

FIG. 1. Kirtland in 1857. This map defines the lowland area (the “Flats”) around the East Branch of the Chagrin River. Note the markings indicating the higher elevation to the north and south of the river. Newel K. Whitney built his ashery (designated by the red rectangle) in the Flats, next to the brook. That the ashery is marked on this 1854 map nearly twenty years after the Saints left demonstrates the ashery was still a viable business at that time. *Map of Geauga and Lake Counties, Ohio* (Philadelphia, S. H. Matthews, 1857), 17. Image courtesy Geauga West Branch, Geauga County Public Library.

An Introduction to the Kirtland Flats Ashery

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Reflecting a recent resurgence of interest in one of its most important historic spaces, The Church of Jesus Christ of Latter-day Saints is currently restoring a number of historic structures in Kirtland, Ohio, including buildings in the lowland area known as Kirtland Flats (fig. 1).¹ These buildings are part of a major restoration plan designed to significantly increase the quantity and quality of historical interpretation at the site by introducing visitors to the major doctrinal and historical developments of the Church during the seven years its followers resided in Kirtland (1831–1838).

One of the buildings being restored is the ashery, where ashes from hardwood trees were used to make an alkali important to many industries. Selected for restoration because of its significance to the early economic programs of the Church and its association with prominent Church members, the ashery will help tell the story of the Latter-day Saints in Kirtland. Overlooked by most casual readers of the Doctrine and Covenants, the Kirtland ashery is mentioned in a revelation given to Joseph Smith in spring 1834:

And again, let my servant Newel K. Whitney have appointed unto him . . . the lot on which the ashery is situated . . . for his stewardship, for a blessing upon him and his seed after him, for the benefit of the mercantile establishment of my order which I have established for my stake in the land of Kirtland. (D&C 104:39–40)²

That this obscure industrial building of the nineteenth century is included in canonical text alludes to its significance for the Church and its history. Unfortunately, until now the role of the ashery in this history has been largely ignored.³

Without question, the ashery played an important role in the efforts made by the Latter-day Saints to build the kingdom of God while in Kirtland. However, to thoroughly understand the significance of the Kirtland Flats ashery, it is first necessary to understand the industrial processes involved in an ashery complex, as well as the history of the industry.

This study, therefore, will rely on historical data to illustrate the significance of the ashery industry to early American enterprise. Then, having established a historical framework in which to place the Kirtland Flats ashery, the importance of this structure to the Church and the community will be discussed in more detail.

A Brief History of the American Potash Industry

An ashery was a place where an alkali called potash was produced.⁴ In chemical terms potash is simply a form of potassium hydroxide (KOH).⁵ It was made from the ashes of hardwood trees. Ashes were generated in a wood-burning kiln or collected from local settlers. The ashes were then leached with water, and the resultant highly caustic lye was drained off. Subsequently, the lye was boiled down or evaporated in iron kettles, resulting in a blackened residue known as black salts. Lastly, the salts were subjected to intense heat in large cauldrons until they fused into a continuous molten mass, which, when cooled, became a solid grayish-pink substance. Potash could be further refined in a specialized oven to produce a product known as pearl ash.

Historically, potash was an important element in the manufacture of alum, saltpeter, soap, glass, tanned leather, gunpowder, paper, bleached cotton textiles, and various woolen goods.⁶ In modern times, potash is mined from the beds of ancient evaporated seas and continues to be essential in these and other industries.⁷ Because of its value in these industries, it has been produced, to varying degrees of success, since the very beginnings of the American economy.

America first entered the potash scene one year after members of the London Company founded Jamestown in 1608. Eight skilled Poles and Germans were sent to the new colony with instructions to produce, among other things, “soap ashes,” which were shipped to England, where they were converted into the precious alkali.⁸ Further developments came in 1631 in connection with the construction of the first colonial sawmill near Portsmouth, New Hampshire. Potash was explicitly listed as a by-product of the operation a few years later.

In time, colonial governments began to encourage the production of potash, realizing that the profits could be lucrative.⁹ South Carolina led the

way with their attempts to produce the commodity in 1707, 1711, and 1712. However, due to inadequate resources (having softwood instead of hardwood trees), all three undertakings failed.¹⁰ The same was not true for the New England colonies, which boasted thick forests of hardwood trees. Massachusetts was the first to initiate government-sponsored efforts to produce the commodity in the North. Connecticut and other colonies soon followed. When compared to the attempts made by the South, these Northern enterprises experienced moderate success. However, when compared to the amount of alkalis (or “Baltic Ashes”¹¹) exported from Russia, Naples, and eastern European countries, the contributions of the colonies were insignificant. One manufacturer asserted that the meager production was due to difficulties in shipping, adding that there was an insufficient quantity of skilled workmen and supplies for his operation to function properly.¹² More truthful, perhaps, in explaining the poor results is that these early colonists’ facilities were expensive to build and operated inefficiently.

Fortunately for the colonists, the economic conditions accompanying the beginning of the Industrial Revolution in Great Britain, coupled with the simplification of the potash manufacture process, created an atmosphere that inaugurated a boom in the American potash industry (table 1). One scholar has noted, “In the fifteen years before the Revolution the American [potash] industry rose from insignificance to become the principal supplier of the British market.”¹³ So great was Britain’s industrial need for alkalis that all duties were removed from colonial imports. At the same time, the production of potash shifted to the frontier. As homesteaders realized the manufacturing process could be simplified by using equipment common to any frontier home, the wooded land that had to be cleared for farming acquired new significance.¹⁴ Asheries began to spring up in every frontier town. Some individuals made potash their entire business, buying up ashes from other settlers to supplement their own. Fre-

TABLE 1
Tons of Potash and Pearlash Imported into Great Britain, 1760—1811

| | 1760 | 1763 | 1765 | 1770 | 1775 | 1780 | 1792 | 1800 | 1806 | 1807 | 1811 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total Imports | 2,424 | 1,727 | 1,624 | 2,826 | 2,159 | 1,839 | 6,444 | 9,028 | 8,060 | 7,249 | 8,927 |
| From N. America | 10 | 50 | 596 | 1,728 | 1,429 | 2 | 5,428 | 7,504 | 6,245 | 5,447 | 6,595 |
| % from N. America | .5% | 3% | 37% | 63% | 66% | 1% | 84% | 83% | 77% | 75% | 74% |

Statistics for years 1760–1800 are adapted from William I. Roberts III, “American Potash Manufacture before the American Revolution,” *Proceedings of the American Philosophical Society* 116, no. 5 (1972): 390. Those for 1806 to 1811 are taken from T. C. Barker and others, “The Origins of the Synthetic Alkali Industry in Britain,” *Economica* 23 (May 1956): 163.

quently, however, it was the local merchant who found it profitable to add an ashery to his enterprise, using ashes he generated along with those he took in trade to supply the manufacturing process.¹⁵

Thus, potash, or any of its less refined forms (such as black salts or untreated, raw ashes), became a literal cash staple of the American frontier. Homesteaders, being limited in ways to make money, were provided the financial means by which they could subsist during the first few years of settlement. Moreover, the simplification of the manufacturing process allowed hundreds of individuals to contribute to the industry, thereby supplying the market with enough alkali to satisfy Britain's great demands.

For obvious reasons, American potash production and exportation severely declined with the onset of the Revolutionary War. Nonetheless, Britain again depended heavily on American potash for its supply of alkalis after the war. In fact, in the years following the war, American potash exportation to Britain reached unprecedented levels.¹⁶

State government officials from the newly created United States of America were quick to take advantage of the profitable market. Some viewed it as a fortuitous opportunity to overcome the postwar financial instability from which they were suffering.¹⁷ Thus, potash production on American soil began to be encouraged like never before. American innovation soon became apparent: indeed, in 1790, Samuel Hopkins, a resident of Philadelphia, obtained the first ever U.S. patent, issued for an improvement in the manufacture of potash and pearlash.¹⁸ Another significant milestone was reached in 1807, when American potash production exceeded one million dollars in total revenue.

Just when output reached that mark, the Embargo Act was passed, banning American ships from foreign trade. Needless to say, the embargo critically damaged the American potash industry.¹⁹ Some manufacturers of potash managed to survive by smuggling their potash into Canada, from whence it was shipped to England. When the embargo was finally repealed in 1809, potash exports' value surpassed one and one half million dollars, the highest to date. One scholar has attributed these figures to the anxiety felt by manufacturers "to increase shipments before a threatening restriction of commerce."²⁰

It was only a few years later that the War of 1812 posed another constraint on the potash industry. Naturally, potash production and exportation significantly decreased during this time. But, similar to the events that took place after the Revolutionary War, the industry skyrocketed immediately following the war, approaching the two-million-dollar mark.

The next decade witnessed what some economic historians have recognized as the beginning of the end for the American potash industry. In

1823 manufacturers in Britain initiated large scale production of synthetic soda using the Leblanc method, which had been developed over thirty years earlier in France.²¹ Although this “new” technology satisfied much of the demand for alkalis in the industrial realm, it did not altogether obliterate the need for vegetable-based alkalis. In fact, even though overall exports to Britain declined after 1825, American-produced potash retained its significant role in the British chemical industry “because of its high caustic content and low contamination by any of the sodium salts[,] . . . properties [which] simplified [the] processes of conversion to a wide variety of special salts.”²² Alternative alkalis from Europe and Russia could not boast such properties and, therefore, were the first to decrease in significance.²³

Contributing to the survival of the potash industry was the fact that as the demand for synthetic soda rose, so did its price. Thus, potash, being the less expensive of the two, was substituted wherever possible.²⁴ Moreover, the growing New England textile industry began to provide greater demand for American potash, thereby compensating for some of what was lost in overseas business.²⁵ In fact, it was not only the New England textile industry that was experiencing growth, but the entire region and all of its enterprises. The Industrial Revolution had made its way across the Atlantic and was now pumping change and development into the United States.

Of particular significance to potash manufacturers and other industries was the construction of the Erie Canal (see fig. 13). Completed in 1825, the canal provided easy and affordable access to the profitable markets on the eastern seaboard. Indeed, “the first eastbound freight on the Erie Canal . . . was divided about equally between potash, wheat, and whiskey.”²⁶ Advancements in transportation contributed, for a time, to the continued success of the American potash industry.

Ironically, advancements in transportation eventually led to the demise of the American potash trade. As railroads and canals made it easier and cheaper to transport commodities that were previously too bulky or expensive to freight, frontier settlers were able to expend their energies and resources in producing heavier goods that commanded higher prices.²⁷ Instead of burning forests for potash, the trees were cut for lumber. Cleared land was no longer simply farmed for one’s subsistence but utilized for large-scale agricultural and livestock programs. Essentially, new transportation networks connected people and places in such a way that venues of commerce previously limited to specific geographical areas became lucrative multiregional enterprises. These new connections, coupled with the advent of synthetic alkalis such as soda, reduced the once-thriving American potash industry to a type of specialized craft of minor importance.

Of course, there were those who continued faithfully in the old tradition, supplying the natural alkalis to a specific niche in the American economy. Yet even that production came to an end when the first massive deposit of mineral potash was discovered in Germany in 1861. These new-found naturally occurring alkalis, the remnants of ancient evaporated seas, completely eliminated the industry of manufacturing potash from wood ashes. Since then, potash mines have been opened up in Canada, England, and numerous other locations. Today, mined minerals supply the entire globe with the alkalis necessary for fertilizers and “the essential operations of metallurgy, electroplating, and photography,”²⁸ to name but a few uses. The asheries, in which the industry has its roots, have become little-known relics of the past.

The Ashery in Kirtland

With an overview of the American potash industry in place, it is possible to view in context the role the alkali played in the community of Kirtland and, in particular, within The Church of Jesus Christ of Latter-day Saints.

Background. The city of Kirtland is located near the shores of Lake Erie in the midst of the densely wooded hills of northeastern Ohio.²⁹ Originally the area was part of the Connecticut Western Reserve. Through it runs the East Branch of the Chagrin River, a substantial source of water power that made the area especially appealing to early settlers. The city was named after Turhand Kirtland, a purchasing agent for the Connecticut Land Company who, with another agent, Joshua Stow, was given the responsibility in the late 1790s of surveying the land on which the city now resides. It was this Joshua Stow who, in 1811, traded land in Kirtland for a farm in Massachusetts. The owner of that farm, Christopher Crary, who arrived in Kirtland later that year, became one of the city’s first permanent settlers. Others soon followed, and in a relatively short period of time Kirtland developed into a substantial village. In fact, as late as 1830, Kirtland boasted a population (1,018) equal to that of Cleveland (1,075).³⁰

One of those settlers who chose Kirtland as their home was Newel K. Whitney. Whitney was a young veteran of the War of 1812 who had developed some business interests in the years following the conflict. He had spent some time in Wisconsin trading with the Indians, but by 1822 Whitney arrived in Kirtland.³¹

On September 5, 1822, soon after his arrival, Whitney purchased sixty-five hundredths of an acre from Peter French.³² This property was located near the brook that runs through the flood plain (or “flats”) of the East Branch of the Chagrin River, eventually emptying into the same. It was on this piece of land that Whitney built his ashery. On the same day, French

NOTICE,

THE subscriber will pay **CASH**, and the highest prices, for **Wheat, Rye, Corn, and Pork, and Salts of Lye**, delivered at his store in Kirtland.

He also takes this method to inform all persons indebted to him, either by note or book account, that unless payment is made, by the first of February next, they will be indiscriminately prosecuted, as he is determined to effect a settlement of his outstanding debts.

N. K. WHITNEY.

Jan. 14, 1824. 3 27

FIG. 2. Newel K. Whitney's advertisement in the *Painesville Telegraph*, January 14, 1824. This ad is the first evidence of Whitney's involvement in the potash industry.

leased Whitney the rights to some of the water from a natural spring on the hill south of the Flats region.³³ This contract granted Whitney "the privilege of conveying said water on a direct line to any part of the lot of ground" he had purchased from French that same day.

It is difficult to say exactly when the ashery was built. Nonetheless, it is clear that by 1824 Whitney had a mercantile establishment in Kirtland and an interest in the potash industry. (At a later time Whitney and Algernon Sidney Gilbert were partners in the store.) On January 14, Whitney solicited in the local newspaper that the highest prices would be paid in cash for "*Salts of Lye*" and other goods that were delivered at his store (fig. 2). This suggests that the ashery was built and in operation by this time.

Orson Hyde states, "When winter came on, I went into Gilbert and Whitney's store again, under moderate wages, and continued there until the spring. Then in 1827, business being rather slack in the store, I went to work for the same parties, making pot and pearl ashes."³⁴ That Whitney, a frontier merchant, would supplement his store with a complex in which he could produce potash was very common for the time. Hardwood ashes played a critical role in any frontier economy, and it was the mercantilist who often managed their circulation.

For the merchant, the potash trade provided an opportunity to produce a highly sought-after commodity from an abundant supply of naturally occurring resources. For many settlers, it provided a source of income for the first few years of settlement when their primary task was to clear the

land on which they would later farm.³⁵ Hence, in exchange for their hardwood ashes, Whitney would give his customers the goods they needed or desired.³⁶ He would then convert the ashes into the profitable alkali. With the cash and goods he received from its sale or trade, Whitney's store would be replenished. It was an economic cycle perfectly suited for the frontier, and Whitney was not the only one taking advantage of it. In Geauga County (in which Kirtland was located) alone there were at least three other asheries and eight additional mercantile establishments involved in the industry at the same time Whitney's ashery was in operation.³⁷

Because of the minimal information known about Whitney's ashery, it is only possible to reasonably speculate about its appearance. Nineteenth-century asheries exhibited considerable variation in design and construction, ranging from simple to complex. However, each ashery had certain essential components, including a storage area for ashes and/or wood, a number of leaching vats, and a boiling area; a simple ashery required a roof but may have lacked walls (fig. 3). Some sophisticated operations included an oven in which the alkalis could be further refined (fig. 4).³⁸

The original ashery structure in Kirtland was probably simple. However, there is good evidence that the Kirtland ashery was modified over time, eventually evolving into a more sophisticated structure.³⁹ Nevertheless, every ashery, whether simple or complex, required relatively few resources to successfully operate. Furthermore, the small community of

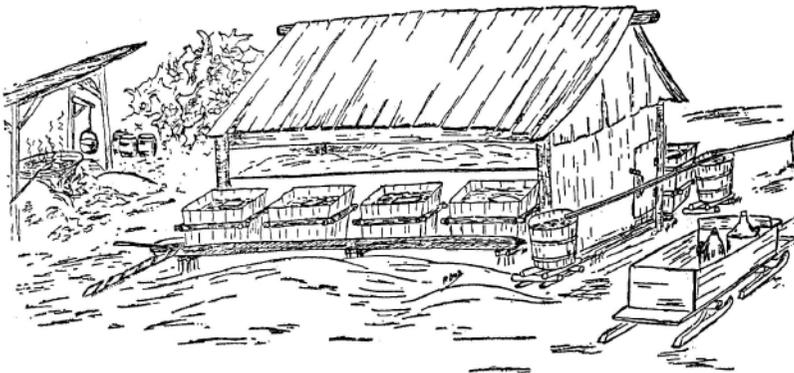


FIG. 3. A typical ashery of simple construction, complete with storage area for ashes, leaching vats, and boiling area. From Dominique-Marie Doyon, "La Fabrication de la potasse, au Canada et spécialement à Saint-François de Beauce," *Les Archives de folklore* (Quebec: Presses de l'Université Laval, 1949), 35. Used by permission.

Kirtland, Ohio, was an ideal setting for potash production in the early 1800s. Living on what was then part of North America's frontier, residents of Kirtland could obtain all four of the essential resources needed to operate a successful ashery of that day.

Hardwood. Of great importance were the wood resources found locally. As noted above, good potash could be derived only from the ashes of hardwood trees, those ashes containing a much greater percentage of natural salts than those of any softwood species. One tradesman's guide noted, "In the Northern, Middle, and Western

States, where a great proportion of the timber is beech, maple, and elm, great quantities of ashes are obtained."⁴⁰ Located in the midst of the dense vegetation typical of the Great Lakes region, Kirtland had an abundant supply of such hardwood trees. Natural hardwood resources would duly supply a local ashery with a quantity of ashes from which to make potash.

During the nineteenth century, wood ashes for potash were produced in three predominate ways. First, during the early spring and late summer, wooded land was cleared for farming. The felled trees were left in the fields to dry all summer long. In the fall, wood that was not needed as lumber for construction was burned. A certain degree of variation existed between individuals regarding how to properly burn the vegetation. Nevertheless, it was important that great care be taken so that as little adulteration took place as possible. That is, the more foreign material (such as dirt and rocks) present in the final ashes, the poorer quality of potash the ashes would produce and, hence, the less money paid in exchange (fig. 5). One observer gives this description of the burning process:

Once the trees, both large and small, cut into lengths of from ten to eleven feet, had been stacked upon each other in order to form piles about seven to eight feet high and from ten to twelve feet wide, mixed with bushes

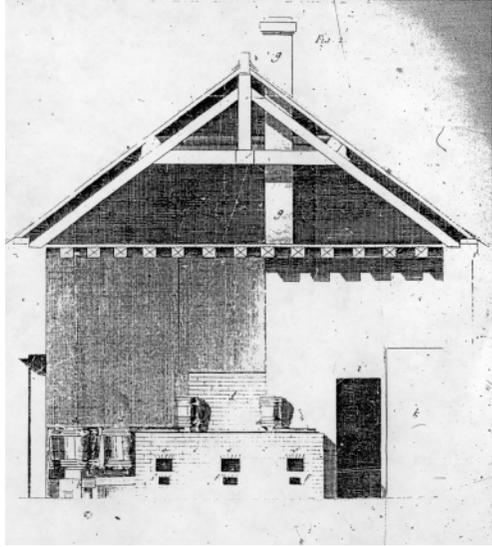


FIG. 4. An example of a more sophisticated and complex ashery. From Antoine Laurent Lavoisier, *The Art of Manufacturing Alkaline Salts and Potashes* (Philadelphia: n.p., [1785?]), plate II, figure 2.

Ashes ! Ashes !
EDWARD BREWSTER will pay 8 cents
 per bushel for house, and 5 cents for field
 ashes, delivered at Varney Prouty's ashery in
 Concord, or at Alvaro Bebee's ashery, in Men-
 tor, in goods at reduced prices.
 April 30

FIG. 5. Advertisement for ashes from the *Painesville Telegraph*, April 30, 1825. Notice the difference in price between field and house ashes. Notice also that ashes were to be delivered at either of two asheries in Geauga County.

and brush and bits of wood of all sorts, all that was left to do was light the fire. Then when the fire had consumed most of this enormous heap, a second and sometimes even a third step was taken, by gathering all the remains of the huge trunks that the initial fire had not completely consumed, as well as the charcoal, the wood shavings, and in other words, anything that could still burn and increase the amount of ashes that could be gathered. . . . This last part of the work . . . required the greatest care, and they could not stop before the work was finished because the least amount of rain falling on the ashes had the effect of destroying a large part of their value.⁴¹

The entire burning process could take as long as a week to complete. Once finished, however, the resulting immense pile of ashes was scooped up into baskets or wagons to be carted off to the ashery or local mercantile establishment where they were exchanged for cash or other goods.⁴² If the gatherer did not have a wagon, he could fashion a backpack-like box from bark and roots in which he would carry the ashes to the ashery.⁴³ Once at the ashery, the ashes were heaped up in large but simple storehouses that would protect them from the rain.

The second way ashes for potash were produced was by burning wood in domestic stoves and hearths. A person known as an ash-man⁴⁴ gathered these types of ashes in exchange for cash or other needed commodities. Although it is possible that ash-men were collectors acting as independent middlemen between the homes of the community and the ashery itself, it is equally likely that they would have been employed by the owner of the local ashery. Remembering such events in connection with the ashery on the Flats, one Kirtland citizen reminisced, "There was an Ashery on that creek where they did a thriving business making potash. They sent out teams all over the country gathering up the ashes only paying a few cents per bushel."⁴⁵

Burning wood in a kiln was the third way that ash for potash was produced in the nineteenth century. Apparently, some asheries had their own kiln. These kilns have been described as being "usually a small building laid

up with stone, sometimes no larger than six by ten feet, with an opening near the top to stoke the wood, which was fired on a grade, and a hole underneath to rake out the ashes.”⁴⁶ The kilns were built to generate a more pure, less adulterated ash by providing an enclosed environment in which wood could be burned. Although it is not entirely clear whether or not Whitney’s ashery utilized a kiln of this kind, there is some evidence indicating that wood was being consumed at the ashery site: early settler Christopher G. Crary recounts an incident when he “paid Whitney with wood at his ashery”⁴⁷ for goods he had acquired from Whitney’s store. It is possible that an oven utilized to make pearl原因 also generated ashes that were used to manufacture potash.

Water Supply. A productive ashery also needed an adequate supply of water. Water’s primary purpose was to leach the ashes. In the early nineteenth century, ashes were leached with water either in an ash hopper or a leach barrel⁴⁸ (fig. 6). An ash hopper was an inverted pyramidal container constructed from common lumber.⁴⁹ The opening at its top was a few square feet in dimension, and the receptacle’s sides narrowed to a small opening at the bottom that emptied into a length of pipe made from a hollowed log.

A leach barrel, on the other hand, was no more than a bottomless barrel normally situated on some type of “leach stone” or “lie stone”⁵⁰ in which a circular groove was chiseled, securing the barrel’s position. A narrow channel was also carved in the stone, extending from the circular

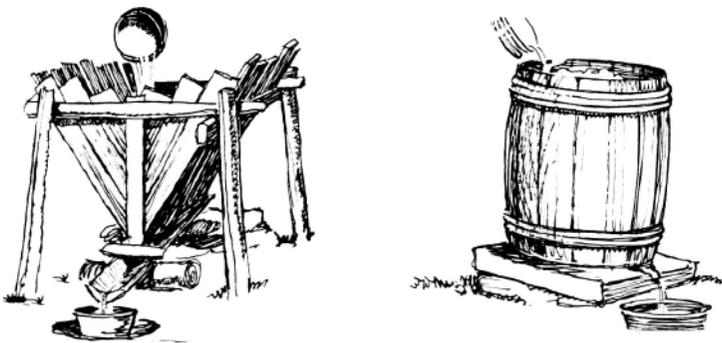


FIG. 6. A typical nineteenth-century ash hopper, left, and leach barrel. Drawings made by and taken from Eric Sloane, *The Seasons of America Past* (New York: Wilfred Funk, 1958), 105.

groove to the stone's edge, and served as a gutter through which the liquid lye could drain. Some of these repositories could hold between sixty and seventy gallons of material.⁵¹ The number of leaching vats an ashery possessed depended on the size of the complex and the ambition of its operators.

Although it varied over time and according to place, the leaching process was rather simple. In the bottom of the ash hopper or leach barrel was placed a network of small sticks and a layer of straw several inches thick, which served as a sieve and ensured that no large pieces of ash material would seep through. The vessel was then filled with wood ashes, packed down for maximum capacity. Sometimes a measure of wet lime was added to increase the causticity of the resultant lye.⁵² A few inches of open space near the top of the receptacle was reserved to hold the several buckets of water that were poured over the compressed wood ash at timely intervals, each time filling the container to its brim.⁵³ One woman noted, "Sometimes it took all day for water to run through and come out at the bottom."⁵⁴ The resulting amber fluid that percolated out through the lower orifice was caught in a smaller container that sat underneath either of the larger receptacles. This was the potent potassium lye that was to become the treasured potash. If not satisfactorily strong, the first run-off of lye could be poured again over the same ashes or over a fresh batch, thus increasing its causticity. The ashes, on the other hand, although now deficient of most of their potassium and other natural salts, could be sold, used for fertilizer, or simply discarded.⁵⁵

Because water was an essential ingredient in the manufacturing of potash, most asheries were located near a convenient water source. One late-nineteenth-century account speaks of water being brought in from a nearby well through long wooden piping made from hollowed out trees (fig. 7).⁵⁶ A different description mentions "twelve to eighteen of these [leach] tubs placed in a line, over which a trough is placed, and a hole with a plug in each over every tub."⁵⁷ The ashery at Kirtland Flats was placed on the south bank of a brook that emptied into the East Branch of the Chagrin

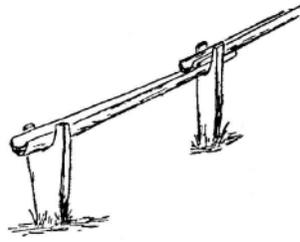


FIG. 7. Wood piping, or pump logs, commonly used to convey water to an ashery. From Dominique-Marie Doyon, "La Fabrication de la potasse, au Canada et spécialement à Saint-François de Beauce," *Les Archives de Folklore* (Quebec: Presses de l'Université Laval, 1949), 38. Used by permission.

River, a seemingly appropriate location. It is not clear, however, if Newel K. Whitney ever used the water from the brook to leach the ashes in his ashery. More likely, he used the water from a natural spring on the hill to the south of the ashery. Whitney leased the rights to this water from Peter French on September 5, 1822, the same day he purchased the ashery property from French. Why he did not use the water from the brook remains a mystery; but, it could have been due to the facility of running water downhill to his ashery, rather than bringing it up from the brook.

From a deed dated February 8, 1853, we learn that similar conditions prevailed several years after the Latter-day Saints left Kirtland. In it, Isaac Sherman and wife, then owners of the ashery, sold Daniel Bliss a piece of land and the rights to keep an open ditch “on the West End of said Ashery to Brook for the purpose of a trail race.”⁵⁸ However, the Shermans were explicit in “reserving the privilege of laying pump logs and the privilege of water from said ditch for the use of our Ashery.”⁵⁹ Since “pump logs” are logs “suitably bored or hollowed out for making a pump or for a water pipe,”⁶⁰ it is clear that even as late as 1853 the Kirtland Flats ashery was drawing on sources other than the brook itself for its supply of water.

Potash Kettle. One scholar has argued that “the commercial success of those frontier establishments [asheries] was dependent on the reliability and long life of their one major facility—the cast-iron pot ash kettle.”⁶¹ In the northeastern United States, these kettles were normally a simple bowl with diameters ranging between forty-two and fifty-four inches. As they were cast in iron one to one-and-one-quarter inches thick, an ordinary potash kettle weighed somewhere between four hundred and one thousand pounds (fig. 8).⁶² Because of their size, potash kettles were seven to ten times more expensive than other cast-iron ware, making the manufacture of potash a specialized industry.⁶³ The most important step in the manufacturing process took place within these kettles.⁶⁴

In a sector of the ashery sometimes referred to as the “boiling camp,” the kettle was mounted approximately two feet above the ground on a circular

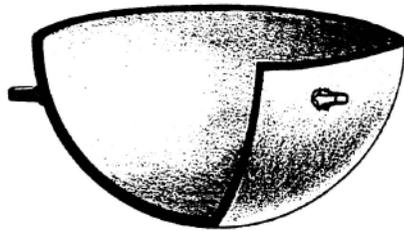


FIG. 8. Cross section of a typical bowl-shaped cast-iron potash kettle. From Harry Miller, “Potash from Wood Ashes: Frontier Technology in Canada and the United States,” *Technology and Culture* 21, no. 2 (1980): 191. Reprinted by permission of the Johns Hopkins University Press. © Society for the History of Technology.

support known as an “arch” made of brick or stone, under which a substantial fire could be maintained. On one side there was an opening at ground level through which the fire was stoked. On the opposite side there was a smaller opening that served as a vent and provided a cross draft for the fire. Once potassium lye was leached from the ashes as described above, the amber liquid was poured into the kettle, where it was boiled down to a dark, syrupy residue known as “black salts,” “salts of lye,” or simply “salts.” Undoubt-

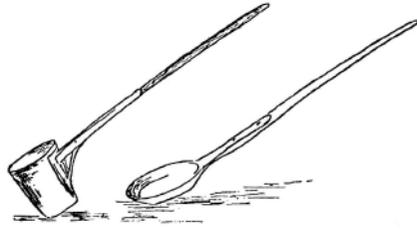


FIG. 9. Examples of ladles commonly used in the manufacture of potash. From Dominique-Marie Doyon, “La Fabrication de la potasse, au Canada et spécialement à Saint-François de Beauce,” *Les Archives de folklore* (Quebec: Presses de l’Université Laval, 1949), 38. Used by permission.

edly, mixed in with the salts were bits of charcoal, soil, and other polluting material left over from the burning and leaching processes. The salts at this point were ladled (fig. 9) into a number of nearby smaller cauldrons called “coolers,” which sometimes hung from a wooden frame above the boiling area by hinged arms able to swing to and from the larger potash kettle.⁶⁵

In reality, this initial step of the boiling process did not have to be done in the expensive potash kettles of the asheries. Salts could be produced in a kettle of any size or shape. For this reason, settlers would often produce salts themselves and sell or exchange them to the ashery or merchant. One man involved in a potash operation noted, “Our people have got into the way of making up their own ashes into salts in the kettles they get to make sugar in and they find they turn their labor as well as their ashes into money so there is no getting their ashes.”⁶⁶ Another contemporary observed, “Very few of the settlers have an ashery, as it is called, in which the whole process of making either pot or pearl-ash is performed. They usually sell the black salts to the store-keepers in their neighbourhood, who complete the process of the manufacture.”⁶⁷

Thus, in the nineteenth-century newspapers we see advertisements for ashes as well as advertisements soliciting domestically produced salts (see figs. 2 and 10).⁶⁸ It is interesting to note that in many of these ads the merchants were willing to “pay a part cash” for the salts, whereas for other commodities only “the highest price in Goods” would be paid.⁶⁹

After several days of incessant lye boiling, enough salts to fill the potash kettle had been produced. The next and most important step was to

heat the kettle to a temperature of “red heat” (usually around 1,000° F), which caused the salts to fuse into a boiling molten mass. In order to maintain the temperature necessary for the scorching, the fire beneath had to be continuously fed from the piles of wood gathered beforehand. It took between two and four hours of constant heat and boiling until the polluting material had burned off and “the bubbles . . . erupted from every point on the liquid’s surface. . . . [This] was the sign that the potash was cooked.”⁷⁰ During this cooking phase, a crust of thick foam that formed over the surface of the liquid was skimmed off periodically. If the bubbles of the boiling mass were not able to break through this crust, the potash could not be completed, and the batch was abandoned and reused at a later time.⁷¹

During this phase potash kettles were at the greatest risk. Due to the extreme stress, heat, and corrosion to which they were ceaselessly subjected, it was not uncommon for kettles to be ruined by large cracks in their bases. Apparently, this was frequently the case in the northeastern United States before the 1830s because of the inferior casting techniques available at the time.⁷² However, once technology improved, the life span of potash kettles increased considerably.⁷³

After the liquid had sufficiently boiled, the molten potash was ladled into the same coolers as before, only this time the smaller vessels were preheated to minimize sudden ruptures. By the fol-

**SAWYER, GOODMAN,
& CO.**
HAVE just received a fine & general
 assortment of
SPRING GOODS,
*Which they are ready to hand over on the
 fairest terms.—Their DRY GOODS
 consist in part of Blue, Black, Brown, Olive,
 Green and Mixed Broad Cloths, Fancy
 Cassimers, light and dark Satinets,
 Beaverteens, Bangups, Rouen Cassimers,
 Merino do. London Drilling, French printed
 Muslins, (an elegant article for Ladies
 dresses,) black, white, pink, orange and
 straw, striped and plaid Gingham, Calicoes,
 Stocks, Collars, Caps, Palmleaf hats,
 Cravats & cravat-stiffners—a great variety
 of Fancy articles including Millinery, &c.
 &c.—Also bleached & brown*

| | |
|--|--------------------|
| Shirtings & Sheetings, | |
| Ticking, | Batting, |
| Wicking, | GROCERIES, |
| HARDWARE, | Cutlery, |
| CROCKERY, | Glass-ware, |
| Paints, | Dye-stuff's |
| Iron, Steel, | Nails, |
| Glass, | Leather, |
| Salt, | |
| Mill & X cut Saws, &c &c. | |

**N. B. The highest price
 paid for Pot, Pearl Ashes,
 & Salts of Lye.**
 CHAGRIN, June 1, 1832.

FIG. 10. An 1832 advertisement showing the distinction made between potash, pearlash, and salts of lye. *Painesville Telegraph*, June 7, 1832.



FIG. 11. Chunks of potash produced by the author following the process described herein. Photo by Benjamin C. Pykles.

lowing day, the potash had solidified into an extremely hard, gray mass. The mass was then broken up into chunks with an ax, revealing its pinkish interior (fig. 11). The chunks were then tightly packed into large wooden barrels and shipped to the markets of the East Coast or Great Britain to be sold.⁷⁴ In order to preserve its causticity and, therefore, its use as an industrial alkali, the potash was sometimes tightly packed in crushed lime.⁷⁵ This causticity posed a formidable

threat to those handling the solidified potash. Although the potash was cooled, it could still scorch the skin, especially when the skin was moist with perspiration.⁷⁶ Workers took precaution by wearing long-sleeved clothing, aprons, and long mitts while preparing and packing the potent alkali.⁷⁷

While a large and expensive kettle was needed to manufacture potash in the manner described here, and thus only an ashery could complete the process, a less refined version of the alkali could be produced by any settler owning a basic kettle. This less refined version of potash was commonly called *pearlash* (confusingly, this was not the same product also known as *pearlash* that was a highly refined alkali produced in more sophisticated ashery operations). Numerous advertisements in a local newspaper suggest that ordinary settlers were producing the alkali in its various forms. That local mercantile establishments were distinguishing between “Pot, Pearl Ashes, & Salts of Lye” is clearly seen in figure 10. It is difficult to say, however, exactly how these distinctions were made. Several historians have mistaken the raw *pearlash* of the frontier for the more refined alkali. The more refined *pearlash*, produced in the more advanced asheries, was made from potash baked in a reverberatory oven, producing a white, granular substance.⁷⁸ At times this more refined *pearlash* commanded a higher market price than potash (see graph 1). As indicated above, it is possible that Whitney had a reverberatory oven as part of his ashery complex.⁷⁹

The less refined frontier *pearlash* was apparently made in the settlers’ own cast-iron vessels by cooking and heavily stirring their homemade salts at temperatures below the red heat fusion point.⁸⁰ The scorched material

could then be dissolved in water, have its impurities skimmed off, and reboiled down to a more purified form.⁸¹ The result was a granular, yellow-gray pearlash. Without doubt, this substance was of an inferior quality to the potash and pearlash produced in the asheries with an oven, but the crude material evidently secured a price suitable enough to encourage the merchants' soliciting. What these merchants were seeking when advertising for domestically produced "Potash" is not clear. It is possible, however, that some ordinary folk owned potash kettles of their own or risked their smaller, thin-walled kettles in which they produced a shoddy yet marketable form of potash.

In Kirtland, potash kettles most likely were obtained from one of the few major iron works in Geauga County. In 1825 a local newspaper announced the discovery of an extensive deposit of iron ore found in the vicinity of Painesville Township.⁸² The year following, three major iron works were listed in the same paper: the Geauga Iron Company in Painesville, the Rail-Road Furnace in Perry, and the Concord Iron Works in Concord.⁸³ Although only one of the three specifically advertised the manufacture of potash kettles, it is likely that all supplied the market with their own castings. In later years, other iron works were established in the county, supplementing the supply of cast-iron hollow ware⁸⁴ available to the settlers (fig. 12).

Transportation. The fourth and final element of a truly successful frontier ashery

Arcole Iron Works.
 (MADISON, GEAGA CO. OHIO.)
WILKINSON, SEELEY & CO.
 proprietors of the *Arcole Furnace*
 having recently built and put in operation
 an additional Blast Furnace, are now pre-
 pared to furnish dealers with
CAST IRON,
 in all its various forms. Comprised in
 the assortment of Stove patterns, are
James' & Wilson' Cooking
Stoves, Camboos, Hall,
7 & 10 plate, Franklin,
Coal and Box STOVES,
 Of every size and form, from eastern patterns,
 as light as Philadelphia plates,
And every description of
HOLLOW WARE,
 From the *Carron* form of patterns,
 (as light as Jersey ware)
Comprehending in the assortment
 3 sizes of Cauldrons,
 6, 8, 10, 12, 13, 24, 30, 40, 50, and 70 lb
KETTLES,
 3 sizes Tea Kettles,
 7 sizes Pots, 3 sizes Bake Ovens,
 6 sizes Spiders,
 2 sizes portable Furnaces,
 3 sizes Griddles, Basins
 Gridirons, Stew Pots, Spanish Pot,
 Also 5 sizes Fire Dogs,
 60, 90, 110 & 120 gallon Potash Kettles,
 Mill Irons, Fuller's Irons,
 Gudgeons,
 Wagon Boxes, Fanning-mill Irons,
 Plough Irons, &c. &c.

FIG. 12. An 1831 advertisement of the Arcole Iron Works, located in Madison, Geauga County, Ohio. Notice the variety in size of potash kettles offered. *Painesville Telegraph*, July 19, 1831.

was access to affordable means of transporting potash to the various markets. This access, perhaps, was the principal reason that a great number of frontier mercantilists established asheries: they were already involved in the networks of transportation.

Potash produced in Kirtland would have been shipped both locally and to the eastern seaboard. The need for alkali within Geauga County itself would have been great enough to warrant the shipment of Kirtland potash to some of the local glass works and carding mills. Potash transported by wagons would have satisfied these demands. However, the demand for potash on the East Coast in the early nineteenth century was much greater than that of the local economies. Not only were the New England glass and textile industries beginning to grow, but brokers purchasing goods to be shipped to England were also snatching up potash for the booming cotton and wool industries there. Canada's eastern ports were likewise centers of great potash exportation.

No doubt Kirtland was founded in part due to its convenient access to the major waterways of the Northeast. From Kirtland it was a relatively short wagon ride to Fairport Harbor, a major port of Lake Erie at that time. From there, potash and other goods could be shipped to Buffalo. Before the completion of the Erie Canal in 1825, the commodities would then have had to travel by wagon to Albany where they could make their way to New York via the Hudson River or to other Eastern ports by way of land travel. Another option was to head northward towards Lake Ontario, where the goods could reach the port of Quebec via the St. Lawrence River.

Obviously, when the Erie Canal connected Buffalo to Albany, the shipping scene changed dramatically. Now, Kirtland goods could reach the markets of New York almost entirely by boat—a much quicker and cheaper means of transportation (fig. 13). A year after the canal was finished, the *Painesville Telegraph* noted the improvements in transportation costs: “In 1819 the transportation of goods from the city of New-York to this place, was *four dollars twenty five cents* per hundred: now we pay *one dollar and thirty seven cents* per hundred—a distance of six hundred miles.”⁸⁵ Of course, there were other canals besides the Erie that contributed to these advantages as well. By October 1833, Kirtland businesses had access to Southern markets via the Ohio and Erie Canal,⁸⁶ which connected Cleveland to the Ohio River at Portsmouth.

Merchants soon realized, however, that not all industries profited equally from the improved travel route. Increased access to the markets of the eastern seaboard meant increased competition as well. Perhaps it was this competition that caused a local newspaper to note in 1829 that “a small decline has taken place in Pot and Pearl-ashes, since the opening of river



FIG. 13. The Erie Canal. Finished in 1825, the Erie Canal became the primary route from Kirtland to the East Coast markets.

navigation.⁸⁷ Graph 1 illustrates the trend in potash and pearlash prices at the time this statement was made.

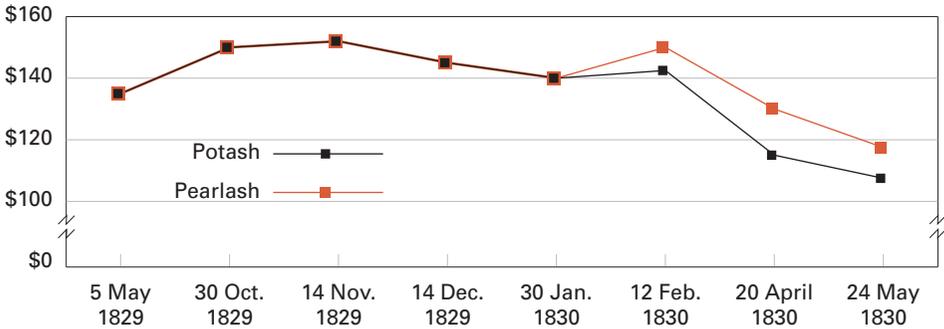
It was not only the Erie Canal that induced the decline, but the extensions of railroads also. In 1835 it was advertised that two new railroads would soon connect Painesville to Richmond and Fairport.⁸⁸ Such improvements in transportation made it profitable to ship goods that were previously too expensive to cart over land, and many people began to utilize their resources in different ways. Such was the situation with wood, which received a higher price as lumber than it did for ashes. The result is obvious; the potash industry began to dwindle. Yet even as late as 1840, potash was one of the two major manufactures in Lake County, Ohio. That year alone 153 tons of the alkali was produced.⁸⁹ No doubt the ashery in Kirtland contributed to this total.

Significance to the Church

In spite of the challenges posed by the improvements in transportation, the Kirtland Flats ashery continued to operate for several more years. In fact, the 1830s were a significant time in the history of the Kirtland ashery. During this time the ashery became uniquely involved with The Church of Jesus Christ of Latter-day Saints.

Newel K. and Elizabeth Ann Whitney heard about the Church when the first Latter-day Saint missionaries came to Ohio in 1830, only months after the Church was organized. These missionaries preached in the vicin-

GRAPH 1

Decline in Potash and Pearlash Prices in the New York Market, 1829–1830

Figures taken from monthly reports found in the *Painesville Telegraph*.

ity of Kirtland and baptized many. Newel and Elizabeth were among the first converts, receiving baptism in winter 1830. A few months later, in February 1831, the Prophet Joseph Smith and his wife, Emma, arrived in the small town. In a short time, Kirtland became the administrative headquarters of the Church and remained so until 1838.

One of the first revelations received by the Prophet in Kirtland outlined the Lord's plan for the economic organization of the Church and was later known as the law of consecration. Essentially, the law required that each Church member "consecrate" or deed all of his or her property to the bishop of the Church, who then would grant an "inheritance" or "stewardship" to every family from the properties received, according to the wants and needs of each particular family.⁹⁰ The stewardships could be anything from a farm to a building lot; whatever it was, the family was expected to consecrate annually their surplus production to the storehouse of the bishop. This surplus, in turn, was used to assist those who, for whatever reason, were unable to sufficiently provide for their own wants and needs.⁹¹

Five days before the revelation containing the law of consecration was given, the Lord indicated his will that Edward Partridge be "ordained a bishop unto the church" (D&C 41:9). A short time later, Bishop Partridge was commanded to relocate his family to Jackson County, Missouri, where he would keep the storehouse of the Church and manage the affairs of Zion (D&C 58:24–25). As a result of Bishop Partridge's removal, the Lord called Newel K. Whitney as second bishop of the Church, appointing him to manage the storehouse and other affairs in Kirtland (D&C 72).

In April 1832, in an attempt to alleviate the temporal responsibilities of the two bishops, a "Central Council" of five (later seven) men was created to supervise the business affairs of the Church in both Missouri and

Ohio.⁹² Bishop Whitney was one of those chosen to comprise this council. Immediately, the Central Council established what was called the United Firm.⁹³ This was “a joint-stewardship of the members of the council with the responsibility of holding properties in trust, assisting the poor, and supervising the establishment of merchandising stores in Ohio and Missouri.”⁹⁴ Because of the potential of Bishop Whitney’s ashery to help fulfill these objectives, the council adopted the business as one of the properties to be owned in trust.

The fact that a cash staple such as potash could be produced from the simplest and most abundant resources of the frontier made the ashery an ideal selection for the United Firm. With the annually consecrated resources of Church members in Kirtland, which presumably included their hardwood ashes, the ashery could produce the profitable potash. From the sale or trade of the potash manufactured in the Kirtland Flats ashery, the Central Council could provide for the needs of the poor within the Church. Moreover, the profits would assist the council in their efforts to establish stores where Church members could procure essential goods. Perhaps most importantly, the assets earned from the ashery operation could be used toward the Church’s efforts to establish the kingdom of God on the earth, including the construction of the Kirtland Temple. All in all, the ashery was an ideal asset to the Church’s attempt to be unified and self-sufficient in their economic and religious pursuits.

For various reasons, but mostly because of hardships caused by the persecution of Saints in Missouri, the law of consecration was suspended about two years after it was established. The economic law would be re-implemented in numerous venues in the future, but it was no longer practical under the circumstances the Latter-day Saints faced in 1834. In the same revelation suspending the law of consecration came the mandate to dissolve the United Firm. Each of the properties previously owned in trust were assigned to individual agents. The Kirtland Flats ashery was returned to Newel K. Whitney “for his stewardship, for a blessing upon him and his seed after him, for the benefit of the mercantile establishment of my order which I have established for my stake in the land of Kirtland” (D&C 104:40). As mentioned in the introduction to this study, this constitutes the only scriptural reference to the Kirtland ashery.

Property Ownership

The history of the Kirtland Flats ashery becomes very vague after this time. Apparently, Newel K. Whitney retained the ashery property until February 1837, when he sold it to Jacob Bump for \$400.⁹⁵ Two months later,

Bump sold the property to Jonathon Holmes for the same amount.⁹⁶ After this point, the property changed size and hands numerous times, making it difficult to construct a continuous chronology of property ownership.⁹⁷

From a relatively obscure deed documenting the sale of a small piece of land from Isaac Sherman to Daniel Bliss in February 1853, it is known that Sherman and his wife were operating an ashery at that time. Apparently the ashery owned by the Shermans was located on the same piece of property on which Whitney had run his operation.⁹⁸ An ashery appears, at the same site as Whitney's ashery, on a map of Kirtland made in 1857 (see fig. 1). Furthermore, an ashery is repeatedly referenced in various property descriptions from 1864 to 1869.⁹⁹

In November of 1870, 1.77 acres of land was sold in the Flats region for "the sum of Five hundred Dollars and the payment of a mortgage of three hundred Dollars."¹⁰⁰ Seven years later, the same property was sold again for \$125. In the deed for this last transaction, the property is described as "the old Ashery lot."¹⁰¹ Therefore, it seems reasonable to conclude that by 1877, the Kirtland Flats ashery had finally ceased to exist. Considering the significant decline of the potash industry throughout the first half of the nineteenth century, the life-span of the Kirtland complex was remarkable indeed.

Conclusion

Although the Kirtland Flats ashery was not built until the early 1820s, it was part of an ongoing legacy of potash production in North America that began with some of the first Europeans to establish themselves on the continent. In this sense, the ashery is symbolic of the innovation and hard work of those who settled the North American frontier. It also represents the efforts of one young man who had the courage and vision to seek a profitable living in the small village of Kirtland. Perhaps most importantly, it symbolizes the faith and devotion of a religious community in their attempt to establish an economic order that would enable them to be self-sufficient and unified in their efforts to build the kingdom of God.

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1. "Church to Restore Historic Landmarks in Kirtland," *Ensign* 30 (July 2000): 78.
2. In early editions of the Doctrine and Covenants, the ashery was given the code name "the Shule" (D&C 104:39). Some names of people and places mentioned in the Doctrine and Covenants were, in the earliest editions, referred to by code names to protect their identity. In the earliest editions only the code name was given, but subsequent editions gave the real name along with the code name. Since 1981 code names have not been given. See the introduction to Doctrine and Covenants 78 in recent editions.
3. The standard work on the history of the Latter-day Saints in Kirtland is Milton V. Backman Jr., *The Heavens Resound: A History of the Latter-day Saints in Ohio, 1830-1838* (Salt Lake City: Deseret Book, 1983). Backman's work, however, will undoubtedly be enhanced by the great amount of historical data amassed by staff at the Museum of Church History and Art in Salt Lake City as part of the Kirtland restoration project.
4. Historically, the alkali was sometimes spelled "pot ash."
5. Harry Miller, "Potash from Wood Ashes: Frontier Technology in Canada and the United States," *Technology and Culture* 21, no. 2 (1980): 198 n. 23.
6. For a brief explanation of how potash and its derivatives were used in each of these commodities, see Dorothy S. Brady, "Relative Prices in the Nineteenth Century," *Journal of Economic History* 24 (June 1964): 166-67.
7. Theodore J. Kreps, "Vicissitudes of the American Potash Industry," *Journal of Economic and Business History* 3 (1930-31): 630.
8. Kreps, "American Potash Industry," 632; C. A. Browne, "Historical Notes upon the Domestic Potash Industry in Early Colonial and Later Times," *Journal of Chemical Education* 3, no. 7 (1926): 749.
9. For a detailed summary of the first government-sponsored attempts, see William I. Roberts III, "American Potash Manufacture before the American Revolution," *Proceedings of the American Philosophical Society* 116, no. 5 (1972): 383-95.
10. Kreps, "American Potash Industry," 633.
11. See Miller, "Potash from Wood Ashes," 199 n. 25.
12. Roberts, "American Potash Manufacture," 389. The manufacturer was Charles Dick, who was in charge of a potash production facility in Fredericksburg, Virginia. Undoubtedly, part of Dick's frustration stemmed from inadequate local wood resources.
13. Roberts, "American Potash Manufacture," 390.
14. Roberts, "American Potash Manufacture," 392.
15. Roberts, "American Potash Manufacture," 392. See also Laurence A. Johnson, *Over the Counter and on the Shelf: Country Storekeeping in America, 1620-1920*, ed. Marcia Ray (New York: Bonanza Books, 1961), 13.
16. Further advancements in the Industrial Revolution provide an explanation of this unique growth. The need for vegetable-based alkalis for the British cotton and soap industries was greater than it had ever been. The country's lack of native wood resources forced manufacturers to seek for alternative sources of alkali. Two variants in particular were utilized to supplement the importation of both American and Eurasian produced potash. Kelp, native to the shores of Britain and whose ashes contain high levels of salt, was used to produce a type of alkali. For a treatise on the history of kelp, see Archibald Clow and Nan L. Clow, "The Natural and Economic History of Kelp," *Annals of Science* 5 (July 1947): 297-316. For similar reasons, Spain exported barilla, an alkali made from the ashes of their coastal vegetation. Together, kelp and barilla constituted a significant supply of Britain's alkalis. Nevertheless, as suggested in table 1, after the Revolutionary War, the demand for American potash quickly surpassed that for alternative sources, including the potash produced in eastern Europe and Russia.
17. Browne, "Historical Notes," 753.

18. David W. Maxey, "Samuel Hopkins, The Holder of the First U.S. Patent: A Study of Failure," *Pennsylvania Magazine of History and Biography* 122 (1998): 3–37; David W. Maxey, "Inventing History: The Holder of the First U.S. Patent," *Journal of the Patent and Trademark Office Society* 80 (1998): 155–70; Henry M. Paynter, "The First U.S. Patent," *American Heritage of Invention and Technology* (fall 1990): 18–22.

19. Among the "ashery men" who suffered greatly as a result of the embargo was the father of future Church leader Heber C. Kimball, then residing in Vermont. Heber wrote, "About the time of the embargo, before the last war with England, my father lost his property, as it was invested in salts, potash and pearlash; the embargo, having shut down the gate of commerce between the United States and England, left his property in his hands without much value." As quoted in Orson F. Whitney, *Life of Heber C. Kimball, An Apostle: The Father and Founder of the British Mission*, 2d ed. (Salt Lake City: Stevens and Wallis, 1945), 4.

20. Browne, "Historical Notes," 755–56.

21. Nicolas Leblanc was granted a patent in 1791 for a method of producing soda from ordinary salt. See T. S. Patterson, "Nicolas Leblanc and the Founding of the Soda Industry," *Chemistry and Industry* 62 (May 1943): 174–77.

22. