The Great WWI Potash Industry of Southern Sheridan County, Nebraska

Potash was an essential ingredient for the soap, glass and fertilizer industries in the era of World War I. In 1905 alone, American soap and glass manufacturers used a combined 8 million pounds of potash.[1] It was also a key ingredient in fertilizers, which had become essential, especially in the South's cotton growing regions. Germany had become the leading producer of potash because of its large, deep deposits that were easily mined near Strassfurt. Estimates place Germany's pre-war potash production at between 730,000 and 1.2 million tons annually.[2] When war broke out in 1914, Germany's potash production halted. The resulting vacuum in potash production became the stimulus that turned a sparsely populated area of the Nebraska Sandhills into a booming industrial complex.

This most unlikely of industrial areas lies on the western edge of the Sandhills in southern Sheridan, northwest Garden, and northeast Morrill counties. The Burlington Railroad dissects the region as it connects the coal mines of Wyoming to the industrial centers of the East. Small towns are common along this stretch of railroad, born as construction camps for the men building the railroad, they became small trade centers for the ranchers and homesteaders who were still settling the region in the late 19th and early 20th centuries. Two of these towns, Antioch, 15 miles east of Alliance, and Lakeside, eight miles further east became important industrial centers during the First World War.

[1] Romance of Potash, *Alliance Herald*, 22 March 1917.
[2] *Alliance Herald*, 28 February 1918 & 19 July 1917.

The rolling hills of this area are punctuated by valleys, which often contain shallow, brackish lakes that vary in size from a few dozen square feet to several hundred acres. The water of these lakes absorbs the potash from the soil, making them unusable as a water source for livestock and a nuisance to ranchers. The potash content of these lakes varies greatly with some containing little or no potash at all.

In 1910, two recent University of Nebraska graduates, John Show and Carl Modisett, began investigating the potash content of lakes in this area and in 1912 filed a mineral claim on Jesse Lake in southwest Sheridan County.[3] They developed a solar drying plant in which they pumped water out of the lake into evaporation beds where solar evaporation separated out the potash salts. This process was inefficient at best, and it appeared that the experiment was bound to fail when war broke out in Europe and the German potash mines were closed. In the following months, the price of potash went from $11.33 per ton to over $100 per ton. Show and Modisett now had no difficulty finding investors and the Potash Reduction Company was formed to build a reduction plant at what would become known as Hoffland.[4]

The Hoffland plant pumped the lake water or "brine" through a pipeline three miles from Jesse Lake to the plant where it was run through a solar evaporation tower, then boiled to concentrate the brine further before being run through coal or oil fired dryers that crystallized the potash salts. This was a constantly changing process with ongoing improvements, but by November of 1917, the cost to produce a ton of potash was about $30. With the market price at an average of $100 per ton, a profit of $70 per

[3] Romance of Potash, *Alliance Herald*, 22 March 1917.
[4] Features Potash Industry, *Alliance Herald*, 1 November 1917.

ton was left over. By this time, the plant was producing about 100 tons per day resulting in a total net profit of $7,000 per day.[5]

The profit potential of potash was quickly realized and others were quick to take advantage of it. Heber Hord, owner of the Lakeside Ranch Company with its headquarters in Lakeside was the next to enter the field. Hord Alkali Products Co. built a plant just west of Lakeside where it pumped brine from lakes owned by the Lakeside Ranch Company, some of which were as far as 15 miles from the plant.

The third plant to be built was that of the American Potash Company which "…was built and in operation in the early part of 1917."[6] The American plant was located approximately 4 miles east of Hoffland near the town of Antioch and operated on brine from lakes mostly owned by the Krause brothers north of town.

Antioch was to become the largest and most important of the potash towns primarily because of its location. Its newspaper, *The Antioch News*, proudly proclaimed, "Published in the heart of the great potash fields of Western Nebraska." With Hoffland and Lakeside on the periphery of the potash region, Antioch quickly became the focal point for those looking to invest in potash. Antioch boasted five large reduction plants; the American, Nebraska, Alliance, National, and Western all called Antioch home. These plants all attained a capacity of over 100 tons per day with some at or near 200 tons.

The town of Lakeside served as the headquarters for the Lakeside Ranch Company, and became the home of two large plants: the Hord Alkali Products Company

[5] Features Potash Industry, *Alliance Herald*, 1 November 1917.
[6] The Great Potash Industry of Nebraska, *Antioch News*, 11 April 1918.

and the Standard. Little is known at this time about the Standard plant other than that it was a large capacity plant located west of the Hord plant.

