FAMOUS LEADERS
OF
INDUSTRY

Second Series

THE LIFE STORIES OF BOYS WHO HAVE SUCCEEDED

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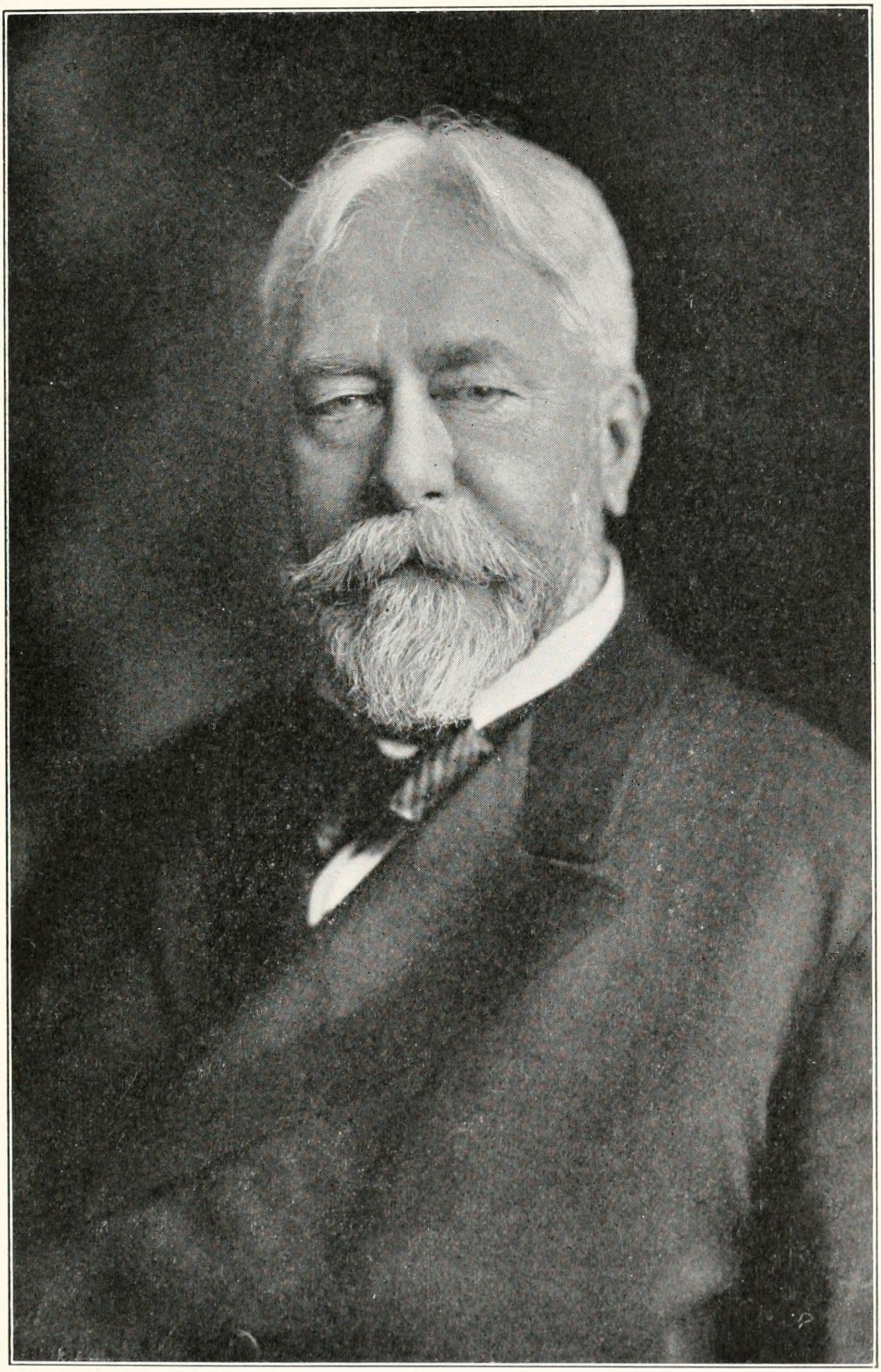

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GUSTAV LINDENTHAL

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A BUILDER OF BIG BRIDGES

"I AM mostly taken as a bridge engineer," says Gustav Lindenthal, "although I have built railroads, tunnels and other works. But bridges appear to the beholder more in evidence than tunnels and so it seems bridges for me. The contemporary story of a man's life is usually harmless." He had just read a brief biographical account of his career.

"Only a few intimates recollect that I had once to earn a living as a mechanic, working as a stone mason. If I were to tell some of my real experiences and hardships, they would sound less amusing, but perhaps more interesting. At least so it may appear to a young unsophisticated fellow, when the strange things happen to him to compromising the deepest agony and the greatest happiness, both surpassing his vivid but inexperienced imagination. It is well that both are over, long ago, for both were nearly killing."

One gathers in these reflections an afterglow of the man's busy, hardworking, imaginative life. His deeds are registered in steel on the records of this generation and doubtless will survive the next.

Lindenthal came from Brünn, Austria, where he was born, in 1874. He was then twenty-five.

