders made.

After eight days, when he believed the town would be less vigilant, Bruce led his men by night back to Perth, and across the moat at the shallow spot. Hooking the rope ladder he carried onto his spear, he threw the spear up onto the battlements, where it caught and held him as he climbed up. Bruce ordered his men to do the same with the other ladders that they carried. He then led his men up the ladders and had them scatter through the city, causing great confusion while opening the gates to the rest of his forces. By sunrise, the city and castle were his.

With Perth under his control, Bruce was able to move successfully against a number of lesser English fortifications in central Scotland. With no supplies or relief coming to them from Perth, the English garrisons were starved into submission.

In the summer of 1313, Bruce learned that his brother Edward, who was leading a siege of Stirling Castle, had signed a treaty with Philip Mowbray, the castle's English commander, by which Edward would lift his siege of the castle in exchange for a promise that Mowbray would turn the castle over to the Scots in one year—unless the English army came to relieve them in the meantime. Bruce was angered to learn that his impetuous brother had agreed to such a long period of time for the relief of Stirling. He knew that the English could not refuse such a direct challenge, that they would send a large army to the castle, and that he would have to confront and defeat that army before it reached Stirling, or else the English would continue to have a foothold in Scotland. Because his brother had negotiated the pact, Bruce felt that his family's honor was at stake, prohibiting him from attacking Stirling himself.

In the summer of 1314, King Edward II led a twenty-five-

thousand-strong English army into Scotland, heading towards Stirling Castle. Bruce commanded only seven thousand trained men, but he also had an irregular force of perhaps two thousand untrained farmers and servants who were loyal to the ideal of an independent Scottish kingdom. They were referred to as the "small folk."

Bruce positioned his men along the road to Stirling Castle near a small stream (called a "burn" in Scotland), the Bannock Burn. He ordered that knee-deep pits be dug on both sides of the road. The pits were one-foot wide and covered by brush and grass. Bruce knew that his infantry, aware of the location of the pits, would be able to avoid them, but he hoped that the English cavalry horses would be hampered by them.

On June 23, one day before the agreed deadline, the English army approached the Bannock Burn. Bruce was on horseback, inspecting his army's formation, when an English knight in the vanguard of the army appeared through the trees. Seeing Bruce, the knight charged to the attack. Bruce turned towards him and waited for the knight to reach him. At the last moment, Bruce dodged the knight's attack, and struck him down with his battle-ax. The Scots cheered and then charged the rest of the English vanguard, who were trying to assume an attack formation but could not succeed because their horses kept slipping into the hidden pits that Bruce had had dug on both sides of the road. Bruce's men drove them back.

When another English cavalry unit advanced across a nearby field, Bruce dispatched a unit of Scottish spearmen who positioned themselves in a circular formation called a "schiltron." This formation presented the English cavalry with an unbroken wall of spears. The English tried to breach the wall with a series of quick charges, which failed; then the Scottish infantry counterattacked and scattered them. With night falling, the battle ended for the day.

The next morning, reports reached Bruce soon after dawn that the main English force was crossing the Bannock Burn, with cavalry in the lead. He decided to let them make the crossing, and then he attacked when they were trying to organize their formations on the near side of the stream, where the river behind them limited their maneuverability.

Bruce's attack began at a deliberate pace. Holding his cavalry, some infantry, and his irregular "small folk" in reserve, he sent most of his spearmen advancing slowly towards the English in tight schiltron formation. The English at first responded with a cavalry charge, which broke against the long spears and shields of the Scottish spearmen.

The English cavalry began to retreat, but the tide of battle suddenly turned when arrows began to rain down on the Scottish spearmen, forcing them to halt and take cover under upraised shields. Bruce realized that the English had sent a division of archers to his left flank. He ordered his cavalry into action for the first time, sending them left to attack the archers.

Although the Scottish cavalry was badly outnumbered by the English cavalry, the English archers had advanced beyond the protection of their own knights. Unable to defend themselves against the armored Scottish horsemen, the English archers ran for the protection of their own cavalry, still milling about in disorder by Bannock Burn.

The arrival of the fleeing archers caused more fear and confusion among the English by the stream. Sensing that the English were on the edge of panic, Bruce called his infantry reserves into the front lines. The infantry reinforced the Scottish left and added to the weight of the line of spears pressing forward. Under the assault of the Scottish reinforcements, the English army began to give way. King Edward himself was forced to flee. The sight of the royal banner leaving the field emboldened the Scottish, who cried: "Lay on! Lay on! They fail!"

The battle of Bannock Burn.

Bruce then called in the last of his reserves, the "small folk." At their charge, the English thought a second Scottish army was approaching, and they broke ranks completely. The battle became a rout.

In the aftermath of the battle, Stirling Castle was handed over to the Scots, as promised. Bruce had finally established military control over all of Scotland, and established the country as an independent nation. As King Robert I, he ruled over his country for fifteen years. England refused to acknowledge Scottish sovereignty until 1328, just one year before Bruce's death. In May of that year, a peace treaty was signed at Northampton in the name of the adolescent Edward III (who had replaced his recently deposed father) recognizing Scotland as an independent kingdom, and Robert Bruce as its king.

