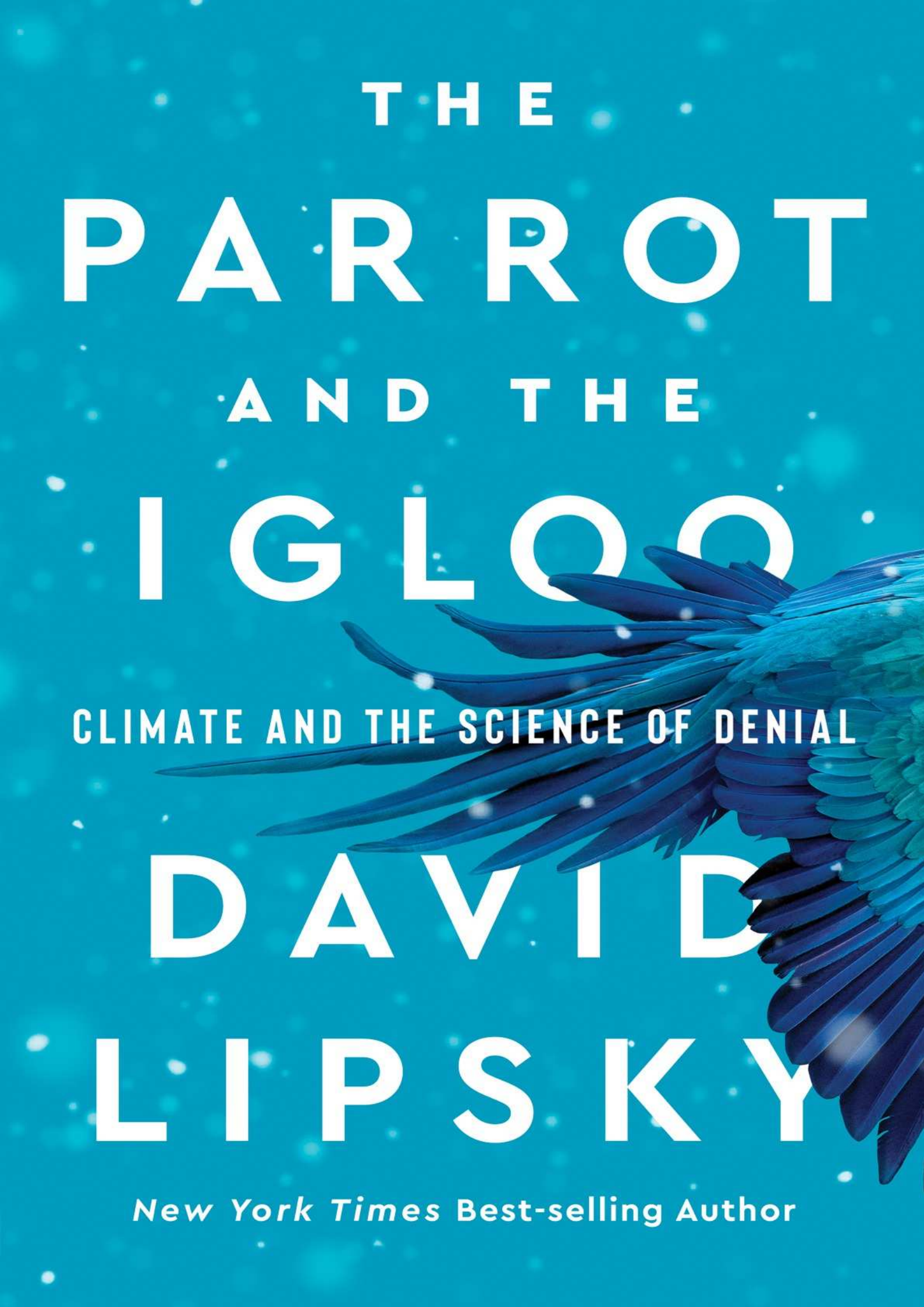
THE PARROT AND THE IGLOO

CLIMATE AND THE SCIENCE OF DENIAL



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THE PARROT AND THE IGLOO

Climate and the Science of Denial

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For Lisa Gerard and Bill Clegg

Well, you know, I like a hustler.

—THOMAS EDISON

What’s the use of having developed a science well enough to make predictions, if in the end all we’re willing to do is stand around and wait for them to come true?

