has amazed the world and clogged Pittsburgh with millions. When the river of gold that flowed into the steel trade's treasury suddenly became wider and deeper, it was because Holley had been at work enlarging the channel. He worked out what we may rightfully call the American plan of steel-making. He made war on clumsiness. He taught the steelmen what they had never known before—the value of a second. His personal magnetism, his eloquent tongue, and his ready pen made him an ideal instructor. He became the leader and inspirer of a body of young men, among whom were Robert Forsyth, John E. Fry, George Fritz, Robert W. Hunt, Owen Leibert, P. Barnes, D. N. Jones, and William R. Jones. Holley's one thought was that "America must be first," and the building of steel-mills was to him more a matter of patriotism than of business.

For two decades Great Britain led the world in the making of Bessemer steel. Then, exactly twenty-five years ago, the United States forged ahead and in a short time outclassed all competitors. The sceptre of power passed from Troy to Pittsburgh, and from the "big three" to an unknown young Scotchman who had been a clerk in the employ of the Pennsylvania Railroad. Dear iron had been replaced by cheap steel. Orrin W. Potter and William Chisholm were building up the steel trade in Chicago; Henry Chisholm had established it in Cleveland; Abram S. Hewitt was making structural steel at Trenton; Captain "Bill" Jones was beating the world's records in rail-making at Braddock; and the American iron and steel trade was at last upon a solid footing, after more than two centuries of struggle and disaster.

"BILL" JONES STEPS UPON THE STAGE

At this point in the drama of steel there steps upon the stage perhaps the most interesting figure of all who have played a part in it—Captain William R. Jones. It was "Bill" Jones

who took the invention of Kelly and Bessemer into his strong hands and developed it into one of the wonders of the world. It was his work that gave the Carnegie company its first uplift from among a mob of competitors. It was his amazing record that first startled England and left it far in the rear.

As the manager of a steel plant, as the leader of a vast body of workmen, and as a mechanical genius, it is safe to say that Captain Jones has never had a superior. If he had not hammered down the cost of steel rails with mighty blows, the golden stream of profits might never have been widened into the Lake of Billions. From the time when he wrecked the Catasauqua schoolhouse, because the teacher had unjustly whipped one of his boy chums, until the moment of his tragic death, the life of Bill Jones was packed with adventure and romance; yet the full story of his career is here made public for the first time.

His father was a poor Welsh pattern-maker, the religious and intellectual leader of the Welsh in the village of Catasauqua, Pennsylvania. The cottage in which he lived is still standing, No. 315 in a row of "company houses." The principal man in the village was David Thomas, who has justly been called "the father of the American iron trade." It was he who successfully introduced into this country the manufacture of pig iron with anthracite coal, and the "hot blast" furnace—the latter being an idea which originated with the Scottish engineer Neilson, and which, with its great saving of fuel in the smelting of ore, marked an advance in the making of pig iron comparable in importance to Kelly's invention in the field of steel. Thomas built big furnaces, instead of little ones; and worked powerfully to put the iron trade upon a solid footing with the new fuel. In 1849 he became the employer of "Billy" Jones, who was then a ten-year-old youngster, with a local reputation for recklessness and mischievousness.

Among the men who knew Captain Jones in his later years only, it has always been more or less of a mystery how he acquired his unusual command of language and knowledge of classic literature, without any sort of regular education. The mystery is made clear by the fact that, like Mr. Carnegie, Captain Jones had access to a library and made good use of it. His father had a hundred and fifty volumes—the largest collection in the village. They were mainly historical books, such as Plutarch and Josephus, with Shakespeare and other miscellaneous classics. Billy, when not robbing hens' nests or pelting stones at the Irish boys at the other end of the hamlet, was lying prone on the uncarpeted floor of the wooden cottage, wrestling with the long words in one of his father's precious books. Shakespeare was his favourite author—a taste which he shared with General Nathanael Greene, the iron-maker patriot of the Revolution.