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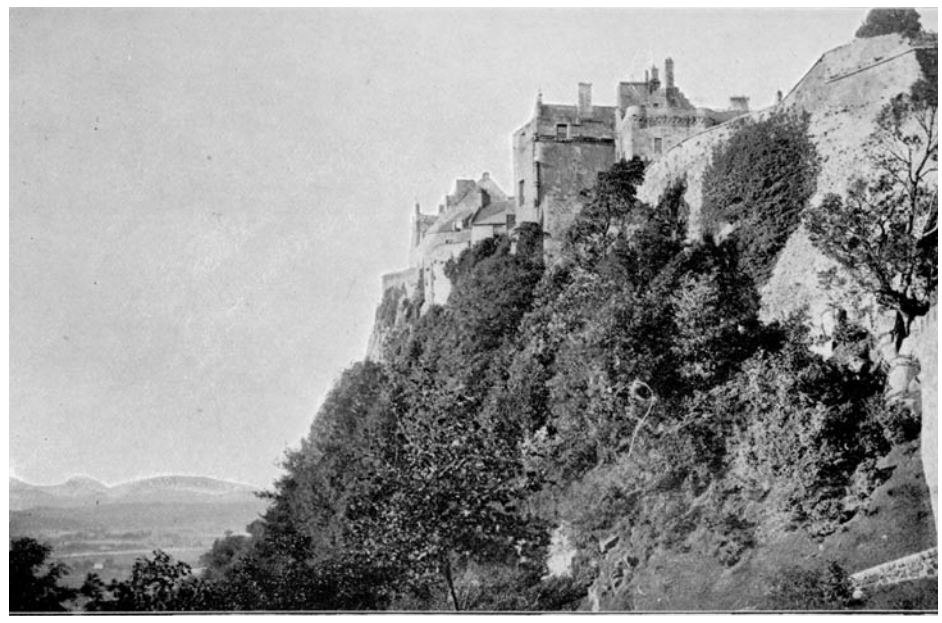
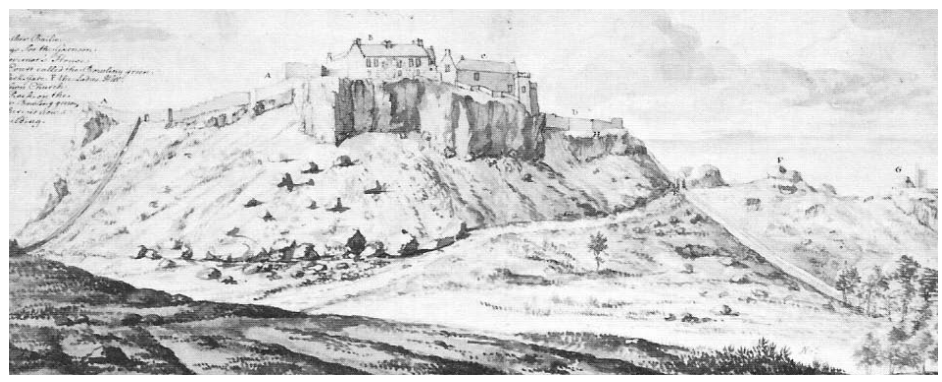
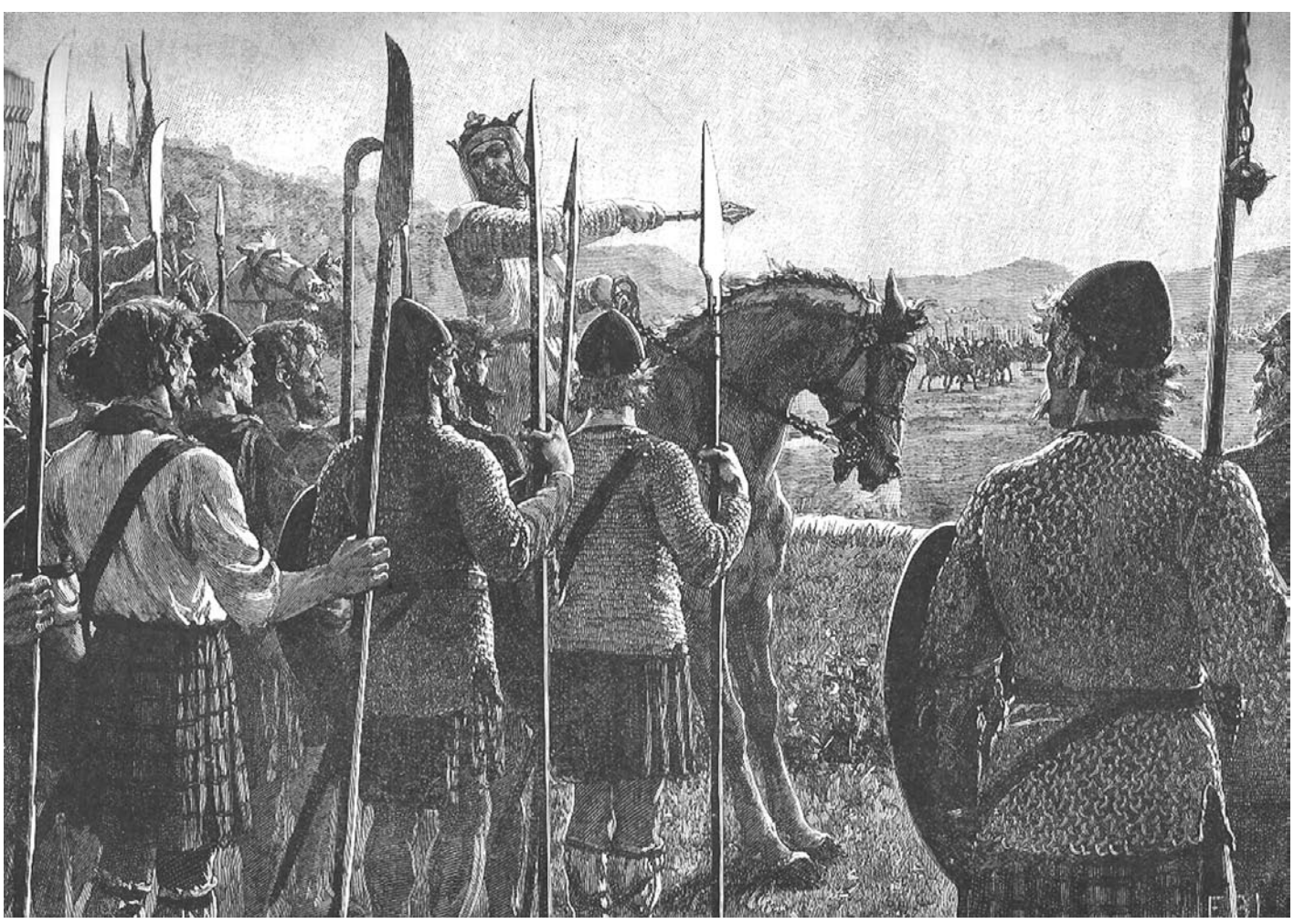


Stirling Castle.



The hilltop location of Stirling Castle made it difficult for attackers to storm its walls.



Bruce leading his troops into the battle of Bannock Burn.

Engineers Detonate Huge Blast In New York

By Paul Chrastina

In January of 1867, Lieutenant-Colonel John Newton of the U.S. Army Corps of Engineers was authorized by Congress to deepen busy shipping lanes at Hell Gate, a half-mile stretch of the East River connecting New York Harbor and Long Island Sound. Hell Gate was extremely dangerous for ships because opposing tides converged there in a welter of unpredictable rips, whirlpools, and currents that funneled through rocks and submerged reefs. Captains trying to pass through these channels often found their ships suddenly going out of control, spinning sideways or drifting backwards in the fast-changing currents.

Each year nearly a thousand vessels were damaged or lost in collisions with rocks or other ships in the crowded Hell Gate channel. Fatalities were common, and financial losses from accidents totaled at least two million dollars annually.

One of the worst hazards at Hell Gate was a reef off the Long Island shore at Hallett's Point. Depending on the ebb and flow of tides, portions of this three-acre bedrock shelf lay anywhere from just above the water's surface to a depth of fifteen feet.

Newton learned that previous efforts to clear obstructions from the channel by detonating kegs of gunpowder near dangerous rock outcroppings had only achieved limited success. This method had removed the highest points from isolated rocks but had proven inadequate on more extensive bedrock reefs such as Hallett's Point and Middle Reef—the sites of some of the worst accidents in the channel.