—DR. SHERWOOD ROWLAND

History is full of stories that aren’t actually true.

—LORD CHRISTOPHER MONCKTON

CONTENTS

PART THREE: DENIERS

PREFACE

THIS STORY IS ABOUT INGENUITY AND FOLLY.

It has three sections and an epilogue—which takes us up to the present day. I wanted it to be like a Netflix release, where all the episodes drop together.

You can read these parts in any order you'd like. If you're eager to know the history of the hired scientists who lied us into the problem, start with section three, Deniers. (They will surprise you.)

If you want to follow the detective work that identified carbon dioxide as our culprit, that would be episode two, Scientists.

If you'd like to browse the suite of gifts—the "work of the future will be the pressing of electric buttons," Nikola Tesla announced, when he understood how much he was about to change everybody's life—that led to our situation, your pick is Inventors, the series premiere.

The story this book tells is about the people who made our world; then the people who realized there might be a problem; then the people who lied about that problem.

There was a lot to read. It's a great story about the last seventy years, and I wanted it to work like a novel—like *Great Expectations*, if the hero were an idea: that one modest waste product of our power cords and long sweeping glides down the highway could eventually crowd our weather, which is the basis for everything. So the plan was to read all the articles, replay all the newscasts and antique NPR, and chart what a reasonably well-informed person might have been expected to know about climate during those seven decades. This is that story: the travels of one disturbing thought—in the words of one historian, "a theory more peculiar and unattractive than most"—its friends, enemies, and adventures, on the road between then and now.

I kept thinking the book was almost done. ("This story put a hole through my life," was my first plan for this preface. "Now it's your turn.") I had an old dog; then a very old dog. And I wanted her to still be alive

when the book was complete—to know me again without this project left to do. I'd look down from my chair, see her long black-and-white body curled against my ankles. She died two years before I finished. She's buried now on a kind of low mountain, an ambitious hill, near West Point, New York, one more thing on the Earth.

Part I

INVENTORS

Well, you know, I like a hustler.
—THOMAS EDISON, 1885

THE MESSAGE

TECHNOLOGIES ARE LIKE STARS: THEY HANG AROUND the lot waiting for the right story, the proper vehicle. Electricity became a star with the telegraph. The telegraph needed a crime.

On New Year's Day in 1845, a sixty-year-old Quaker named John Tawell caught the Paddington train for Slough. (Slough, twenty miles from London, is one of those in-between places people like to make fun of. It's where the Ricky Gervais version of *The Office* is set.) John Tawell had been a chemist, a forger, a deportee to Australia; in 1841, he'd romanced and wed the dream bride of every reformed criminal: a prosperous widow. He also maintained a former mistress, Sarah Hart. They'd arrived at an informal palimony scheme. Fifty-two pounds a year, so long as Hart didn't spill the beans and ruin everything. Tawell was now running short of cash. Sarah Hart had a solution: Tawell could murder his wife. Instead, he bought a bottle of prussic acid and boarded the train for Slough.

Tawell poured the poison into a mug of beer, watched in Hart's kitchen as she drank it. Then he left. A neighbor—recognizing Tawell by his Quaker coat but not by name—saw a man so agitated he couldn't unlatch the front gate. The neighbor found Hart on the kitchen floor, foam around her lips. A second neighbor trailed Tawell to Slough station. Tawell was in time to catch the seven-forty for London—where he would melt into a world of coats and commuters. The business settled, Tawell had treated himself to a first-class ticket.

Tawell's misfortune was to have selected the one British rail line with a working telegraph. In the 1840s, the telegraph had been used as a royal novelty: to announce the birth of Queen Victoria's son and to fetch the Duke of Wellington some clothes he'd forgotten for a party. It had not caught on—made much imaginative headway—among nonroyals. By 1843, its British introducers were broke. They'd fallen to their "lowest point of depression."

The station manager sat down at the telegraph, wired a description to London. Tawell was shadowed from the station, then apprehended, then charged. He was tried—a tabloid bonanza, a dress rehearsal for our own podcasts and *Dateline*s—convicted and executed. Here was a detective story with technology as the hero. Poles, wires, operators, and offices rose over the landscape. People would point and explain, "Them's the cords that hung John Tawell."