"What experience had you in engineering work?" he was asked when he presented himself for a job.

"After my scientific studies at the universities of Brünn and Vienna, I was employed in the construction of bridges in Austria and Switzerland," he replied, adding proudly, "I have helped build some wonderful bridges over there."

"Why did you leave Europe?" he was asked.

"I used to dream of how I could build bridges over your great rivers, and I knew that bridges would be needed over them. I imagined these bridges complete even to every steel riveting band."

The man to whom he said these things was impressed with the eager imaginative temperament of the young foreigner. His first American job in engineering was on the Centennial Exposition. How he fulfilled his ambition to be a builder of great steel bridges, is his achievement of today.

His most sensational, difficult engineering feat is the Hell Gate bridge over the East River in New York. The structure presents, in steel, 19,000 tons. Its span, from pier to pier, is over a thousand feet, and two massive granite towers, each 250 feet high, support the enormous weight. Like a huge animal, with two paws on one shore and two paws on the other, all four immovably clutched in steel shoes, this big bridge bestrides the river that separates Manhattan Island from Long Island.

It took two years of the most complicated calculation to complete the plans for this bridge whose thousand-foot arch in two sections each weighing 6,500 tons was joined on October 15, 1915. So correctly had every computation been made that when the gap between the

two gigantic arches was closed by a keystone, or central panel, of steel weighing 300 tons, the two ends of the bridge in mid-river met within five-sixteenths of an inch!

Mr. Lindenthal visualizes a project in all its details. His mind is a map of every span, arch, steel rail and rivet to be used in his plans. He works like a Napoleon of engineering, leveling here, changing there, throwing over enormous weights for stability, shifting tremendous steel arches from one point to another—all in his mind where he is able to carry every detail. In the character of a man who can design such mighty structures there is something to harmonize with their vastness—some Titanic qualities of brain and mind that make the builder and the work one.

Intense concentration is Mr. Lindenthal's method. In a tiny cubby hole in a corner of his spacious offices, he sits in a big chair, bent over his plans, his forehead knotted, his eyes indrawn, his mind relentlessly working out its problems. No one dares to interrupt his train of thought when he is planning one of his vast schemes, for so minutely and perfectly does one link of thought fit into another that an unguarded moment may disorganize the whole idea. He demands perfection; and no expenditure of time, energy or labor on his part, or that of his subordinates, can be too great to secure desired results. Three little words serve as Mr. Lindenthal's motto, and they are: "Do it right."

The career of this great bridge-builder, Gustav Lindenthal, is a romance of successful endeaver notable even in this country of great opportunities, and one

main reason for his success is that from the beginning of his working life, *he knew what he wanted to do!*

Born at Brünn, Austria, on May 21, 1850, Gustav Lindenthal, before he was fifteen years old, made up his mind to be a civil engineer. This became his sole idea, and his youthful hobby was crossing bridges, examining and admiring their construction. His parents saw the direction of his talent, and, as they were well-to-do, decided to give him the best education possible.

So after his preliminary schooling Gustav was permitted to pursue scientific studies, first at Brünn and later at Vienna.

His father, however, a somewhat strict and severe man, believed that practice should accompany theory, and made Gustav *work* during his vacations. Theoretical studies, in his view, were only pastimes, and he believed that every man should train both hands and brain for some useful though perhaps humble work, so that if the necessity arose he could earn a living in more ways than one.

So while Gustav traveled for study in Germany and France, he was made to work during semesters, sometimes as a carpenter, sometimes as a mason.

But for this hard manual training "it would have gone hard with me in America," said Mr. Lindenthal not long ago.

He was twenty when he completed his college course, and then, for four years, until 1874, was employed in numerous surveys and construction of railroads and bridges in Austria and Switzerland. But his thirst for knowledge, for ideas, for new methods and greater

efficiency was insatiable and growing, and as a result of his keen observation he concluded that in some things American bridge and railroad engineers had a superiority to the European. The result of his thinking was: "I'll take a practical course in bridge and railroad building in that great country of big things—America."

But he little knew when he started for America without any financial assistance from his family, on his own small savings, what obstacles he would encounter in the land of big things. When he stepped ashore in New York he had but a few dollars—but he had the determination to succeed in his design—top off his European engineering training with practical American training.

But the fact that he could not speak English fluently was a formidable obstacle. Nobody took any stock in the "foreigner." And besides, the times were hard, and there was little or no construction under way. His money was vanishing fast, but there was no thought of going back home in his mind. Instead he went to Philadelphia, where work was just beginning on the Centennial Exposition, and applied for work in the drafting department. All the positions were filled, and again he was disappointed.

Then the wisdom of his father's "severity" in making him learn a trade during vacations came home to him. He was a pretty good mason, he figured, so he bought a second-hand set of tools—and the next thing he knew he was busily working, trowel in hand, on the foundations of Memorial Hall, one of the principal buildings of the Exposition.