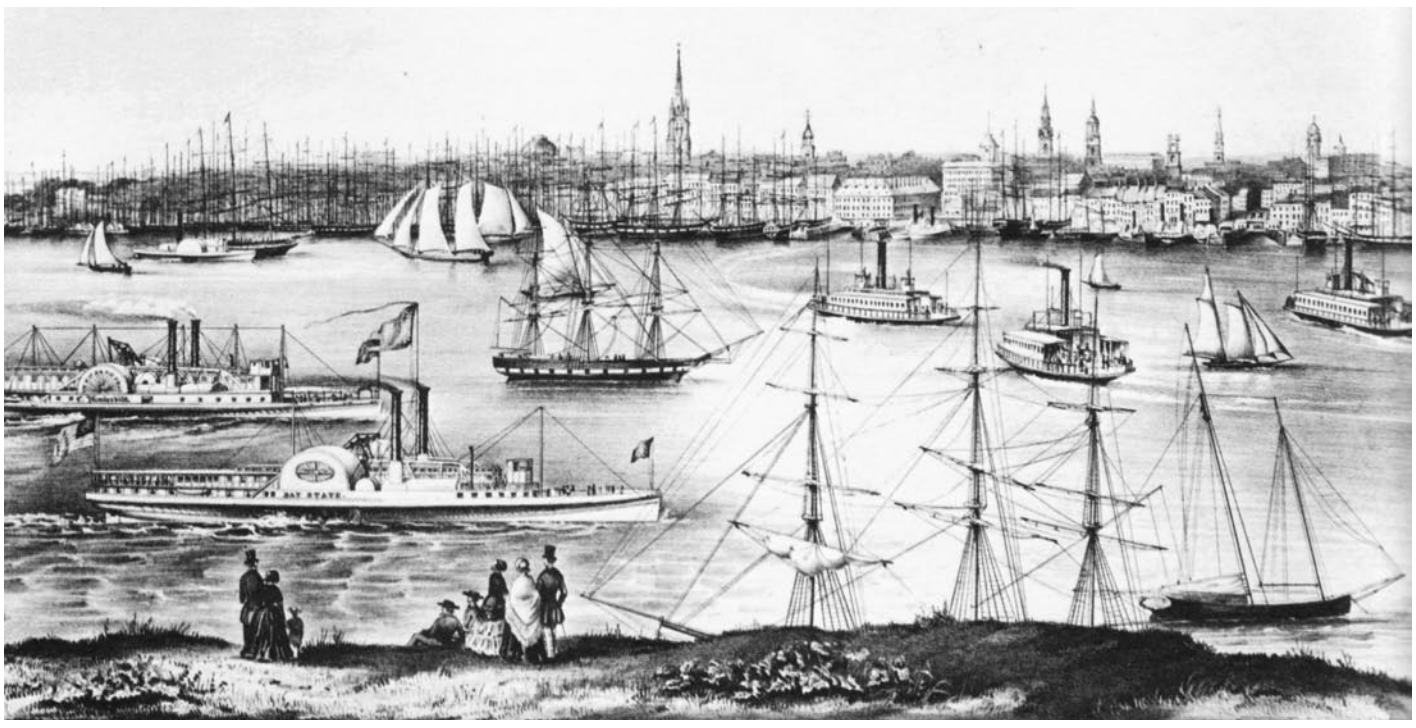
Newton hired private contractors to continue demolishing smaller rocks in the channel, while he developed a plan to deal with the larger reefs.

He began at Hallett's Point in August of 1869. Newton hired eighty skilled English and Welsh miners who were expert in the dangerous procedures of submarine excavation, having performed comparable work in tin mines beneath the Atlantic seabed off the coast of Cornwall. They began by building a 310-foot long, U-shaped cofferdam along the Hallett's Point waterfront that left part of the solid-rock riverbed dry. There, the workers laboriously excavated a thirty-foot-deep vertical mineshaft. After they completed digging the shaft in July of 1870, they began excavating ten tunnels that fanned out into the bedrock beneath the shallow, turbulent channel.

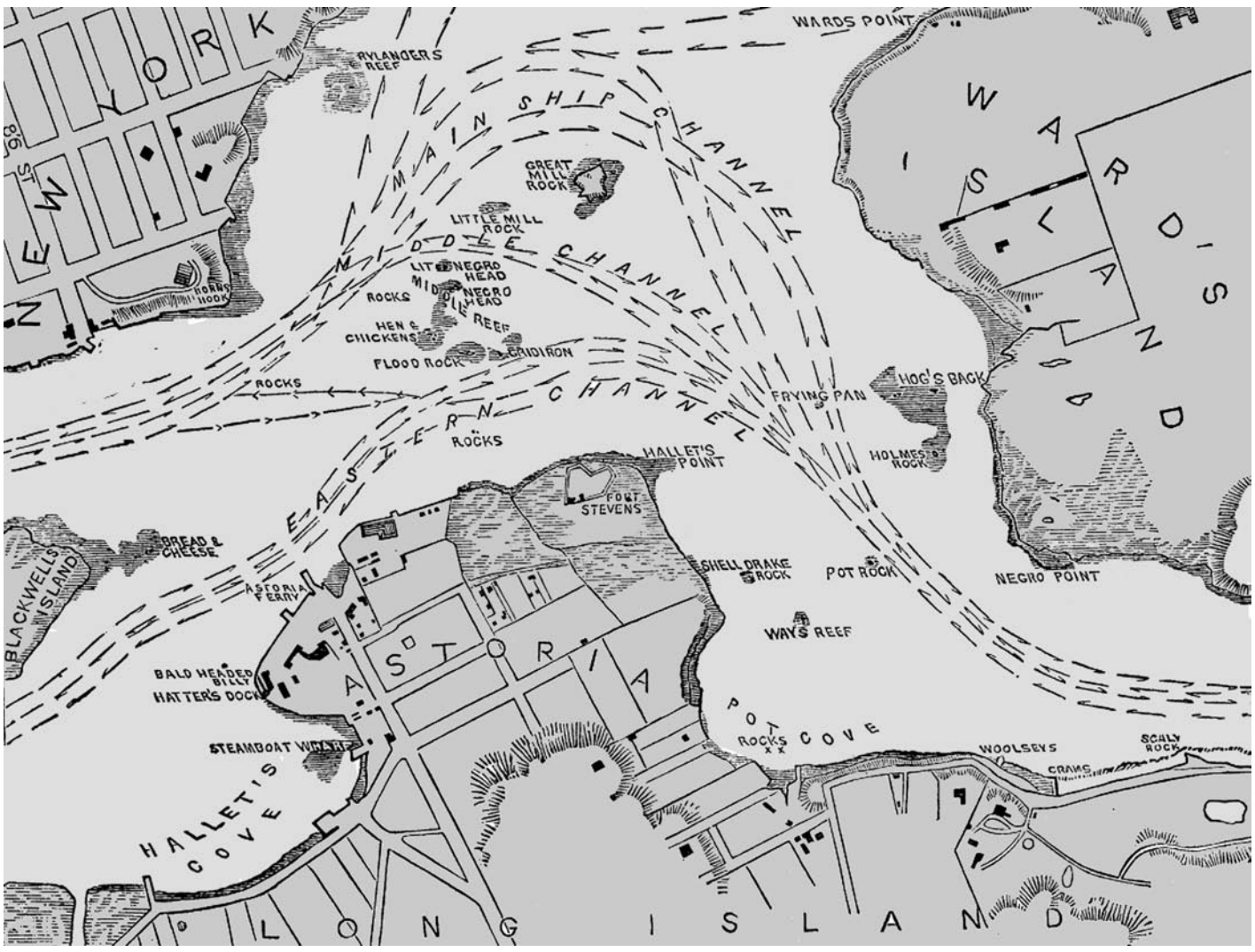
Newton had estimated that it would take two or three years to complete the tunneling at Hallett's Point. As work on the tunnels progressed, however, work crews encountered much harder layers of bedrock than he had expected to find beneath the channel. To remove this rock, Newton had to use large charges of nitroglycerin, a recently invented chemical explosive so powerful that it blew chunks of rock out of the excavation high into the air above Long Island.

