NATIONAL ALUMINUM PRODUCTION HERITAGE ASSOCIATION

Spring 2023 Vol. 4 No. 1

120 Years of Aluminum Production in Massena

NAPHA is intended to be a national organization, but we are based in Massena NY for good reason. Last year marked 120 years of aluminum production in Massena. As you have read in these newsletters, that is as long as the commercial process for producing aluminum has been around.

In May 1902, the Pittsburgh Reduction Company (PRC), founded by the inventor of the aluminum smelting process Charles Martin Hall, signed a contract to purchase power from a new hydroelectric facility in Massena. The groundbreaking for the new plant was in July, then thirteen months later in August 1903 the first metal was produced there. PRC changed their name to the Aluminum Company of America in 1907 and the rest is history, and what a history at this location. In 1959 Reynolds Metals built their own reduction plant in Massena. General Motors also built a plant here to make aluminum parts. Both the Reynolds and GM plants are now closed.

NAPHA prepared a pop-up museum for Alcoa's Massena Operations 120-year celebration on June 18, 2022. Then another one for Arconic's Massena celebration on August 27 (Alcoa split into two companies in 2016). The local Massena Museum is now continuing the display on a temporary basis, with a possible permanent display starting this year. The permanent display will include Reynolds and GM. All this advances NAPHA's mission to preserve and tell our local and national industrial heritage. See pictures in this newsletter for the rest of the story.

Aluminum Smelters of the United States

The modern, electrolysis process to produce aluminum metal has its roots in the independent and coincidental discoveries of two young men. At age 22, Charles Martin Hall produced pure aluminum by electrolysis in Oberlin, Ohio on February 23, 1886. At about the time of his 23rd birthday, April 10, 1886, Paul Louis Toussaint Héroult used electrolysis to produce an aluminum-copper alloy in Gentilly, France, near Paris. Key to both discoveries was the emerging development of electrical energy.

Commercial production of aluminum began at the end of 1888 for Hall with the Pittsburgh Reduction Company, the forerunner of Alcoa. Héroult continued to place his focus on production of a useful alloy at that time, aluminum bronze. He began experimentation for production of pure aluminum on a commercial scale in early 1889 with the assistance of Dr. Martin Kiliani from Germany. The Kiliani-Héroult process went into production of aluminum in late 1889 in Froges, France and soon afterwards in Neuhausen, Switzerland, a few miles from the German border on the Rhine River. Both locations relied upon dynamos and hydropower.

From these independent inventions a global industry emerged. But, how much of this growth occurred in the United States, one of the countries where the process was invented and developed?

In late 1888 there was just one small smelter on Smallman Street in the Strip District of Pittsburgh, PA. Operations began with two

small prototype reduction cells, or "pots" as they came to be known. These produced about 50 pounds of metal per day. They were called pots because the steel containers used for processing were the size of a large, rectangular pot, 24" x 16" x 20" deep.

The industry grew but by the time of World War I the USA had only five aluminum smelters, all of which were supplied by abundant and inexpensive hydroelectric power. Two were in Niagara Falls, NY and the others were in Massena, NY, Alcoa, TN and Badin, NC. Coincidentally, the USA has five aluminum smelters that remain in operation today, including the site at Massena, NY.

At its peak, between 1975 and 1980, the Golden Era for Primary Aluminum, the United States had as many as thirty-two aluminum smelters in operation. See Figure 1. This was more than any other country in the world. The largest of these modern pots would be able to contain the volume of more than 400 of the original reduction cells that were used in 1888.

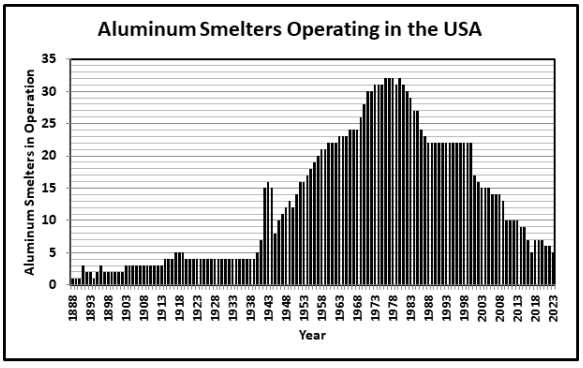

Figure 1 – Aluminum smelters operating in USA from 1888 through 2023

After World War II the industry grew in the US due to three main factors: growth in applications for aluminum metal, large developments of inexpensive power from sources of hydro, coal, and natural gas, and access to capital for investment. An average sized smelter these days consumes enough electricity to power a city of more than 500,000 people. Aluminum metal is thus often thought of as "electricity in solid form."

The last primary aluminum smelter in the USA began operation in 1980 at Mt. Holly, SC. The last pot line constructed in the United States began operation in 1998 at Marston, MO. In all, a total of forty-three aluminum smelters were built in the US between 1888 and 1980. Most were built between the 1950's and 1970's. Since 1980 a total of twenty-seven aluminum smelters have either been completely idled or permanently shut down and dismantled.

The decline of US industry and its offshoring has little to do with the strong markets for a lightweight and versatile metal and much to do with changes in the availability of abundant and inexpensive electricity in the USA.

Inexpensive natural gas in Texas and Louisiana came and went quickly. Population growth and changes in energy markets affected the pricing of energy for all the smelters remaining after the late 1980's. Environmental regulations have also stymied the ability to reinvest in US smelting capacity.

The future for aluminum is still bright, but the industry has moved to; China with rapid development of coal reserves and massive hydroelectric projects, the middle-east with abundance of low-cost natural gas, Russia with an abundance of hydroelectric power in Siberia, and to northern nations such as Canada, Norway and Iceland with large amounts of hydroelectric power and geothermal power in the case of Iceland.

The primary aluminum industry began with innovation and then shifted to access to investment capital, and low-cost power. It has continued to follow the path of converting electricity into aluminum metal at competitive prices over the past 135 years.

Article by: Stephen Lindsay

Alcoa Massena 120 Year Celebration Event Pop-up Museum

Arconic Massena 120 Year Celebration event pop-up museum.

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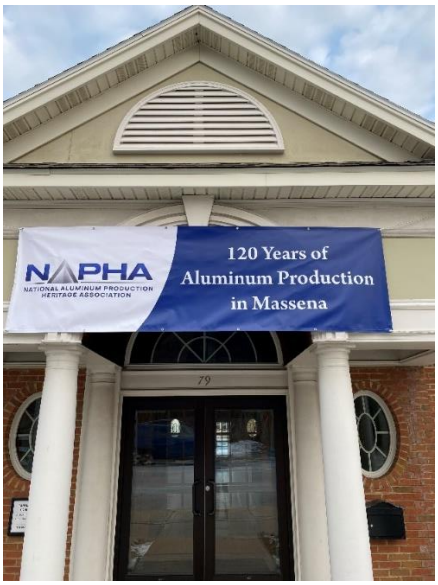

Massena Museum Display – 120 Years of Aluminum Production in Massena

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