THE PERSONALITY OF "BILL" JONES

From boyhood Captain Jones was absolutely indifferent to danger or pain. Ethan Allen, who sat in a dentist's chair and had a good tooth extracted, merely to give encouragement to a timid old lady; Paul Kruger, who amputated one of his own thumbs with a jack-knife; and Captain Jones, who when a boy cut his finger-nail open to see what was underneath—these three may be compared as types of recklessness and hardihood. During the Civil War, in which he fought at Fredericksburg, Chancellorsville, and the storming of Fort Fisher, his regiment came, on one occasion, to a river that had to be crossed by a pontoon bridge.

"Hanged if I'll wait for a bridge!" shouted Jones, plunging into the muddy water head first.

After the splash, he found himself in about two feet of water, with his nose split from top to tip. Never possessing the slightest degree of caution. he had leaped into the river with-

out thinking of its depth. To him the only consideration was to get across.

When he was eighteen, he ran away from Catasauqua, and tramped about the country, finally landing in Chattanooga, where he met Miss Harriet Lloyd, wooed her fervently, and won her. His first job after marriage was in the Cambria Works, at Johnstown. He was taken on at two dollars a day, and soon promoted. He and William Kelly arrived in Johnstown about the same time, but knew little of each other. At that period there seemed nothing in common between the quiet, thoughtful Kelly and the roistering Jones, yet without both types of men there would have been no billion-dollar steel corporation.

For sixteen years Jones remained at Johnstown, gaining little except the reputation of being the most popular sub-boss in town. Often he would stop work and take all his men to a baseball game or a horse-race. Fun and frolic seemed, until he was thirty-four, to be the only aim of his life. Morrell, his Quaker employer, would have discharged him if it had not been for the undeniable fact that Jones could get more work out of a gang of men than any other boss in the iron business.

When George Fritz, manager of the Cambria Works, died suddenly in 1873, Jones stood next in line for the position; but Morrell considered him too frolicsome and irresponsible, and promoted Daniel N. Jones over the captain's head. Both Joneses had been Catasauqua boys, and the two were good friends. Bill heard the news first, and told Dan.

"I'm surprised," said Dan; "I was sure that you would get the place."

"So was I, but it seems not," replied Bill.

Dan hesitated a moment, and then said:

"Well, you are entitled to it, Bill, and I won't take it."

"Yes, you must take it," answered Bill. "The company

wants you, not me, and it's a great chance for you. As for me, I'm going to straighten up, go somewhere else, and show them what I can do."

It proved to be the turning-point in Captain Jones' career. From that moment he was no longer an irresponsible youth, but a man of conscious power and purpose.

JONES GOES TO THE BRADDOCK WORKS

At this juncture Andrew Carnegie enters for the first time into the story of steel. It was the terrible panic year, and he was struggling successfully to avert bankruptcy and to build his first steel plant. Up to this date he had made iron, but not a pound of steel. Instead of being the first maker of Bessemer steel, as is often alleged, the fact is that Mr. Carnegie was the eleventh, and did not join the procession until nearly twenty years after the process was patented by Kelly and Bessemer.

Hearing that Captain Jones had resigned, Carnegie not only hired him as superintendent of the new works at Braddock, near Pittsburgh, but also used him as a bell-wether to attract scores of the highly skilled steel-workers of Johnstown. This was a master-stroke, as skilled Bessemer steel-makers were scarcer at that time than four-leaved clovers. In 1875, surrounded by his faithful men from Johnstown, Jones began to show the world how to make steel.

Full credit must be given to the English steel-makers for creating a market for steel rails by fairly forcing them on the railroads. Practically the whole of the pioneer educational work among American railroad men was done by English drummers. In 1861, for instance, a Sheffield agent tried to sell steel rails to the president of the New York, New Haven, and Hartford road. One of the principal directors was sitting in the room, reading a newspaper. He looked up, and with a gesture of supreme contempt, exclaimed:

BIRTH OF THE BESSEMER PROCESS

"Steel rails! Bosh! Stuff! Nonsense! Humbug!"

This was at first the universal reception of the steel rail agents. Steel rails meant a larger outlay for equipment, and, for a time, smaller dividends. However, eight years afterward, more than fifty different American railroads were using steel rails, mainly made in England, the Pennsylvania being the first to try a few hundred tons.