According to the *New York Times*, residents of the Astoria neighborhood complained:

> Great carelessness is manifested in the blasting operations, and the people living or doing business in the vicinity of the Point are kept in constant dread for their lives, owing to the pieces of rock that fall so thick and fast about their places. These pieces weigh from five to seventy-five pounds, and are hurled from [the excavation] seventy-five to five hundred



Shipping in the East River, looking from Brooklyn towards Manhattan.



A maze of rocks and reefs menaced shipping at Hell Gate in the East River.

Lt.-Col. John Newton.

feet distant. The explosions, too, are sometimes so heavy that the houses are shaken.

Complaints about blast debris raining down on the homes and businesses of Astoria convinced a Long Island judge to prohibit further tunneling until stronger safety measures were put in place. Newton installed heavy blast curtains made of timber and steel chains over the entrances to the tunnels, and the injunction was lifted.

On April 20, 1871, the *Times* reported that three shifts of workmen were laboring around the clock at the site and that "it is rather vaguely calculated that the work will be finished in July, 1872." In fact, it wasn't until the late summer of 1876 that Newton announced that the tunneling was nearly finished, and the demolition of the three-acre reef would take place in early autumn.

On September 11 workmen began placing the first of seven thousand individually sealed waterproof cartridges of nitroglycerin and other, less costly, explosives into holes drilled in the walls, columns, and ceilings of the Hallett's Point tunnel complex. The date of the demolition was set for September 24. Some area residents began to worry about the potentially disastrous results of detonating thirty thousand pounds of explosives beneath the channel. Rumors characterized as "wild prophecies and wilder guesses" were spread by tabloid newspapers. "It was only with the greatest difficulty," the *Times* noted, that police succeeded in persuading some alarmed residents not to evacuate their homes.

Newton responded to the local anxiety in a letter published in the *Times* on September 21. He reassured the residents of Astoria that their lives and property were in no danger. To assert his confidence in the "absolute safety" of the blast, he announced that he intended to bring his wife and young daughter to witness the historic event. He also explained that the tunnels would be flooded prior to the blast in order to constrain its destructive power to the reef, rather than dissipating its energy beyond the excavation. "There will be no commotion of the air," he wrote, but he recommended that people living closest to the waterfront "would do well to have windows and doors open, and to look out for their ceilings." The safest thing to do, Newton advised, "would be to stand outside until the explosion is over."

Just after noon on September 23, a siphon was dropped over the edge of the cofferdam into the pit. Water drawn from Hell Gate channel began flooding the tunnel complex, where the sealed and primed canisters of explosives were connected by heavy-gauge wires to a large galvanic battery, located in a shed several hundred yards from the excavation.

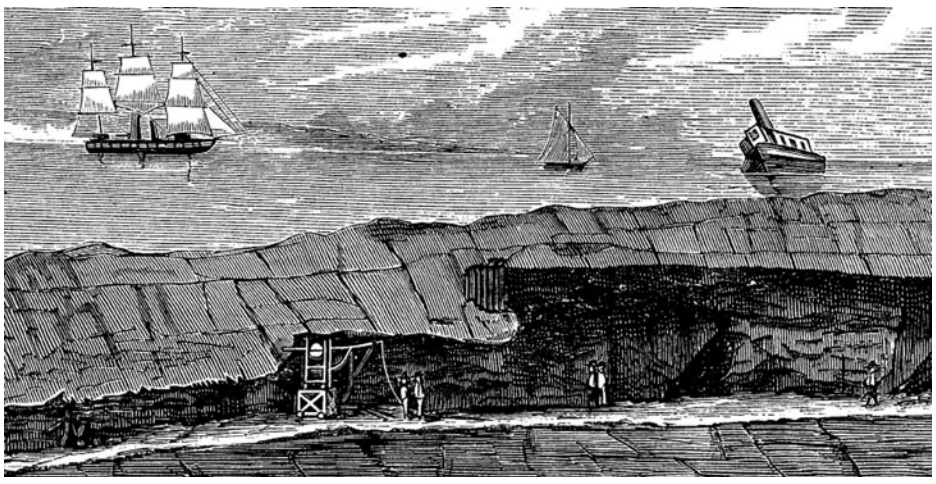
At two o'clock in the afternoon on September 24, Newton joined a group of invited guests and reporters who were on hand at the "firing point" overlooking Hallett's Point. It was a cool, rainy day, but hundreds of sightseers had assembled on the shores of Hell Gate. Fleets of guard boats cordoned off the entrances to the channel.

A reporter from the *Times* wrote that "Newton, on arriving, led his wife up the little pier, and the nurse followed with the little girl," two-year-old Mary Newton.

