

How Andrew Carnegie's Genius and Blue-Collar Grit Made Pittsburgh the Steel City

If AIST Life Member Ken Kobus had his druthers, he'd be in a mill — dirty, sweaty and making steel.

"I'd go right now if I could," he says.

But circumstances being what they are — he's 69 and retired — he has to settle for merely discussing the subject. Still, he's glad to talk about how he followed his father, and his father's father, into the mills; about the 44 great years he had in steelmaking; and about how his story is but a sliver of the Pittsburgh region's rich and significant industrial history.

It's a shame, then, he says, that people in the area aren't more interested.

"People are interested if you want to talk about art and museums, but they don't want to talk about the things that brought that stuff (to Pittsburgh)," he said. "I try to talk to people about this stuff and they have no interest in it."

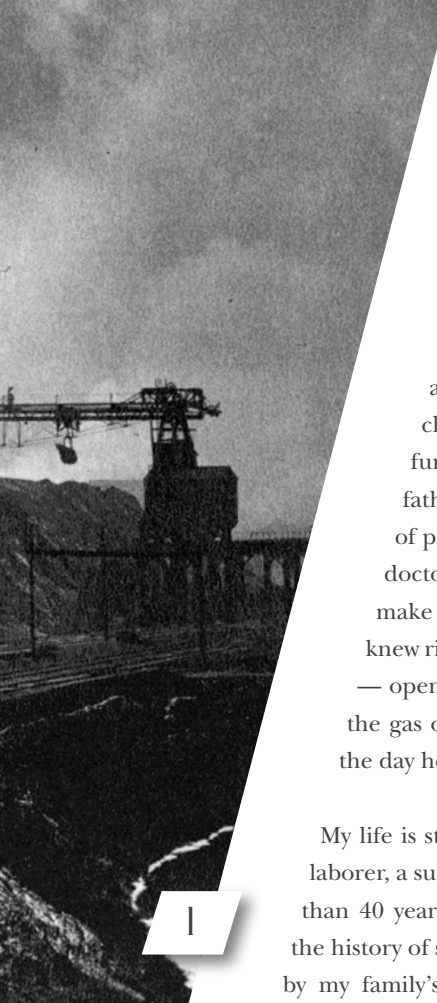
He'll argue that many Pittsburghers are actually embarrassed by the region's smoky industrial past, even though it's an integral part of the city's modern-day identity as a culturally minded, post-industrial town.

"They're averse to thinking about steel."

He, on the other hand, is determined to preserve that history by speaking and writing about it. And to that end, he's written a personal essay that explores his family ties to the steel industry — and argues that Pittsburgh's rise as America's steelmaking capital had more to do with industrialist Andrew Carnegie's inventiveness and skillful management than its access to river transportation and raw materials.

The essay was originally written for the "What It Means To Be American" project, a collection of essays that attempts to answer that question by looking to the past to help understand the present and imagine the future. The National Museum of American History and *Zocalo Public Square*, a digital magazine affiliated with Arizona State University, are sponsoring the project.

The following is Kobus' essay, which was published in April 2017.



I'm a retired steelworker — third generation at the Jones & Laughlin Steel Corp. on the south side of Pittsburgh. Both of my grandfathers were steelworkers, and my father was a first helper, meaning he was in charge of one of the steelmaking furnaces in the plant. When my father was ill and dying and on a lot of pain medication, he would mystify doctors with certain motions he would make with his hands and arms. But I knew right away that he was making steel — opening furnace doors and adjusting the gas on the furnace and the draft. To the day he died, he lived steelmaking.

My life is steelmaking, too — I worked as a laborer, a supervisor and a manager for more than 40 years. I'm also a devoted student of the history of steel, an interest that was spurred by my family's story and my work, and then fueled by my deep desire to answer a single question: How was it that in the latter half of the 19th century it was Pittsburgh — not Chicago or any number of well-positioned metalmaking centers in the U.S. and Europe — that somehow became the world's largest steel manufacturing center?