Hoffland, though referred to as a town, was never incorporated. It was born purely of necessity from the Potash Reduction Company, the only plant in the area, and ceased to exist completely following the end of the potash run. The entire "town" of Hoffland was owned by the Potash Reduction Company from the men's barracks to the laundry and the A-Muse-U Theater.

Many smaller reduction plants were built on or near smaller lakes located some distance from the railroad and the towns of Lakeside, Antioch, and Hoffland. These smaller plants had a capacity of between five and fifteen tons per day and utilized trucks to haul coal from the railroad to the plant, then returning with reduced potash to store near the railroad until shipment. These small plants had much lower initial construction costs because of their small size and had minimal pipeline and pumping expenses since the plants were located on site.

The unparalleled profitability associated with the potash industry caused expanded exploration in many areas. Potash discoveries were reported near Merriman, Mullen, Hyannis, and Ellsworth as well. In addition, Searles Lake, California showed similar promise as a potash producer, but the finding of borax in its refined potash made it much less valuable as a fertilizer source and decreased its value. Others began reclaiming potash as a by-product from industrial processes such as cement mills, blast furnaces, kelp processing, distillery slop, wool washings and other industrial wastes, wood ashes and sugar beets.[7]

[7] Make Report on Potash, *Alliance Herald*, 20 September 1917.

The process of reducing the brines into reduced potash was complex and constantly changing. Since this was a fledgling industry with abundant capital, the plants were always looking for ways to improve the process and lower the inputs needed to produce the final product. The view of the Nebraska potash industry was one of a long-term investment. Knowing that the war would not last forever and the German supply would eventually find its way back onto the world market, these investors hoped to lower the cost of production to a level that would be competitive with the German potash.

The basic process for potash production began by retrieving the potash-rich brines from the lakes. This was accomplished by drilling hundreds of shallow wells in the lake, then connecting these wells to a pump station on the lake shore. At the pump station, gas or electric pumps began the brine on its journey toward the reduction plant sometimes as much as fifteen miles away. Secondary pumping stations were located along the length of the pipeline to keep the brine moving effectively. The pipeline was constructed of long redwood slats, each making up a portion of the circumference of the pipe. Depending on the size of the pipe six to eight of these slats were tightly bound together by heavy wire, then covered in tar to make them watertight. The pipeline was then buried 30 inches below the surface of the ground as per federal regulations at the time.

Once the brine reached the reduction plant, it was held in a large holding basin until the reduction process began. The brine was first pumped to the top of a solar evaporation tower that was usually 25 or 30 feet square and 40 feet high. Inside the tower were approximately 20 different floors or levels that the brine percolated down through, becoming more concentrated as it went. Brines entered the evaporation tower with approximately two to eight percent solids, and exited the tower with ten to twelve

percent solids. This was accomplished strictly by solar evaporation in the early years, but was augmented by exhaust heat from the boilers as the process became more efficient.

From the drying tower, the brine passed to a series of drying pans where it was boiled under pressure, boiled with the pressure reduced, boiled in a vacuum, and finally boiled in the finishing pan at normal pressure. These pans could process 75,000 to 100,000 gallons of brine per day. When the brine left the drying pans, it had been converted into a heavy liquid containing 45 percent solids. This liquid was then allowed to crystallize or run through rotating dryers to complete the crystallization process.[8] Because the rotating dryers worked so slowly, some of the concentrated liquid was shipped in tanker cars rather than drying it to crystallization. The problems with slow dryers were remedied by the end of the war when only dried potash was being shipped. These dried potash crystals were crushed and placed in burlap bags, then shipped in railroad cars to the refineries.

Freight costs were a major concern for the reduction plants since their product had to be transported to refineries in the east to be processed. The cost of transporting inert ingredients prompted several plants to develop refining operations at their plants. By the end of the war, both the Potash Reduction Company of Hoffland and the Western Potash Company of Antioch had built refineries to complement their reduction efforts.