It took one train ride to demonstrate all the virtues scientists had been compiling for twenty-four centuries. Electricity was powerful, it was portable. It was life-altering at a dash.

From the beginning, electricity dawned as a sort of foggy new world—a coastline to be explored, mapped, then settled. As with lots of other things, the Greeks landed first. A sixth century BCE philosopher named Thales made the initial approach. The focus of his experiments was amber. Amber is fossilized tree resin, ancient sap. Thales discovered that when you rubbed a block of amber with cat fur—it's fun to imagine early experiments: different fur, fancier grips—the amber would attract light objects like feathers and straw. They'd slither across a table and stick.

What Thales was doing, of course, was generating static electricity. William Gilbert, Queen Elizabeth's physician—in portraits, he wears one of those *Jurassic Park* ruffs and a Brooklyn brunch stubble—reproduced Thales' experiments for the English court of 1600: the same time that Shakespeare was plotting sad ends for Hamlet and Othello. Gilbert roughed out the basic principles. He also gave the property a name. He took the Greek for "amber"—*elektron*. That's what electric means, basically: having the properties of amber.

Exploration stalled. Electricity became a stunt, a prank, a hobby for tinkering men of science and leisure worldwide. Hosts arranged dinner parties with sparking forks; men surprised women with electrified kisses. The 1730 exhibition The Electrified Boy required an underweight child to suit up with insulated clothes and get winched above the floor stomach-down, like a dolphin in the canvas between tanks. Static was applied to the boy's feet: his hair would rise, his fingertips made metal shavings hover; a crowd-pleasing spark could be elicited from his nose.

Benjamin Franklin left one Boston performance in a state. He immediately tried to put his hands on anything electrical. A primitive electric storage system—wire in water; this was called a Leyden Jar—had been introduced. Franklin showed off Leyden jars at his printing shop:

throwing sparks, drawing crowds. Franklin created a hopping metal spider, cooked turkeys ("birds killed in this manner eat uncommonly tender"), shocked friends. "If there is no other use discovered of electricity," Franklin wrote, "this however is considerable."

Which is what sent Franklin into the Philadelphia rain with a kite, a key, and silk, an insulator. As failure insurance, Franklin brought along his son: If the experiment didn't come off, Franklin could always say the kite was the boy's. Two practical aims: He meant to demonstrate that the electricity generated by static, and the thunderous forks that sometimes singed trees and rooftops, were cousins; that here was a potentially awesome force. As churches, the tallest buildings, were often struck by lightning, Franklin's second aim was to popularize the lightning rod. Franklin became America's first celebrity scientist. Yale and Harvard offered honorary degrees. A Russian named Georg Richmann tried to repeat his work. The lightning burst Richmann's left shoe and pressed a small red circle into his forehead. Richmann became a casualty and a novelty: the first person electrocuted by love of science.

The technology proceeded by fits and starts. Also accidents and grudges, progress charted with entries in the dictionary. In 1781, an Italian professor named Luigi Galvani discovered that frogs' legs—relieved from their donors—would still kick under application of a current. Galvani's belief was that even the dead continued to generate some form of animal electricity. Alessandro Volta, his rival, thought this was just ridiculous. To demonstrate the ridiculousness ("What is left," he wrote, "of the animal Electricity claimed by Galvani?"), Volta invented a surer way to generate and store electricity: The voltaic pile, the battery. But there they are, preserved together in the dictionary—the conventioneers' hall where everyone shakes hands after death. A current that moves is "galvanic." The current is the volt.

Michael Faraday steps into the narrative like a hero out of Dickens: rough childhood, smooth features, virtuous character, shy achievement. (In the old ABC drama *Lost*, which featured a scary electromagnetic island, the sole character to have any idea what was going on is named Faraday.) Faraday, a London blacksmith's son, left school at twelve. He put in seven years as a bookbinder's apprentice. And it's funny that electricity, which would take a planet of readers and redirect them toward YouTube and touchscreens, was perfected by somebody from the trade. In 1812, a customer gave Faraday his tickets to a series of chemistry lectures.

Faraday attended and was smitten. He composed a kind of love letter, using the tools of his shop—took perfect notes, bound them into a volume, presented the book to the lecturer, who happened to be head of the Royal Institute of Science.