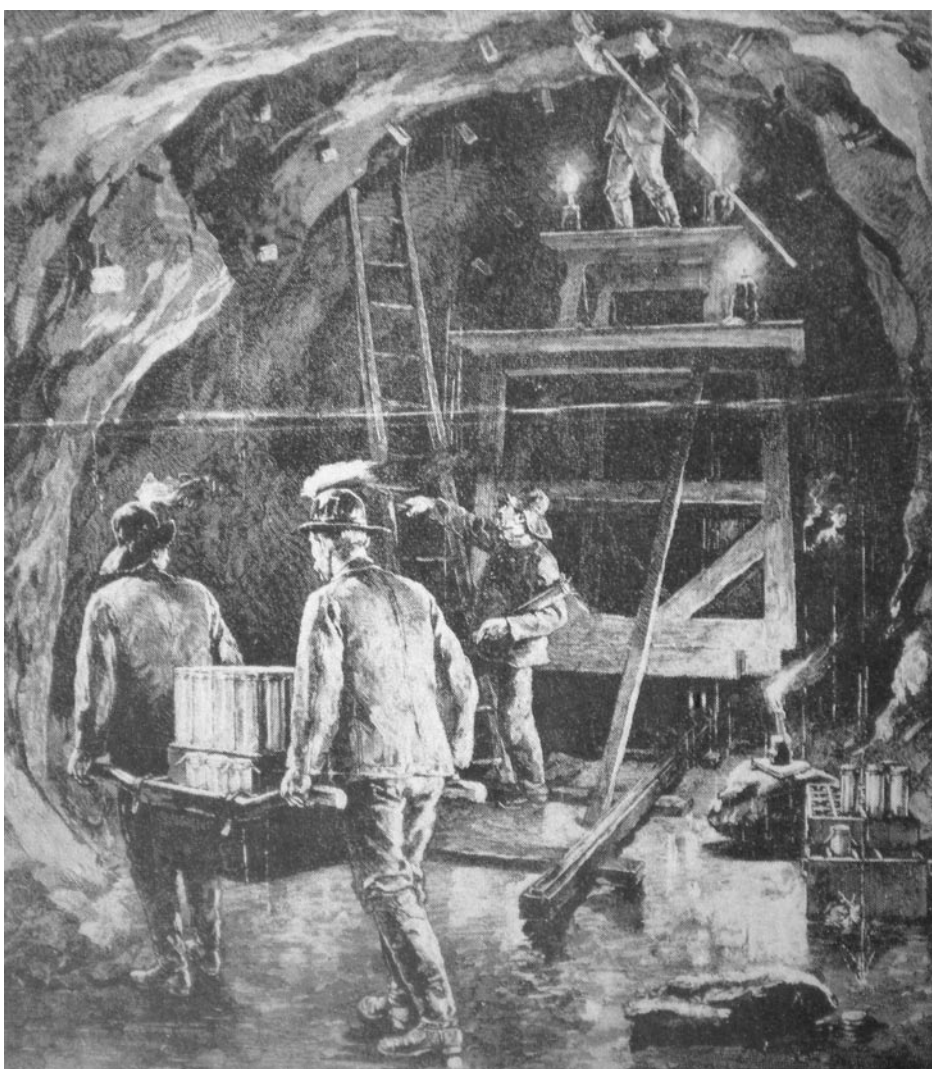
At 2:50, Newton held his daughter up to the control panel and let her press the key that closed the electrical circuit leading to the explosive charges.

According to the *Times* reporter:

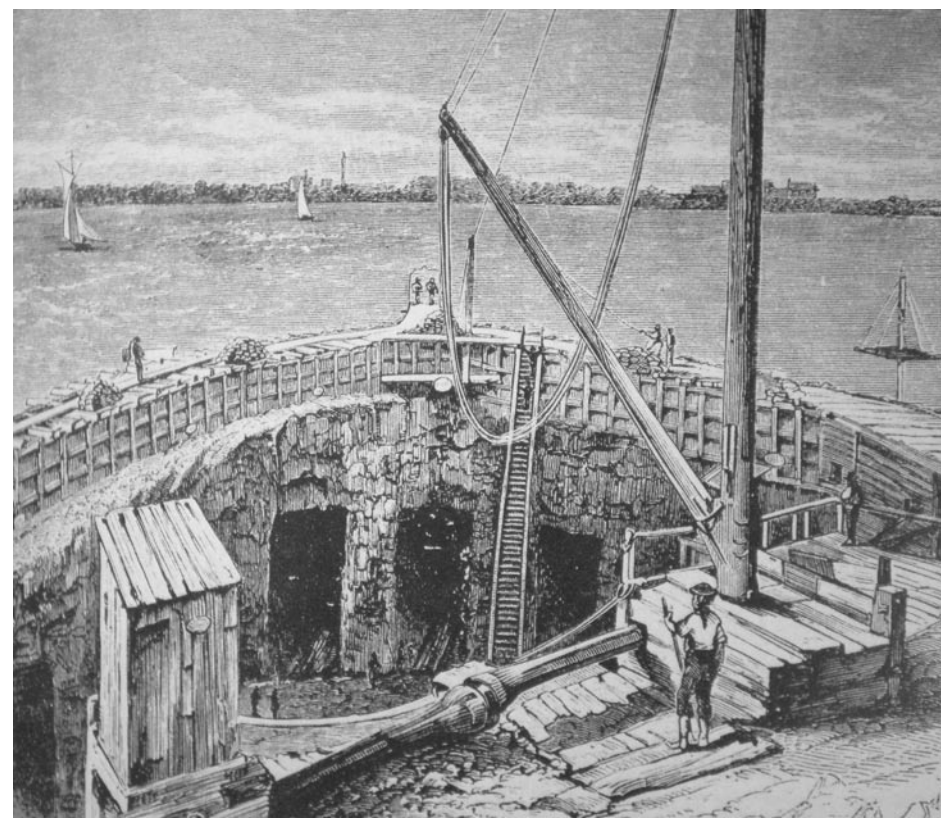
> Probably all held their breath. Certainly the writer did, and in about two seconds . . . he felt a sensation as if he was going to become giddy and fall. This was actually the tremor of the earth from the explosion, but it was so unexpected that it seemed as if it was a nervous action upon the body . . . there was also . . . a slight contraction of



