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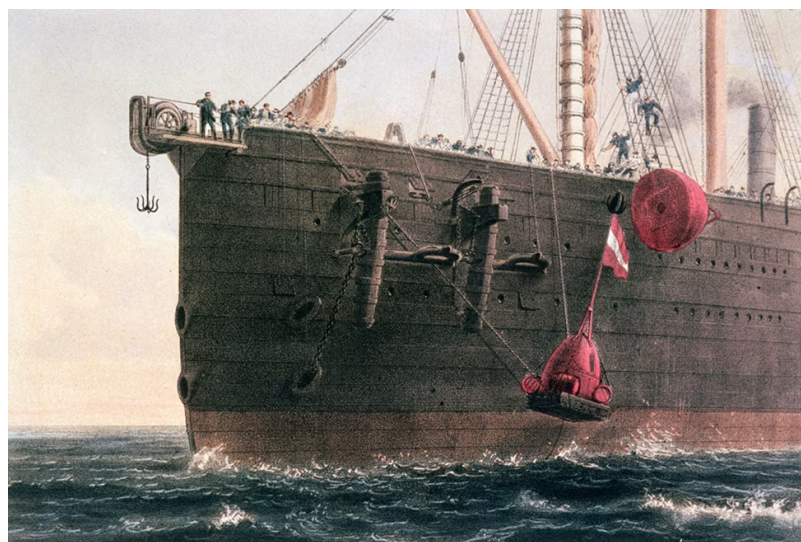
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'Lightning Beneath the Sea' Review: The Path of the Copper Wire

Cyrus Field failed repeatedly before building a reliable telegraph link across the North Atlantic. His perseverance revolutionized global communication.

By Marc Levinson

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A lithograph by Robert Dudley depicting the laying of the trans-Atlantic telegraph line in 1866. ALAMY

You'll rarely know for certain, but when you send an email, check your social-media feed or read this newspaper online, you may be sending pulses of light through a conduit the size of a garden hose resting on the floor of the sea. Around 500 fiber-optic cables, not counting those owned by governments, stretch for more than a million total miles beneath the oceans. They provide the physical backbone for the weightless world of the internet. Life without them would be hard to imagine.

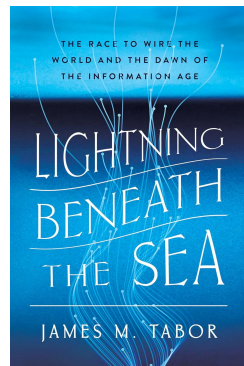
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Lightning Beneath the Sea: The Race to Wire the World and the Dawn of the Information Age

These days fiber cables are laid by purpose-built ships using proven methods. In the middle of the 19th century, matters were rather different. Within hours of carrying the first telegram across the English Channel in 1851, the earliest "submarine

By James M. Tabor

Norton



1850, the earliest submarine telegraph”—27 miles of copper wire wrapped in a rubbery substance called gutta percha—was broken by a fishing trawler. Laying a cable across the deep and stormy North Atlantic would prove far more difficult. It would take another 16 years before dots and dashes reliably flowed between Great Britain and North

America.

The tortuous effort to build that cable is the subject of James Tabor’s “Lightning Beneath the Sea: The Race to Wire the World and the Dawn of the Information Age.” Mr. Tabor is a novelist and a historian, and this book demonstrates his literary skills: “Lightning Beneath the Sea” is full of drama and excitement. While this is far from the first book on this topic—there’s even another one that bears the same title—Mr. Tabor’s research is thorough, allowing him to explore why several efforts failed embarrassingly before a reliable telegraph link across the North Atlantic opened in July 1866.

The lead character in the story is Cyrus Field. A wealthy American entrepreneur who had retired from his paper-wholesaling business at the age of 34, Field knew nothing about telegraphy when Frederic Gisborne, a down-and-out inventor, approached him in 1854 about investing in a telegraph line. Gisborne had laid a 10-mile link between Prince Edward Island and New Brunswick, the first undersea cable in North America; he now sought to convince Field that linking Newfoundland to the mainland would make it possible to send telegrams to and from ships en route across the Atlantic, cutting several days from the time needed to communicate between New York and London.