Faraday became his apprentice—then began to outshine everybody. In 1822, Faraday wrote four words in his notebook: “convert magnetism into electricity.” It took nine years. His solution was to rotate a metal disk inside the arms of a horseshoe magnet. Since the process was dynamic, his machine was called a Faraday dynamo, which meant another new word.

By 1831, electricity could be stored, it could be generated. It still didn’t have a use.

SAMUEL MORSE WAS BORN—oddly—a mile from Ben Franklin’s birthplace. He arrived in 1791, one year after the big Philadelphian departed, as if the tech were passing a sort of baton. Morse liked to draw—as a kid, he scratched a portrait into a school cabinet, got yelled at. Once he was famous, that chest became a relic.

Morse attended Andover, started Yale at age fourteen. He liked physics and chemistry. He played with Volta’s battery, sat in on lectures about electricity: it was then understood as one of the world’s secretions —“electrical effluvia,” the “universal fluid.”

But Morse was mostly an artist; he helped defray tuition by selling friends portraits of themselves. Then he headed for England, to study painting, enter competitions, grouse about money, return home broke after three years. London had been a series of wardrobe and beverage disappointments. “My drink is water,” Morse complained to his parents. “I have had no new clothes for nearly a year.”

In the States, Morse began an incredibly successful career as a failure. He became a kind of restlessly unsuccessful painter, changing lures and streams each time he couldn’t catch fish, failing at a variety of locations and styles. He failed with mythological subjects in Boston. With patriotic images in Washington and mini-portraits in New Hampshire. (In 1827, he began a strange campaign in New York City against the ballet. “The plain fact of the matter is this,” Morse explained in an editorial. “The exhibition in question is to all intents and purposes *the public exposure of a naked female*.” This failed.) For an uncustomary, four-year respite, Morse succeeded in Charleston, South Carolina, as a society painter. Then recession crept in, and he failed there, too.

So he headed back to Europe. To Italy and France. He had an idea for a kind of commercial anti-travel. Since most Americans knew about the Louvre, but were unlikely to ever get across, he would execute a group portrait of the museum's collection, which could then be exhibited for money throughout the United States. This failed. In 1832, Morse sailed home aboard the *Sully*—another Sully, Thomas Sully, was America's foremost painter. If Morse had been a luckless actor, this would have been as gloomy as slinking home aboard a boat called the *De Niro,* the *DiCaprio*, or the *Pitt*. It must have put him in a rotten mood.

One night at dinner he fell into a conversation about electricity. Another Franklin experiment had demonstrated how quickly current flashed over the wire. Even across rivers and miles: It happened in no time at all. Electricity, it later turned out, moves at nearly the speed of light. (As Martin Amis would write, "It ain't slow.") Franklin, a showboater, used this principle to set off gunpowder from remote locations. He liked a boom.

At the table, Morse posed his question: If the wire could communicate a spark—the idea that Franklin had just now decided to set off the gunpowder—why couldn't it also communicate information? If the information were simply on and off, couldn't you convert this into an alphabet? (Morse code, a sort of primitive binary, was the first spoken instance of what's now the most common language on Earth. Email, texts, Instagram; what gets exchanged more often over the course of a day than binary?)

Morse's father had been a minister, and the evening has the sound of one of those encounters from the Bible: the men fell to talking, and did not stop till morning. Morse wandered the deck, continuing the conversation in his head, and did not even notice when it was dawn. His invention would make use of everything then understood about electricity: battery, wires, speed.

He roughed out a sample message on deck—"War. Holland. Belgium. Alliance. France. England. Against. Russia. Prussia. Austria." Which reads like a stray bit of Nostradamus, a news broadcast from one century ahead. Debarking in New York City, Morse turned to the boat's chief officer. "Well, Captain, should you hear of the telegraph one of these days," he said, "remember the discovery was made on board the good ship *Sully*."

Then Morse began a twelve-year career of failing at the telegraph. (It's no accident his best biography is subtitled "The Accursed Life of Samuel

Morse.") He mocked up devices that failed. He failed to patent his work. He couch-surfed with his brothers in Manhattan. He wrote tracts denouncing Catholics and immigrants—"The insolence of foreigners," he warned, "will no longer be endured," and "We shall soon have more papists in the North than they have slaves in the South." He took a position as professor of painting at New York University; unpaid. In his offices, Morse set up magnets, wires, batteries. To save money, he ate and slept by their side.