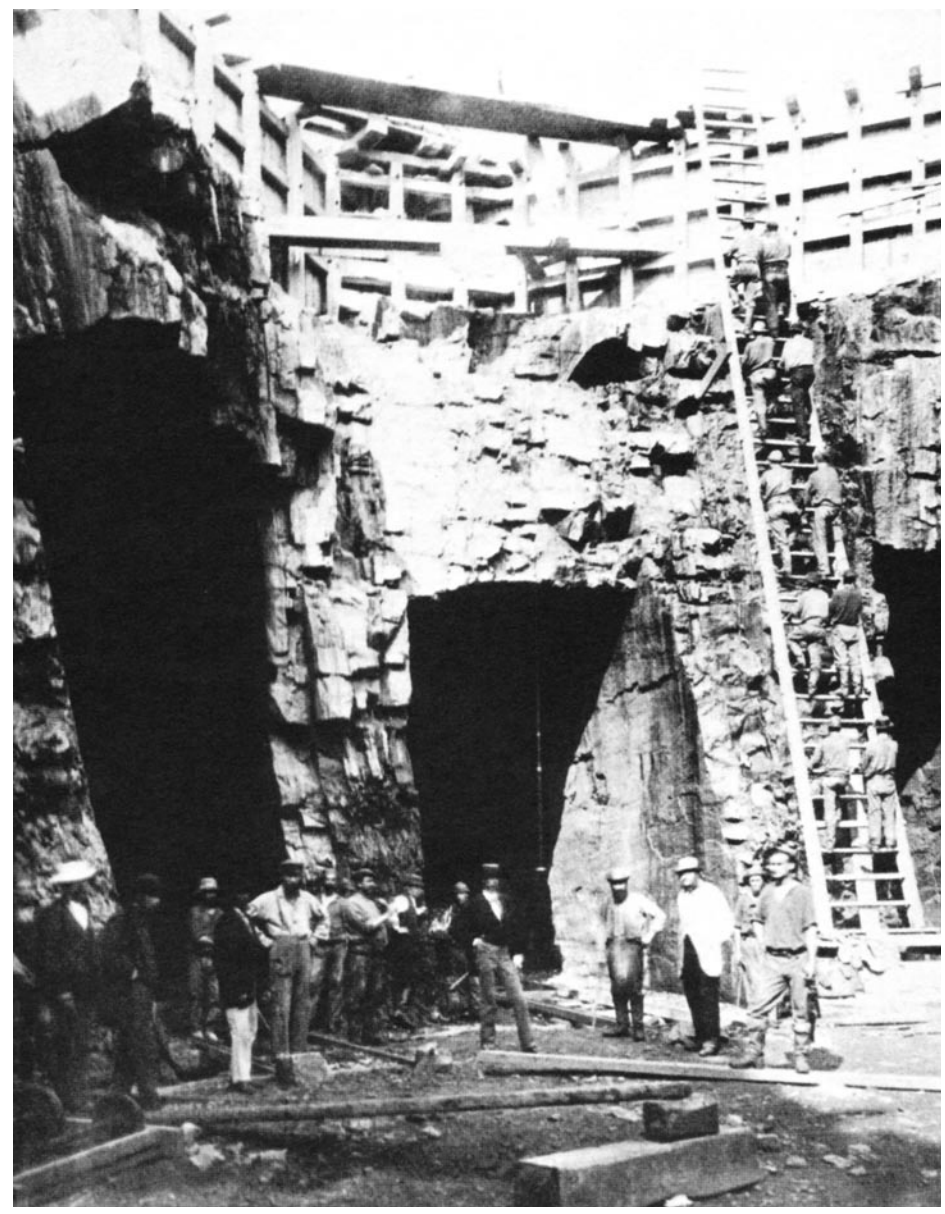
One of the Hallett's Point tunnels in cross section.



Workers carry blasting equipment into a tunnel.



A cofferdam kept the East River out of the vertical mineshaft on the Long Island shore.



Horizontal tunnels at the bottom of the vertical shaft lead under the East River.

the heart, such as a man might feel from some great sorrow. . . . Then came a grand and thrilling spectacle. The water rose up like a wall of many geysers, separate, yet united, to a height of from sixty to seventy feet. It was snow-white in color, and formed of huge cones, which had dome-like terminations. Suddenly there came out . . . a dark cloud of mingled stones and earth, in front of which were huge wooden fragments of the coffer-dam. This cloud spread over the columnar geysers, and hid them, and even while this last apparition was sinking a lurid greenish-yellow mist . . . rose up from the seething waters and brooded over them. This was composed of the terrible gasses from the explosive agents that had done their work and found their way into the atmosphere. This gaseous fog hung heavily over the place, but seemed to spread itself like oil over an increasing area, until it was no more than a screen over the rocking surface of the Hell Gate stream, upon which the black floating fragments of the poor coffer-dam were distinctly visible.

Young Mary Newton presses a key to set off the charges.

Newton's report of the blast was less dramatic. He noted:

> [The explosion] was distinguished by the absence of hurtful shocks in the water or underground. . . . The explosive effort in the air was not perceptible, [and] the underground shock was trifling. . . . A little plastering was dislodged from the ceiling in a house 150 yards away and in two houses 600 yards away from the work.

A photograph of the explosion at Hallett's Point.

In the aftermath of the detonation of Hallett's Point reef, the *Times* reported, "a reactionary feeling set in, and men said that they would not object to seeing a little blasting operation like that several times a week and twice on Sundays."

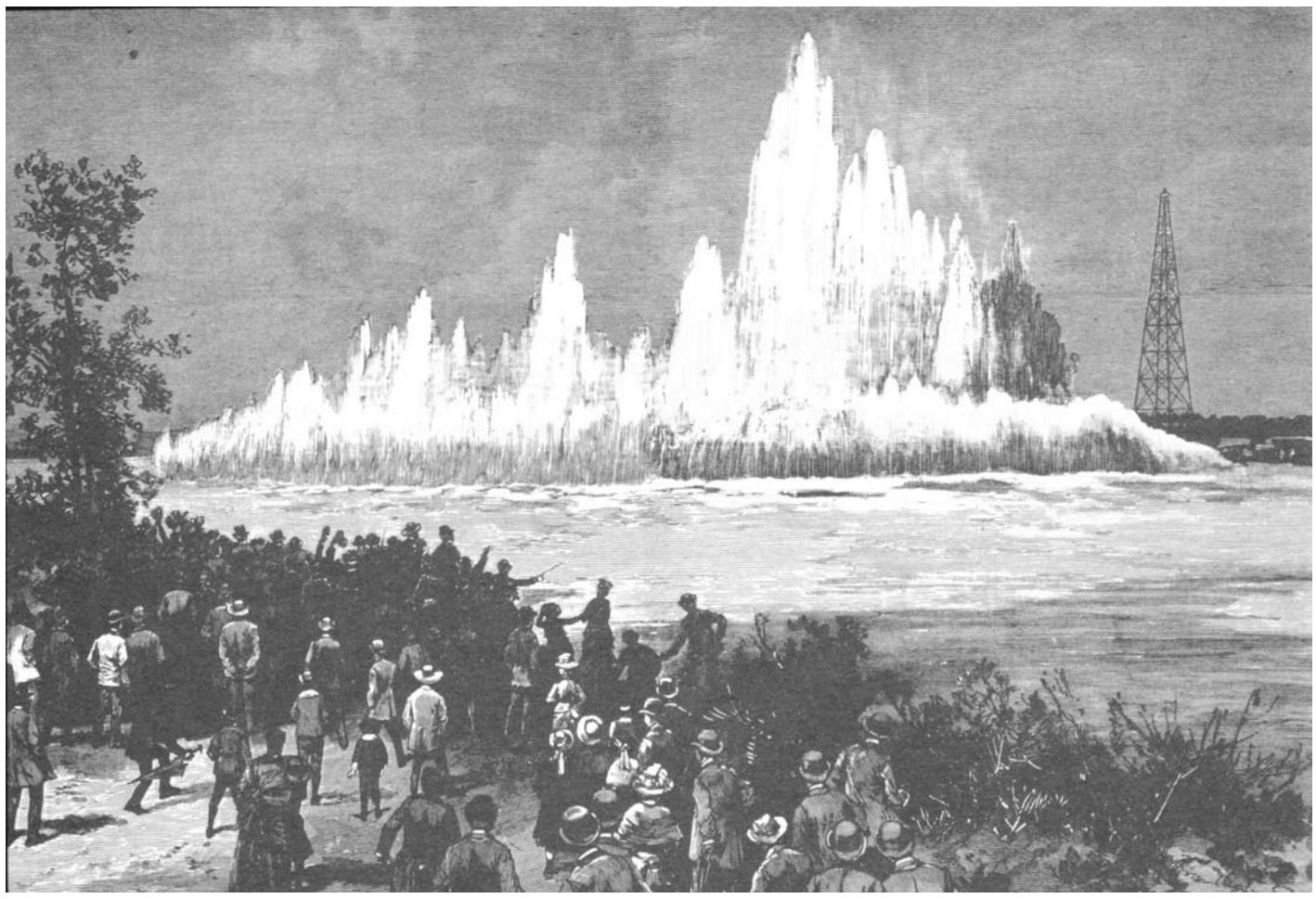
Within a few weeks, steam-powered dredging equipment removed enough rock from the shattered reef to create a much safer twenty-foot-deep channel around Hallett's Point. After passing through this new channel, however, ships' captains still had to avoid a second, larger obstacle in the middle of Hell Gate—Flood Rock.