Then young Lindenthal did a still wiser thing. He

moved to a higher-class boarding house and engaged an English teacher, who tutored him at night after he had changed his workman's clothes for his Sunday best. Before long he could speak English fluently, and then, the chief engineer, learning, from him that he, too, was an engineer, put him to a drafting job. He finished this so far ahead of time that he was engaged permanently on the staff.

Then he was given the planning of iron construction, and it was made his task to design the dome for the same building whose foundations he had worked on as a mason!

From all of which it is plain that no one can afford to turn his nose up at honest work, however humble or sneered at by the great tribe of snobs and kid-glove gentry.

Mr. Lindenthal also designed most of the Horticultural Hall, after which he was given charge of iron construction. Both buildings are still standing.

Now came an opportunity to the young engineer and architect to witness some remarkable American hustle and skill—a wooden bridge over the Schuylkill River burned up just as the Exposition was about to open. It was the principal artery of travel to and from the Exposition and without this bridge the big show was doomed to failure.

To his astonishment the railroad men started to build another while the old one was still burning! They built it of wood, too, using beams of a size young Lindenthal had never even dreamed of. He soon realized what had made the Americans foremost in

the construction of wooden ships—clippers—and wooden bridges.

The Exposition over, the West beckoned him, and thither he went to become a railroad builder. In the course of his labors on the Atlantic and Great Western Railroad, he reconstructed or strengthened some hundred old bridges, and built at least half a hundred iron ones throughout the Middle West. At Pittsburgh he built bridges over the Monongahela and Allegheny rivers, and then in Ohio one of the largest girder bridges, 1600 feet long, in the country.

There was lots of adventure and danger in this pioneer railroad construction, and it took the big, strong man Lindenthal is—he is a six-footer—to hold his own with the rough elements he had to boss—men drawn from all countries. One of his notable feats was to change the gauge of no less than 340 miles of railroad. Assembling his men at dawn and distributing them in squads, like soldiers, all along the line, in *nine hours* the work was completed!

In 1890 Lindenthal settled in New York to build one great bridge after another, and from the center of Brooklyn Bridge may be seen his three monumental works—the Manhattan Bridge, the Williamsburgh Bridge, and the giant Queensboro Bridge. Further up the big river is the wonderful Hell Gate creation, already mentioned, a steel arch bridge for which he was consulting engineer and architect. This bridge was planned to carry the heaviest loads of any bridge so far built in the world.

The building of all these now world-famous spans

meant the overcoming of unprecedented difficulties. Their enormous size alone was a formidable obstacle to surmount. That Lindenthal's genius triumphantly brought all these vast projects to a successful completion is his best title to fame as one of the world's greatest bridge-builders.

But the dream of Mr. Lindenthal's life is to bridge the Hudson, and he has already, after much investigation and study, prepared plans for a great bridge from 58th Street, New York, across to New Jersey. The estimated cost of this proposed colossal North River Bridge is $211,000,000.

This stupendous structure, if built, will be the crowning act of his life—his greatest engineering feat.

Lindenthal, who became an American citizen soon after landing in the country, is big and broad-shouldered, with deep-set, blue twinkling eyes and iron-grey hair and a bushy beard. He is genial and good tempered in his moments of relaxation from the tremendous problems he wraps himself up in. Once in his den at work he suffers no interruption, for his brain, like a machine, cannot be halted in the midst of its concentrated movements.

He was the Commissioner of Bridges for New York from 1902 to 1903, and he is of course a member of many scientific and learned societies.

On engineering problems his work is law to countless corporations and municipalities. He has succeeded because of his thoroughness—his insistence upon getting all the facts and experience about anything he

had to do, and then taking infinite pains in preparation.

He sees, hence, with a master vision that enables him to interpret with the clearness of knowledge or understanding, and then execute with absolute mechanical precision.

Lindenthal does not know how many bridges he has built because when one thing is done, he obliterates it, to make room for the next thing. In the half century he has lived in America, he has pursued the work he set out to do, in his youth. He knew what that was and never swerved from the course. In revitalizing the Atlantic and Great Western, at that time an imperfect railroad construction with a six-foot gauge that began nowhere and ended in the same place, he revealed creative gift. This was an engineering miracle that led to others. He surveyed and built railroads througout Ohio, Pennsylvania, Virginia, West Virginia, and Indiana. His engineering genius is stamped all over the Middle West. A number of bridges over the Monongahela and Allegheny Rivers followed.

The first heavy girder bridge in the world was built by Lindenthal over the Ohio. It is 1600 feet long. The Kentucky River High Bridge over a canyon three hundred and fifty feet above the river, from shore to shore, he constructed without false work. He is a steel-engineer of individual pride in his work, declining to allow his name to go on a bridge unless the guarantee was wholly his own. An instance of this is the Williamsburg Bridge in New York in which although he did the largest share of the work

he did not approve of the original plans, which he thought should have been better.

The Hell Gate Bridge is Lindenthal's engineering masterpiece. He insisted upon being given full authority in building it. Its huge steel arches make it the strongest bridge in the world. There is nothing else like it. It can carry sixty locomotives between its towers. Three and a half miles is the length, and it represents the accumulation of half a century's experience in the active life of Gustav Lindenthal.