Public demonstrations of the telegraph failed. "His situation," explains an otherwise sober nineteenth-century biography, "was forlorn in the extreme." He ran for mayor of New York, on a strict anti-immigration, pro-nativist platform, and failed spectacularly. (Morse received just under a thousand close-the-pier votes.) Morse wrote to Washington, asking to demonstrate his apparatus. In February 1838, the inventor set up wires and receivers for senators and congressmen in the firelit chambers of the Commerce Committee. And a strange thing happened. It must have felt unnatural, like a spring breeze over snow.

Morse succeeded. The response was passionate, immediate. A kind of stunned babbling. The congressmen: "What would Jefferson think, should he rise up and witness what we have just seen?" "When will improvements and discoveries stop?" "Time and space are now annihilated." Another said simply, "The world is coming to an end." The committee voted funds, a $30,000 grant, for Morse to string forty miles of telegraph line connecting Washington to Baltimore.

And then, Morse being Morse, and politicians being politicians, they forgot. The bill needed full votes from the House and Senate; the grant was abandoned, and Morse resumed failing. He traveled for nine months through Europe on a capital hunt. Because you have to spend money to make money, he returned home flat broke. In New York, he failed at sending a telegraph message across the river. He stood again for mayor—another bitterly anti-immigrant platform—and face-planted once more. In 1841, one of his private art students asked if it wouldn't be okay to pay his fees a week late. "I shall be dead by that time," Morse said. He added, "By starvation." The student asked whether ten dollars might help. "Ten dollars would save my life," Morse said. "That's all it would do." They sat together at a restaurant, Morse explaining this was his first meal for a day. "Don't be an artist," he advised. "It means beggary. A house-dog lives better."

He wrote a friend, quoting his father's Bible. Proverbs: "'Hope deferred maketh the heart sick.' It is true, and I have known the full meaning of it."

In late 1842, Morse found himself back in Washington. A sort of last-chance commute. His savings were so meager—thirty-seven and a half cents—they had become entirely portable. They were riding in his pocket. This time, the appropriation came to a vote. Morse got his money. It took six months to wire the thirty-eight miles from a train station outside Baltimore to the chambers of the Supreme Court. The first intercity communication was sent successfully on May 24, 1844. A few days later, the machine made a bigger splash. Its debut in politics, in up-to-the-minute news-gathering. The Democratic Convention was being held in Baltimore. The nominee for vice president, congratulated via telegraph, quickly wired back to refuse the honor.

After hours, Morse and his Baltimore operator had the first kick-around, interstate, late-night, nothing-much conversations in history. About food. FRIEND: Have you had your dinner? MORSE: Yes have you? FRIEND: Yes what had you? MORSE: Mutton chop and strawberries. You can feel the pastness—that menu—and the future in this conversation. A future of post-delivery texting, remote control under the thumb, sites and news channels scanning by. Word of the telegraph threw the country into a mix of excitement and anxiety. Electricity had found its first big use.

New York was soon wired to Washington. Americans—feeling that Morse had somehow trained lightning—called these wires "lightning lines." Newspapers wrote, "We stand wonder-stricken and confused." The telegraph, they explained, had abolished the idea of "elsewhere . . . it is all *here*." The machine was "the climax of all human might."

Morse's invention proved not just emotional and welcome, but retroactively *necessary*. As the country reached adolescence and kept on expanding—new states, territories, homesteaders—there were worries about keeping a nation as big and disparate as America united. "Doubt has been entertained by many patriotic minds," a government report noted, about how communication, "so necessary to a people living under a common representative republic, could be expected to take place throughout such immense bounds. That doubt can no longer exist."

By 1846, Boston, New York, and Washington had all been strung on the same wire. In 1846, the first national media service formed up, the Associated Press. (It's why these outfits are still called the wire services.)