When Captain Jones "straightened up" and joined the Carnegie forces, the United States was a buyer, not a seller, of steel. England made as much iron and steel in four months as America did in a year. Steel rails sold for one hundred and twenty dollars a ton. England appreciated the Bessemer process ten years sooner than the United States. She was compelled to do so by the commercial enterprise of Sir Henry Bessemer, who started a plant of his own and cut prices. Great Britain was supposed to have as complete control of the steel trade as she has to-day of the shipping. She was the iron and steel "workshop of the world," and she continued to be—until Bill Jones straightened up.

HOW JONES BROKE ALL THE RECORDS

In his first fifteen weeks of steel-making, Jones turned out nearly twice as much as any one had made before with a similar equipment. This was well enough, but a year later he made more steel in a week than the average plant had been producing in six weeks. While every one in the steel world was gasping at the news, Jones took a fresh grip and once more doubled his output, bringing it up to thirty-three hundred tons a week.

Several years before, John A. Griswold had made a bet with Holley that the Troy plant could not produce fifteen hundred tons a month. He lost his money, but it is certain that even Holley would not have wagered that any one could make four-

teen thousand tons a month, as Jones did with a plant of equal size. Holley had accomplished the impossible at Troy; but Jones had done nearly ten times as much. He had in one day poured out from his sputtering converters six hundred and twenty-three tons—more than thirty thousand dollars' worth. The river of gold was knee-deep and rising like a flood.

Back in Baron Stiegel's day, twenty-five tons of pig iron in a week was satisfactory production; but now this wizard, Jones, was making twenty-five tons of steel every hour of the day and night. And on every ton there was from ten to fifty dollars of clear profit. At that time the public was not permitted to know the low cost of making Bessemer steel; but the profits made by the Braddock plant under the management of Captain Jones, were as follows:

1875 (three months)	$41,970.06
1876	181,007.18
1877	190,379.33
1878	250,000.00
1879	401,800.00
1880	1,625,000.00

In these figures we have the beginning—the small beginning, as we shall see later—of the immense Carnegie fortune and the fivefold greater affluence of the Steel Trust.

As for Bill Jones, the man behind the profits, he cared little for the shower of checks that fell from the railroad offices into the Carnegie treasury. The millions meant no more to him than the stakes to a Kentucky thoroughbred. What he loved was the race. He was making good. He was beating Jack Fry and Bob Hunt and Dan Jones, his old-time Johnstown chums, who were now managing rival steel plants. He was smashing down the idea that the steel trade of the world belonged to England. His day of triumph came when Morrell, his former Johnstown employer, visited Braddock and said:

"Well, Bill, I see that I hired the wrong Jones."

Jones had the knack of imparting his sporting instinct to his workmen. Every man strove to win the championship in his class. Jones got a huge broom, and gave it as a trophy of victory to whichever gang of men had made a clean sweep of the world's records. This was kept up for several years, until the records were beaten so often that the men had no time to remove the broom.

When England heard the story of Jones it seemed like a fairy tale. "Preposterous!" said the men of Sheffield and Newcastle. "Almost incredible!" said E. Windsor Richards. "A physical impossibility!" said Sir Isaac Lowthian Bell. But it would have been wonderful indeed if they had not been incredulous. Imagine the unbelief of the sporting world if a horseman in Brazil announced that he had trained a horse to trot a mile in fifteen seconds, or the skepticism of railroad men who were told that an engineer in Denmark had made a locomotive that ran six hundred miles an hour!

HOW AMERICA PASSED ENGLAND

When the British Iron and Steel Institute met in 1881, a paper written by Captain Jones was read by its secretary. This paper marked an epoch as distinctly as did Darwin's famous announcement of the theory of evolution, twenty-three years before. It was America's industrial Declaration of Independence. Although England had sold seventy-one million dollars' worth of iron and steel to the United States during the previous year, Jones' paper coolly told them that England was now second to America in the production of Bessemer steel and far behind in methods of manufacture. Jones modestly ascribed his success to the following five causes:

First, the employment of men who were young and ambitious.

Second, the "strong but pleasant rivalry" between different plants.

Third, the employment of mixed nationalties.