The smaller plants, which operated away from the railroad, were faced with some problems different from the larger plants. While pumping and pipeline costs were low, the cost of transporting coal great distances posed a large problem and drove operating costs up. To make their plant more efficient, the Sunnyside plant located southwest of Antioch turned their evaporating tower into a smokestack. Exhaust heat from the

[8] Build New Potash Plant, *Alliance Herald*, 18 January 1917.

evaporating pan furnace was forced through the evaporating tower, which allowed the brine to be concentrated in the tower to 35 to 40 percent solids. The heavy liquid then passed through the evaporating pan and the drying pan before reaching the rotary dryer.[9] This method proved to be very efficient and was soon adopted by the larger plants.

The instant success of the potash industry had a huge effect on the area. In less than three years, Antioch's population ballooned from 175 to between 1,600 and 3,000 people. Capital investment in southern Sheridan County was estimated at $25 million, and over 2,000 men were employed in the potash district at an average wage of $8 per day.[10] Hoffland grew from nothing to an industrial center of 600 people almost overnight, while Lakeside also grew dramatically.

With this civic growth came many improvements as well. Electrical service for Antioch was provided through the Nebraska Potash Company's plant, and telephone service was extended east of Alliance to the towns of the potash district. A bus service began carrying passengers between Alliance and Antioch with stops in Hoffland. Federal funding was secured for the "Potash Highway" from Broken Bow to Alliance and much of the work was completed during this period. This route is now known as Nebraska State Highway #2.

The rapid influx of people into these small towns brought businessmen to the region to provide needed services. Banks, liveries, bakeries, boarding houses, moving picture theaters, jewelers and many other businesses opened in Antioch and Lakeside. The *Antioch News* and the *Lakeside Sun* brought news of the world to the potash district

[9] Revolutionary Idea In Small Potash Plant, *Alliance Herald*, 8 August 1918.
[10] *Antioch News*, 27 June 1918.

and spread the news of potash success to the rest of the country. A poem printed in the January 3, 1918 edition of the *Antioch News* sums up the feeling of the times.

Antioch

O thriving town of Antioch,
O busy, busy mart,
So suddenly sprung into life
As by magicians art.
Dark were the nights for aeons
Except for moon and star,
But now a silent wire
Sheds its shafts of light afar.
Lights fair as ancient Aladin's
Shines o'er you through the night,
And to the far fetched plainsman
Beams forth a welcome sight.
The ranger on his foam flecked steed
Rode o'er his vast domain,
Ne'er dreaming of the wealth that lay
Beneath the wind swept plain.
He only thought of scattered herds
Of cattle young and old;
How year by year his wealth increased
In silver and in gold.
He did not dream the sun could set
Upon the valley bare,
And on the morrow rise upon
A city shining fair.
O thriving town of Antioch,
Gem of the emerald plain,
The wealth that at your portals lie
Yield free to brawn and brain.
Deep, deep beneath the murky lakes
That encompass you around,
Mines rich as in ancient fables
The scientists have found.
And may their products e're be used
For mankind's good and gain,
Some poor impoverished soil made rich
By potash and by rain.

C.F.S.T.

While much of the potash profits went to investors outside the potash district, the wildly successful potash industry fed a mad scramble to obtain leases on any lake in the region with potential to produce potash. As a result, many local landowners struck it rich. At the high point of the potash period, the Krause brothers north of Antioch were earning $1,000 per day in royalties from lakes they had leased to the reduction plants. Other landowners and homesteaders supplemented their income by providing services to the potash industry and the accompanying population. Many houses were moved into and out of Antioch during this period and a young Fred Leistritz supplemented his income during these lean years in agriculture by hauling hay to Antioch and selling it to the house movers as feed for their horses. He also sold hay to the Standard Oil Company for their 4-mule teams known as the "John D. Rockefeller Mules" that carried petroleum products to the vast areas of the Sandhills.[11] Through hard work and persistence, Fred eventually developed holdings large enough so that each of his three sons could have their own ranches.

Discord was also present in the potash district. One of the largest disputes of the period centered on lakes located on "school land". Each township in Nebraska is divided into 36 sections, each one mile square and numbered from 1 to 36. Sections 16 and 36 were designated as "school sections" that were owned by the State of Nebraska and leased to the highest bidder with the proceeds going to support schools. Disputes arose over whether the holder of the land lease owned the right to potash in the lakes or if a mineral claim could be filed on the tract by another party. In addition, some of the lakes

[11]F.A. Leistritz, *Having Enjoyed the Sandhills of Nebraska: History in the Making* (Alliance, NE: 1981), 32-33.

crossed section lines and covered both private and “school land”. Lawsuits were filed and eventually the question went to the Nebraska Supreme Court, which ruled that mineral claims could be filed separately, but that the process would need to be repeated to allow everyone a fair chance at the claims.