Pittsburgh's ascent is often attributed to the region's vast coal supply, extensive river system and burgeoning railroad network. Of course, these are factors, but I wasn't convinced that they were reason enough. Numerous cities in America and Europe had similar attributes, and manufacturing regions in England had the added advantage

of originating modern mass-produced steelmaking. So what brought Pittsburgh to the forefront?

The answer, in my opinion, primarily revolves around the actions of one man, Andrew Carnegie, and his singular ability to marshal the forces of science, technology, and innovation to consistently make his plants the most efficient and advanced in the world. Many choose to believe that Carnegie's fortune was won through his abusing of employees and cutting their wages to the bone. Initially I, too, assumed this was true. But years of study and research were full of surprises, which led me to write a book on the subject, and to a very different conclusion.

In addition to writing, I've taught at Carnegie Mellon University's Osher Lifelong Learning Institute. In one of those classes I focused on the infamous Homestead Strike of 1892, in which the trade union workers of Homestead Steel Works faced off against the Carnegie Steel Company in a wage and policy dispute. It ended badly — nine people were killed. So it might surprise you to learn that I presented the material from the perspective of the Carnegie Steel Company.

In my experience, I've found that most people despise Carnegie. I'm not saying he didn't do his share of things that many consider ruthless or immoral — he pushed long hours and low wages — but they don't understand who he was or his incredible life and contributions. Carnegie was born in Scotland, the son of a weaver whose family was driven into poverty when the mechanization of looms made hand-weaving obsolete. After immigrating to the U.S., the young Andy worked as a bobbin boy in a textile mill, as a telegraph messenger, and as a telegrapher, eventually working his way up through the Pennsylvania Railroad to Pittsburgh Division Manager before turning his attention to steel. He assembled his steelmaking empire around three smallish integrated plants, located on several hundred acres of land, distributed





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over approximately a five-river-mile length of suburban Pittsburgh. Their combined output often rivaled or exceeded that of the world's major steelmaking nations, including that of England and the rest of the United States.

The mill has a certain music. I grew up in the shadow of Carnegie's mills and have sensory memories starting from when I was a small child. Back when they were steam-driven, you could hear the rhythmic chug, chug, chug of the mill engines and the hiss of the steam releasing. Also the boom and the clang of metal and chains, the whirling of gears and motors, the dull thud of striking a humongous red-hot ingot and the warning sounds of sirens. There were the odors too — if you've ever heated a metal pan with nothing in it, that's the smell. And all day every day there were fireworks throughout the mill. When charging molten iron in through the open door of a furnace it's like the Fourth of July, with thousands and thousands of sparklers flying, quite spectacular. There may be 40 tons of seething liquid iron in the ladle and 300 tons in the furnace. Some modern plants were miles long; mine was one of those. I would feel like a peewee ant in this gargantuan surrounding. It was awe-inspiring.

Sometimes the things that went into creating that spectacle and improving upon its efficiencies were quite modest — the Carnegie Company often made simple adjustments to the routine, such as adding a chemist on the shop floor. In modern analyses of the industry, small changes

like this are often overlooked, but these departures from conventional practices often enhanced links or forged new ones among the three fundamental approaches to making steel: ironmaking in a blast furnace and steelmaking via either a Bessemer converter or an open hearth furnace.

In the production of iron with the blast furnace, a business that Carnegie entered in 1872, his men reinvented the industry three times in three consecutive decades. Important changes included chemical analysis and adjustments to air flow volume and temperature, as well as installing more efficient stoves, construction materials, and high-quality blowing machinery. These sorts of changes, coupled with automation, increased production many times over. It was during that time that ironmaking was first recognized as a science, a change attributed by industry experts to the work at Carnegie Steel.

Another important contributor to Carnegie's success was the men who helped him run the business. Carnegie's partner, Henry Frick, was perhaps the finest executive manager in the world. Bill Jones, a pre-eminent steel man and inventor known as Captain Jones, helped elevate the company to record levels of both iron and steel production. Among his numerous patents was the mixer, which eliminated two steps in the steelmaking process. He developed an esprit de corps among the workers, partly by convincing Carnegie to introduce the three-turn, eight-hour day in the late 1870s (though the



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company reverted to a two-turn, 12-hour day in 1888).

If Carnegie's unrivaled inventiveness and driving ambition were essential to Pittsburgh's rise, so was the sense of pride in sweaty, back-breaking labor that inspired the steelworkers themselves, including my relatives. When I think about Jones I am reminded of the American folk heroes of my childhood like John Henry, the "steel driving man." There was also Mike Fink, a hero of local folklore who ran boats down the Ohio River to New Orleans and was known as the king of the keelboaters. And also Joe Magarac, a man who — I was told as a young child — was literally made of steel. Here's this mythic figure and all he cares about is making steel — the strongest of the strong, a man to be emulated. But in Eastern European languages, *magarac* means "donkey." People would laugh at him. Yet he's a hero because he loved making steel. This local steelmaking lore, however romanticized, is another thing that made Pittsburgh stand apart from its rivals.

When I started out, I was in the strip mill — a laborer with a shovel. Then I was married and moved to the coke plant, where it's easy to get a job because it's very dirty work. But it was steady, and I worked in one for the rest of my career. When I was 26 I started studying mechanical engineering at the University of Pittsburgh and working swing shifts. It was during the course of my studies, as I was reading about steel and the history of the

industry, that I learned that Pittsburgh was not the most natural place to be the center.

One of the things I discovered was Carnegie's brilliance in the utilization of scrap. Bessemer steel plants generated large volumes of scrap, but Bessemer furnaces generally could not or did not use scrap for a number of different reasons. In economic terms, this commodity had a value, but little utility; it lacked usefulness. Carnegie changed that.

He approached basic steelmaking through the use of open-hearth furnaces, which used scrap metal and pig iron, also called cast iron, to make steel. An acid open hearth required the use of very high-quality scrap, which made its operation expensive. When Carnegie developed the capability to produce basic steel in open-hearth furnaces, he was able to use lower-quality scraps that were contaminated with phosphorus, so it was cheaper to make.

Carnegie could use this material in basic furnaces and convert it into steel — he was the first in the United States to do this. Carnegie owned two of the most productive Bessemer plants in the world, so in essence he could get the scrap for free. Not only that, he used it to make armor plate, boiler plate for locomotives and steel beams. He now had a plant, unique in the country, where he could take large volumes of low-utility scrap or even purchase it from others at low cost, and make high-value products that had high utility. That was one of Carnegie's big breakthroughs, an important one that

helped secure Pittsburgh's place as the steel capital.

During this era, America was changing from an agrarian to an industrial society. The steel industry — and Carnegie himself — played a major part in that transformation. Propelled by Carnegie's impetus, the United States became the largest iron-producing nation in the world. Shortly after his exit from business in 1901, it surpassed England as the largest steel-producing nation as well. With steel affordable and in ample supply, railroads could be rapidly constructed across America's vast expanses and skyscrapers could reach toward the heavens. Later, a number of other new steel plants were established in the Pittsburgh region, solidifying the city's position as the major steel center in the world.

Carnegie's wealth is well known. However, what is not so well known or understood, and worth noting, is that Carnegie did not amass his great fortune until after he sold his company to J.P. Morgan in 1901 for \$480 million — by some estimates about \$13 billion in today's money.

Then he gave almost all of his share away — today, there are no wealthy Carnegies. The list of beneficiaries of his philanthropy is long, and includes, among many others, the Carnegie Museums of Pittsburgh, Carnegie Institute of Technology — now Carnegie Mellon University — Carnegie Institution of Washington (Science), and the Carnegie Corporation of New York, the largest endowment for advancement of education and knowledge.

The hardest work I have ever done was being a third helper on an electric furnace. It was hand charged, the hottest heat, and the hardest work. Your clothes would get soaking wet. The sweat would run into your shoes, so you'd be squishing around in your own sweat. You simply work until you're spent, sometimes until you feel you can't move. So it was primarily Carnegie and his genius managers who made Pittsburgh the steel capital, but it was the men in the mills who made his awesome accomplishment possible — an accomplishment later perpetuated by my grandfathers, my father and so many others.