In 1857, the interstate telegraph company, Western Union, trailed the stagecoaches to California. People thought the poles would probably get chopped down by Indians or knocked over by buffalo. But the buffalo wandered away, and Native Americans weren't much interested. By 1861, San Francisco was wired to Manhattan: one long wire stretched above the country. By 1866—cable laid along the seabed—London was connected to America. There was now no place where a man like John Tawell could hide. By 1867, Western Union had strung eighty-five thousand miles of wire; 5,800,000 messages were sent that year, at a cost of about a dollar each.

A few weeks after successfully demonstrating his telegraph, Morse failed to keep his footing, took a spill, and was laid up for six weeks. The first message he'd sent between Baltimore and DC was four words, a biblical quotation: "What hath God wrought?"

THE HUSTLER

HOW ELECTRICITY SLIPPED OFF THE WIRE AND INSIDE people's homes—hauling its big freight of power plants, light, and television, of pop culture and heavy machinery—is really the story of three men. One is very famous. Another put his name on washing machines. The third suffered from the combination of brilliance and misfortune that makes him famous among people who like to identify a dark unfairness at the heart of the world. The three men are Thomas Edison, George Westinghouse, and Nikola Tesla. It's Edison who threaded the wire under the streets and behind the wallboards. In a lot of ways, being alive now—this era's inheritance of problems and gifts—is like living inside a math question first posed in 1878. No matter how we spend our days and hours we're all pitching in on the implications: what would the world be like if Thomas Edison got his way?

Edison's whole life was about the telegraph. It's the answer sheet he cribbed from, the notes he snuck into every test. The telegraph made him rich—he nicknamed his first children "Dot" and "Dash"—and later in life, when he stopped being rich for a while, he said he could always go back "and earn my living again as a telegraph operator." Edison got famous in an innocent way nobody gets famous now. People called him "the Greatest Single Benefactor of the Race."

Starting out with the telegraph made Edison so famous that, when he was sixty-three, drawing his face on an envelope and dropping it in the mail would see your letter delivered to his hands.

He was born in the sort of incidental, beside-the-point town founders try to buff up with a grand European name: Milan, Ohio. When Edison was two, his uncle Snow Edison—a style of name that would have to wait for a century and movie stars to return to fashion—joined the wagon trains for the 1849 California Gold Rush, but died at the edge of the trip. Edison's life forms the bridge between gold-rush America and tech-rush

America: Between value you gouge out of the earth and ideas you nudge into the air. His childhood got squeezed by processes he helped accelerate: technology shucking off industries, advances smothering towns, ecology taking the hit.

Milan was a canal on Lake Erie—a thriving grain port. Then railroads stole the business, and the Edisons relocated to Port Huron, Michigan, a timber boomtown. Lumberjacks overcut the forests, and business dried up.

Edison's father tried real estate, farming, shingle making; he went bust with a grocery. A 1857 credit report notes that he'd been "indicted for selling real estate not his own," and concludes with a BEWARE sign: "Should not like to trust him largely." Family life became a battle against middle-class slippage. Tight smiles in town, anxiety around the kitchen. At seven, his parents yanked Edison from school. Because a teacher had called him "addled"—also for a more homely reason: they were out of money. He ended up homeschooled by his mom. (Decades later, Edison in the national press, the former headmaster wrote him. He wanted to see about back tuition. "I am now almost seventy-seven, and am on the retired clergy list. As you have now a large income, I thought perhaps you would be glad to *render me a little aid*." Being lively—as Edison always was—includes the talent for keeping grudges alive, too. Edison mailed back twenty-five dollars.)

As a boy, he read science, built a telegraph, fiddled with chemicals, blew the corner off a building. At twelve, Edison found a job with the railroads. Boarding the traincars at dawn, trawling the aisles, selling fruit, sandwiches and newspapers, stepping back into the kitchen at midnight, where he'd leave a dollar for his parents.

If Edison's life were a comic book, this would be the origin story. He was selling papers just as reporters, via the telegraph from the Civil War, were revolutionizing the news business: producing the first real-time battlefront coverage in history. Edison's train pulled into Detroit the morning of the Battle of Shiloh.

A mangling three days—reports fixed the dead and wounded at sixty thousand. Edison watched anxious families mill around the train station bulletin board, desperate for news.

Everything came together. Telegraph, media, money. Edison paid the station operator to wire the battle news all the way down the line. Instead of his usual one hundred papers, he took a thousand, on credit. Pulling into the next station, Edison found a panic he'd helped generate: worried