The war ended in November of 1918, but potash production continued unabated for several months. The question on the minds of all in the potash district was would the United States government place a protective tariff on German potash and allow the fledgling industry of western Nebraska to gain a foothold? A temporary embargo was placed on German potash until the peace treaty could be signed which gave encouragement to the potash producers that it may become permanent. However, other factors began to affect the industry at home that would be much more damaging.

The majority of Nebraska potash was used as fertilizer in the cotton fields of the South. Cotton producers had faced a series of bad years and could not afford to fertilize their land in the spring of 1919. This forced the fertilizer manufacturers to cut back on production, resulting in a halt in potash purchases. In early February 1919, plants in the potash district shut down temporarily until demand again grew. This shut down lasted until September, but by October, the plants were gearing up for full production until an unexpected snag slowed the process again.

A workers strike in the coal fields that supplied the potash plants shut off the coal supply that fired the boilers of the plants in early November. Some plants began burning oil as a substitute, but the increased cost could not be justified and the plants again sat idle. This was not just a problem for the potash producers, but for the people as well. Coal was the primary heat source in many homes, making life miserable for many of the

citizens. When the coal again started heading east in mid-December, many residents climbed aboard passing coal trains to fill bags that were thrown off in hopes of supporting themselves until another train rolled through.

Late December, 1919 saw the potash industry again alive and well. The five big plants in Antioch were running 24 hours a day with enough orders to keep them busy at that rate for nine months. Prices at this time had fallen to between $50 and $75 per ton, which was still a very profitable level. Antioch was again booming and the five big plants made "one continuous chain of wealth producers two miles in length."[12] This second run of production lasted until November 1920 when the fertilizer manufacturers cancelled their orders and the reduction plants began to shut down.

The fertilizer manufacturers could see an opportunity to purchase potash from Germany for a much lower price if the temporary protective tariff could be eliminated. A permanent tariff bill was being debated by Congress at this time, so a lobbying war ensued between the potash producers and the fertilizer manufacturers over listing potash in the tariff bill. In the ensuing months with no production or income, the plants began to fail and bankruptcy became an all too common word in the potash district. By September 1921, almost all plants had declared bankruptcy.

The exception was the Potash Reduction Company at Hoffland. In December 1920, it was reported that the Hoffland plant was building a refinery. In the coming months, a refining operation was built, but unlike the reduction process, details of the refining methods were kept in strict secrecy. The refining operation of the Potash Reduction Company allowed it to process the potash it had on hand rather than storing it in hopes that the market would again reach profitable levels. Reduction operations had

[12] *Antioch News*, 15 January 1920.

stopped at Hoffland in January of 1921, but resumed in November and continued until September 1922 when the tariff bill passed through committee with no protection for the potash industry. It was altogether fitting that the plant that started it all would be the last to close. The *Antioch News* reported on October 12, 1922 that the last five carloads of refined potash had been shipped from the Potash Reduction Company and the plant was closed. It would never re-open.

One month later, a wrecking crew arrived to start work demolishing the American plant in Antioch. Houses were moved to Alliance and surrounding ranches, businesses closed or relocated, and the people moved away returning the area to much the way it was before the boom – a quiet waypoint on the road to somewhere else.

Today, Antioch and Lakeside probably look much the same as they would have without the potash boom. A few old ruins remain to remind residents of another era. The bank vault still sits in Lakeside, dismantled redwood pipelines now serve as windbreaks for cattle, odd shaped cement structures still guard many of the lakes in the area, and the ruins of a large plant at Antioch remind passers by that this was once a roaring industrial center churning out money in an endless stream.

Perhaps the legacy of the potash boom is the large ranches that were built with potash money, many of which still endure with familiar names: Krause, Herman and Black. Fortunes and ranches were made and lost from this enigma known as potash. From these lakes unfit for consumption by man or beast, an entire industry sprang up creating wealth unheard of. Just as quickly, the dream that was too good to be true gave way to the reality of the 20th century, a reality that did not include outrageous profits or industrial development. Rather, the potash district returned to Sandhill ranchland,

cattlemen, windmills, fences, grass, and an occasional brackish lake that is little more than a nuisance.

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