You can read the essay as it originally appeared here:
<http://www.zocalopublicsquare.org/category/chronicles/who-we-were>.





Ken Kobus spent 35 years with Jones & Laughlin Steel, later LTV Steel, and another nine with United States Steel Corporation. He holds a mechanical engineering degree from the University of Pittsburgh and is the author of *City of Steel: How Pittsburgh Became the World's Steelmaking Capital During the Carnegie Era*. ◆

1. It may not be much to look at, but Carnegie Steel Co.'s Duquesne Works was the most technologically advanced blast furnace operation in the world at the time. According to Kobus, the furnaces produced 50% more iron per day than could be expected from the best furnaces at the time, even though they were about the same size as other furnaces in their class. The furnaces were the first equipped with an ore field that had ore bridges, rapid-discharge bottom dump steel hopper cars to offload raw materials into stock bins, electric lighting, and equipment to handle and break the cast pig. They also employed the Neeland system for charging coke, ore and stone into the furnace. A new technology at the time, the Neeland system used buckets, not skips, suspended below the incline to hoist raw materials to the top. The works would eventually become a part of United States Steel Corporation.
2. Ken Kobus' maternal grandfather, Vid Salopek (far left), worked at United States Steel Corporation's Duquesne Works in Pennsylvania from 1906 to 1953. He was assigned to the No. 1 open hearth department. The Duquesne Works was one of Andrew Carnegie's mills.
3. Kobus' father, John, sits with Kobus' two older brothers, Regis and Jerry. Like his father, John Kobus worked for Jones & Laughlin Steel Corp. in Pittsburgh. He was employed as a first helper on the open hearth furnaces. The photo was taken in 1945.
4. An unidentified worker teems an ingot at Colonial Steel Co. in Pittsburgh, Pa., USA. The photograph was taken in 1912.
5. Ken Kobus, at work on a coke oven battery at Jones & Laughlin Steel Corp. in Pittsburgh.
6. A Bessemer converter at an unidentified mill, presumably one in Pittsburgh, is charged with molten iron. Of note are two shaft furnaces (cupolas) in the background. According to Kobus, early blast furnaces were incapable of producing iron of consistent quality, which meant that molten iron could not be directly used at the steel shop. So iron was cast into pigs, broken and graded, and then mixed to attain the desired chemistry. It was then remelted in shaft furnaces before it was charged into a Bessemer converter.

Steel Stories Wanted: Teacher Solicits Stories About Mill Towns

If you have a good steel yarn to tell, Gloria McMillan would like to hear from you.

McMillan, research associate and literature lecturer at The University of Arizona, is soliciting fictional short stories related to North American steel mills and steel towns for an anthology she's compiling. Tentatively titled *Children of Steel*, the collection is intended to provide an outlet for industrial stories that might otherwise go unpublished.

McMillan said literary circles tend to be dominated by people from the East Coast with upper-middle-class backgrounds. And lost, she said, are the stories and voices of the industrial Midwest.

She herself is from East Chicago, Ind., USA, and grew up near what is now ArcelorMittal's Indiana Harbor plant. She said the Midwestern industrial towns have rich cultures and traditions of their own, but they often are unrecognized by a literary world that tends to draw from elsewhere.

It was something she noticed in her college days, she said.

"Our lives mustn't be interesting. That was the message that was telegraphed," she said.

McMillan said she has so far collected 15 stories, all in varying states of readiness. But she'd like more.

"I'm taking submissions until the publisher sets a deadline, and right now we have no publisher," she said.

There are two conditions, however. One, she said, is that the stories have to be fictional short stories. While they certainly may be derived from personal experiences or rooted in family histories, submissions must tell a story.

The second is that the stories have to be geographically limited to the Canada and the U.S.

For more information, or to submit a story, write to glocmc@dakotacom.net.