Field determined that such a line should extend all the way to Ireland. He would devote the next 12 years to raising money, hiring experts, improving technology and organizing multiple attempts to push the work forward.

Despite frequent bouts of seasickness, Field undertook dozens of crossings between New York and London, seeking investors and cultivating government support. He devoted many years and much effort to his dream, Mr. Tabor writes, because Field “believed from the very beginning that wiring the globe would usher in a new age of world peace.”

The project was unlike any other. “As of 1855, construction of overland telegraph systems had become standardized,” Mr. Tabor writes, but “no such standard existed for submarine telegraph lines, especially those running through salt water.” None had been laid beneath the open ocean. Field pulled together an Anglo-American team whose

members had widely divergent opinions about how the job should be done.

The first stage—a 70-mile-long cable beneath the Cabot Strait between Newfoundland and Nova Scotia—seemed the easiest. But the venture, in 1855, failed badly: In front of a boatload of dignitaries brought from New York to observe a technological triumph, a sudden gale tossed the ships so violently that crew members had to cut the partially laid cable to save their vessels.

Field, Mr. Tabor contends, was to blame for the fiasco, having bought the wrong cable-laying equipment, hired the wrong ships and employed the wrong captain. A second attempt, more carefully planned, succeeded a year later.

Laying cable on a mountainous seabed across the 1,600 miles between Ireland and Newfoundland was even tougher. Mr. Tabor is particularly good at explaining the limits of scientific and technical knowledge at a time when electricity was often thought of as a fluid, and electricians tested electrical currents by “tasting” a live copper wire with their tongues. The inconsistent purity of the copper could garble transmissions. Residue from the gutta percha insulation could foul cable-laying machines. If the brakes—meant to control the pace at which the ship paid out cable—gripped too hard, the cable could snap. The pressure on a wire lying 12,000 feet beneath the water’s surface was intense, its effects unknown.

The initial cable-laying effort in the North Atlantic began in 1857. It ended abruptly when the cable suddenly broke while slowly being released from the ship that was laying it, leaving 380 miles of metal and rubber stranded on the sea floor. A second cable in August 1858 successfully carried congratulatory messages between Queen Victoria and President James Buchanan and was hailed by the *New York Times* as “the great event of the age.” That one failed within a month. While there was much blame to go around, a major cause of the failure, Mr. Tabor contends, was that “Field had rushed everyone and everything.”

That failure, occurring on the very day New York luminaries were holding a banquet in Field’s honor, might have convinced many entrepreneurs to try a different line of business. Field, however, persisted. When the eruption of the Civil War and the rise of potential competitors cutting into Field’s political support made another cable-laying attempt impossible in 1861 and 1862, Field “became a traveling salesman,” Mr. Tabor reports. He traveled across America, pitching his proposal for a third attempt “to audiences large and small in dozens of cities.” By 1865, with the war over, he was eager to try again.

The intervening years had brought major advances: better copper wires, improved insulation and increased buoyancy. Yet the next venture, in 1865, failed as well. This time

because someone, perhaps a crew member working at the behest of a competitor, we are told, had pushed spikes through the insulation to sabotage the cable. Field orchestrated yet another expedition in 1866. This time all went well. Telegrams between Wall Street and London became routine and Field was celebrated as a hero.

In the decades that followed, Field would lose his fortune to several Wall Street scams, dying in 1892 poor and largely forgotten. The cable undeniably changed the world, but who pays attention to how the digits that increasingly occupy our time are conveyed around the globe? As Mr. Tabor observes, “there may be no more classic example of that old maxim ‘out of sight, out of mind’ than Cyrus Field’s Atlantic cable.”

—*Mr. Levinson is the author of “The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger.”*

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