Fourth, the eight-hour day. "Flesh and blood cannot stand twelve hours' continuous work," he said.

Fifth, the use of the most up-to-date machinery.

The veteran steel-makers of England listened to the paper in dignified silence. At its close the president, Mr. J. T. Smith, rose slowly to his feet.

"Of course," said he, "when this man speaks of making one hundred and twenty-three thousand tons in ten months, he means a net ton of two thousand pounds."

"No," replied the secretary. "He means a gross ton of twenty-two hundred and forty pounds. I have also received a letter from Captain Jones, saying that since this paper was written he has beaten his record by thirty-three tons a week."

Again there was silence; then another member rose.

"Working with such reckless haste," he said, "his steel is certain to be variable and inferior."

"On the contrary," replied the secretary, "Mr. Jones says that the average variation is not more than one degree from the quality aimed at."

There was nothing more to be said, and the meeting adjourned.

Six months later the steel-makers of England met again, and a second paper from Captain Jones was read. Sir Henry Bessemer was present, but made no comment on Jones' announcement that Braddock was making steel faster than ever. Holley opened the discussion, and in a friendly way put the British ironmasters on the gridiron for fifteen mintues. He pointed out that the average British ironworker produced four hundred and twenty tons of iron a year, while the American worker produced five hundred and fifty-five.

"Our steel, made quickly," said he, "is the same quality as your steel, made slowly. You increase your output by making more machinery of the same kind, while we increase ours by making a new machine. Of course," continued Holley, smiling, "as my capital is invested in America, and not in England, I regard these English habits with resignation, even with cheerfulness." His genial criticism was received in silence. No one answered. It was unanswerable. The star of the steel empire had moved westward.

JONES AND HIS "BIG SALARY"

Among all the partners and employees of the Carnegie Company, Jones earned the most and received the least. This was largely his own fault, as he refused to be a shareholder.

"No, Mr. Carnegie, I'm much obliged," said he when he was offered a partnership. "I don't know anything about business, and I don't want to be bothered with it. I've got trouble enough here in these works. I'll tell you what you can do"—these were his exact words—"you can give me a hell of a big salary."

"After this, captain," replied Carnegie, "you shall have the salary of the President of the United States—twenty-five thousand dollars." This sounded well, but in a short time the President's salary was scarcely pin-money compared to the amounts that were yearly shovelled into each shareholder's pocket.

When the writer asked for an estimate of Jones' work from James Gayley, the first vice-president of the Steel Trust, Mr. Gayley replied emphatically:

"You can say that Captain Jones, through his mechanical contributions to the development of the steel-making industry, accomplished fully as much as Mushet or Sir Henry Bessemer."

The famous "scrap-heap" policy was originated by Jones. He did not believe in waiting until his machinery was worn out. The moment that an improvement was invented, the old machinery was dragged to the scrap-heap, and the latest devices put in its place. He made the shareholders gasp on several occasions by asking permission to smash up half a million dollars' worth of machinery that was as good as new, but outgrown. They were wise enough to give him a free hand, and to buy him whatever he ordered.

Practical suggestions flashed from Jones like sparks from his converters.

"See here, why can't we armor-plate that hose?" he asked one day. "Get a coil of wire and wind it around the hose to keep it from bursting."

This idea, which has been generally adopted, was simple enough; but millions of people had looked at hose without thinking of it.

His greatest invention is known by the name of the Jones mixer. This is a monster iron box, brick-lined, capable of holding half a million pounds of melted metal. Into it is poured the molten iron from different furnaces, so that it may be mixed and made uniform in quality. A train of small iron cars, or ladles, steams up alongside of the mixer, each ladle full of sparkling, splashing metal. The mixer lies lower than the track, and the cars, one by one, are tipped over so that they spill their load into its wide mouth. Then it is rocked to and fro, like the cradle of a sun god, until its contents are thoroughly homogeneous, when they are sent on their turbulent way to the converter.

"The Jones mixer was, and still is, invaluable to us," said James Gayley—a fact which was shown two years ago, when the Steel Trust secured an injunction to prevent one of its competitors from using the device.