Flood Rock, also known as Middle Reef, was three times larger than Hallett's Point reef. Working from a vertical shaft drilled and blasted fifty feet down from the top of the rock, Newton proceeded to excavate four miles of intersecting tunnels in the riverbed beneath the surrounding reef. The massive project was stalled by funding shortfalls and an economic depression that forced Newton to suspend work for months and years at a time, but finally, on October 10, 1885, Miss Mary Newton—twelve years old—again pressed the firing key, this time setting off two hundred and eighty thousand pounds of explosives beneath the middle of the channel.

The resulting detonation held the record as the world's largest deliberately planned explosion until the Trinity atomic bomb test blast in 1945. An estimated twenty thousand spectators crowded the shores of Hell Gate to witness the event, and seismographs forty miles away at West Point and Princeton University recorded the tremor produced by the detonation. Following the blast, the *Times* reported: "Ocean steamers will find 26 feet of good, clear water over the once treacherous bottom, and a new highway will be open for the commerce of the world."

John Newton retired from the Army Corps of Engineers in 1886 to serve for two years as New York City's Commissioner of Public Works. He then worked as president of the Panama Railroad Company until his death in 1895.

Today, the only remaining obstruction in the Hell Gate channel is Mill Rock Island, originally two smaller rocks that were joined by rock fill deposited from the Flood Rock demolition site. The island served as headquarters for further drilling and dredging projects carried out in the East River by the Army Corps of Engineers between 1899 and 1915.



New Yorkers view the stupendous blast.

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Weather Warning May Delay Invasion

By David Vachon

In May of 1944, during the Second World War, General Dwight D. Eisenhower, the Supreme Allied Commander, was preparing to launch a massive invasion of Nazi-occupied Europe, using Britain as a base.

Eisenhower knew that the Germans were expecting the invasion. Over the course of the previous three years, they had been strengthening fortifications all along the northern French, Belgian, and Dutch coasts, installing heavy artillery, barbed wire, land mines, and underwater devices to repel Allied landing craft. German Field Marshal Erwin Rommel, Germany's best general, had personally supervised strengthening defenses along the beaches.

Eisenhower's plan was to land one hundred and fifty thousand Allied troops on French soil in a single day, before the German high command could learn of the invasion. One hundred and twenty-seven thousand of these troops—American, British, and Canadian—would be carried by seven thousand ships launched from British ports. The other twenty-three thousand troops would either drop by parachute or land in gliders inland from the coast, in order to secure both flanks of the invading forces.

Eisenhower was confident that the Allies had more and better planes than the Germans and could support the invading troops with air cover. He knew, however, that German Field Marshal Gerd von Rundstedt, head of German forces in Western Europe, had six armored divisions in France ready to respond to an invasion, and that German Chancellor Adolf Hitler kept four more armored divisions in France under his personal command. If all of these divisions engaged with the invading troops on D-day, the invasion would probably fail. It was vital, therefore, to prevent the Germans from learning where or when the landings would take place.

Eisenhower set the date of the invasion for June 5, when the tides in the English Channel would be at their lowest. Low tides would allow his troops to see and avoid the mines and upright steel girders that Rommel had placed on the long beaches.

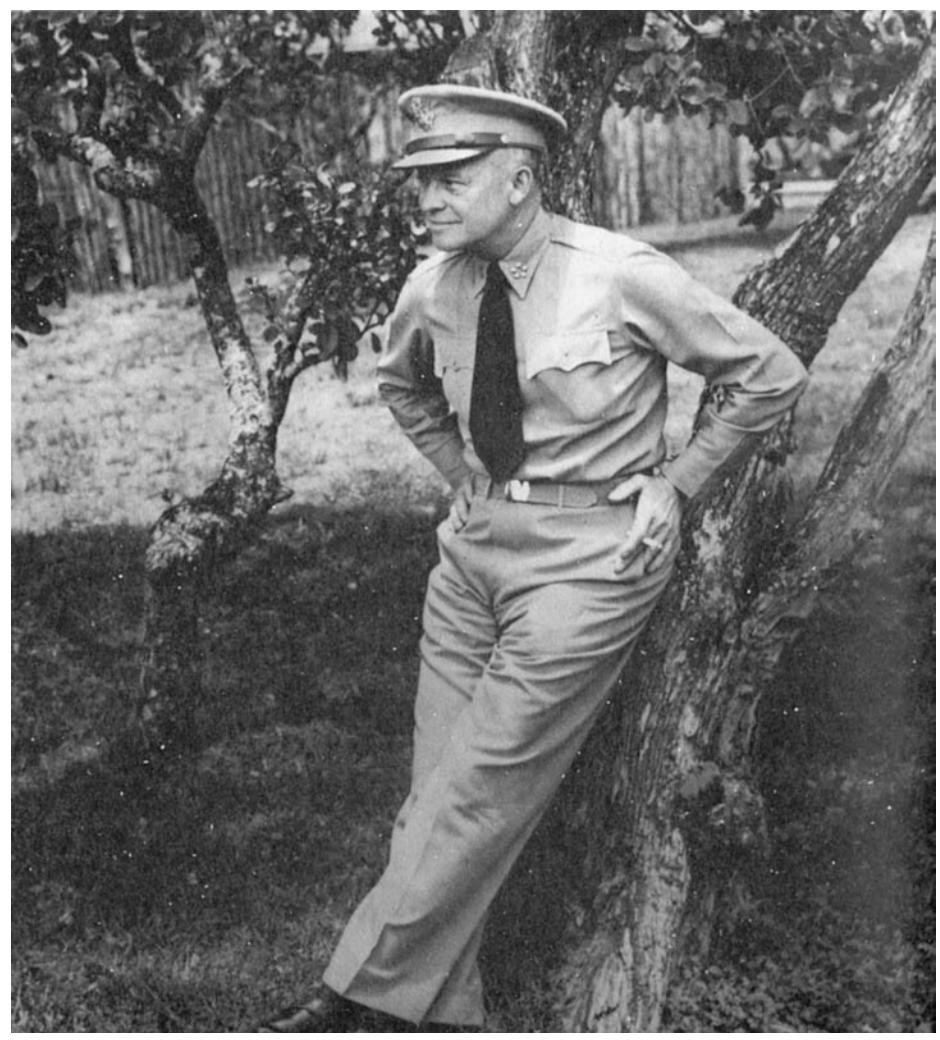
Allied Intelligence agents spread misinformation to convince Hitler that the Allies would land at Calais, eighteen miles across the English Channel from Britain, when, in fact, they planned to attack one hundred and fifty miles south of Calais, along the Normandy coast. The Allies had intercepted German communications showing that their plan was working. Hitler appeared to be convinced that the main attack would come at Calais and that it would be preceded by a diversionary attack, perhaps on the beaches of Normandy.

Eisenhower was concerned that as soon as news of the attack reached the German high command, they would immediately send vast numbers of troops to Normandy by rail. To prevent this, he ordered British and American bombers to concentrate on destroying rail lines in France. Members of the French Resistance also took part in disabling the French rail system.

On June 3 the weather unexpectedly turned foul: high winds, heavy clouds, and torrential rain descended on the English Channel. Eisenhower was worried that wind and waves would buffet the small landing craft, and that cloud cover would make it difficult for Allied fighters, bombers, and transport planes carrying paratroopers to find their targets.

On the evening of June 3, he met with his commanders at his headquarters near Portsmouth, fifty miles south of London. His chief weatherman, Royal Air Force (RAF) Group Captain J. M. Stagg, had just received a report from one of his weather planes over the North Atlantic, and the report contained bad news. The early hours of June 5 would be overcast and stormy with high winds.

Field Marshal Gerd von Rundstedt.



Eisenhower in 1946.

Field Marshal Erwin Rommel with German Chancellor Adolf Hitler.

Allied landing craft at the British port of Southampton a few days before the invasion.

At 4:30 the next morning, Stagg reported that conditions remained poor. Although Eisenhower was reluctant to postpone the invasion, he decided that the risks of going ahead were too great. He delayed the attack until June 6, hoping that the weather would improve by then.

On the evening of June 4, the wind and rain continued. At 9:30 p.m. Eisenhower called in his commanders to hear the latest weather report. Captain Stagg entered the room with his three senior meteorologists. Stagg reported that conditions remained poor, but that his weather aircraft in the North Atlantic had detected a high-pressure front moving rapidly southeast. On June 5 there would be a gradual clearing during the day, with decreasing winds. Conditions would improve through the night. Stagg could not say whether all skies in the invasion area would be clear enough for the bombers and airborne operations to go ahead, but he calculated that there would be a twenty-four hour window of relatively clear weather and calm seas beginning the night of June 5 and ending the night of June 6, when the weather would turn bad again.

Eisenhower was hesitant to bet everything on the prediction of a short spell of good weather in the midst of a storm, but he knew that if the break did materialize, it would be an opportune time to attack because the Germans would probably not be expecting it.

When Stagg had finished his report and left the room, Eisenhower asked his commanders for their opinions. RAF Marshal Trafford Leigh-Mallory, in charge of the airborne assault, stressed the need for clear skies so that his bombers and paratroopers could reach their targets. He advised that going ahead without the assurance of clear skies would be too risky. Eisenhower's deputy commander, British Air Marshal A. W. Tedder, agreed with Leigh-Mallory. Eisenhower's ground commander, British General Bernard Montgomery, had no reservations. He answered simply, "I would say go."

After a few minutes of silent consideration, Eisenhower authorized the Allied naval commander, Admiral Bertram Ramsay, to launch his ships.

Eisenhower drove back to his trailer and fell asleep. He awoke at 3:30 a.m. to the sound of pounding rain and fierce winds that shook his trailer. He could still call the invasion off, if the break in the weather predicted by Stagg did not materialize. He drove back to the mess hall where Stagg had a fresh report: the high-pressure front was moving in rapidly. Skies would begin to clear within a few hours.

"Okay, let's go," said Eisenhower, now fully convinced that he had made the right decision.

As predicted, the skies over the channel cleared in time for the invasion. Eisenhower woke up early on the morning of June 6 to the reassuring news that most of the paratroopers had landed safely and had secured their immediate objectives while sustaining only minor losses. By 7:00 a.m. the first assault troops were wading through waist-high water onto the beaches of Normandy, while the Allied destroyers bombarded the German fortifications. It appeared that the Germans had been caught off guard.

Eisenhower later learned that the break in the weather that had prompted his decision had come as a complete surprise to the German high command. German meteorologists had called for bad weather to continue uninterrupted for several days. This forecast had given the German high command a false sense of security. Convinced that the Allies would not invade during the storm, von Rundstedt had granted Field Marshal Erwin Rommel permission to leave France and return to Germany and celebrate his wife's birthday. When von Rundstedt received the first reports of the invasion at Normandy, he discounted them because he was convinced that any attack on Normandy would be a diversionary tactic of little consequence and that the real invasion would be at Calais, which was adequately defended. Hitler agreed with von Rundstedt and refused to release the four armored divisions under his direct authority because he believed he would need them at Calais.

Eisenhower also learned that Rommel, at home in Germany with his wife, had immediately grasped the seriousness of the situation. "How stupid of me!" he had exclaimed, as he was informed by telephone of the invasion.

By the night of June 6, one hundred and fifty-six thousand Allied soldiers had come ashore on the Normandy beaches with losses of twenty-five hundred men—much fewer than expected. With the beachhead secured, the Allies landed several hundred thousand additional troops over the coming days. The invasion was a success.

Eisenhower later received a message from his chief weatherman, RAF Captain James Stagg, stating that June 19, the date Eisenhower had considered delaying to, turned out to have the worst channel weather in twenty years. Eisenhower wrote back to Stagg: "Thanks, and thank the gods of war we went when we did."

The war in Europe continued for nearly eleven months. German forces finally submitted to an unconditional surrender in early May of 1945.

American soldiers heading for Normandy with their weapons in clear plastic bags.

U.S. troops wade ashore from a landing vehicle.

American troops and equipment streaming ashore at Omaha Beach on the Normandy Coast.

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