JONES AS A LEADER OF MEN

Kelly lived in a world of ideas; Ward, in a world of money; Holley, in a world of scientific knowledge; and Jones in a world of *men*. Iron and human nature were his raw materials. He put the two together and made steel.

"It wasn't the chemists and the scientists, mainly, who developed the steel business," said the veteran John Fritz to the writer. "It was the practical man who stood among his workmen and hammered everything out inch by inch in the shops."

Cromwell showed no greater generalship in handling his invincible Ironsides than Captain Jones displayed in drilling his iron-workers. He was an absolute monarch of his big steel works, but a just monarch, who rewarded only the good and punished only the bad.

Nothing escaped his notice. Every day, as he stormed up and down the shops, his talk ran on in this fashion:

"Do you get enough fresh air in that corner, Joe? I'll have a window put in for you."

"See here, Smith! If you don't pay your honest debts you can't work for me any longer. You go and settle up with that grocer, or I'll find out why!"

"Shove 'er along, boys! All together! Do you want to get licked by those Joliet farmers?"

"Say, Jim! When you're going home to-night, take this piece of paper and give it to Jack Sullivan's wife. Jack died in the hospital last night, and, confound it, she's got five children!"

The "piece of paper" would usually be a deed to the cottage in which the bereaved family lived.

"There are many Braddock widows that don't forget Captain Jones," said the old doorkeeper.

He scattered his thousands with a free hand among his

men and their families, and accumulated comparatively little for himself. He was, in short, an ideal captain of industry, leading his men on to victory after victory. He was hot-tempered and rough. Under the excitement of the moment, he would often sweep down upon everything in his way with the velocity of a tornado, discharging his best men, and hurling anathemas right and left. But the sky soon cleared. The discharged men would be put back. Jones was as transparent as the day, and as ready to end a quarrel as to begin one.

On the day after the Johnstown flood, he took three hundred of his men and at his own expense brought them to the wrecked city, where they worked for two weeks to restore the property that had been destroyed. Others sent money and sympathy, but Jones gave himself. That was his way.

He was as quick to resent as he was to forgive. "I carried a revolver for two years to protect myself from Bill Jones," admitted a wealthy coal operator—one of Pittsburgh's foremost Presbyterians. "It was this way," he continued. "Carnegie was the first man to start Sunday work in this region. I was opposed to it, and told Jones so. We quarrelled. Soon afterward I heard that he had threatened to 'put a head' on me the next time we met. He was much stronger than I was, so I carried a revolver to defend myself. Nine months before his death, he came to me one morning and said frankly: 'Well, you were right and I was wrong about that Sunday work. If I had my life to live over again, I wouldn't run a mill on Sunday.' Several times after that he came to the little Sunday School of which I was the superintendent, and always left a five-dollar or ten-dollar bill on the collection plate."

Jones' blue eyes looked every man and every difficulty full in the face. Sham, trickery, and meanness he despised.

CAPTAIN WILLIAM R. JONES

HOW JONES MET HIS DEATH

Jones died as he had lived—in the midst of an industrial battle, at the head of his men. He was killed on the firing-line. In 1889 one of the Braddock furnaces had been working badly. Its contents had "bridged," just as a raft of logs will jam in a narrow part of a river. A squad of men were trying to break the "bridge," Jones, as always, being in front. Suddenly it broke, and the fiery contents crashed through the outer wall of the furnace, falling directly on the head and shoulders of Captain Jones. He sprang forcibly backward and fell into a pit, striking his head upon the iron edge of a car. One of his workmen, a Hungarian, fell beside him and was instantly killed.

The next day Jones died in the hospital, having never regained consciousness. His burns were severe, but probably would not have caused his death, as he was a man of amazing vitality. Mr. Gayley, from whom this account of Captain Jones' death has been obtained, stood at his side when the treacherous furnace broke, and narrowly escaped.

The five thousand workmen at Braddock were frantic with grief. Never before or since has the iron and steel world had so great a sorrow. Carnegie, looking upon poor Jones as he lay in the hospital, sobbed like a child. Ten thousand wet-eyed men marched with him to his grave, and to-day the veteran steel-maker's most precious memory is:

"I worked with Bill Jones."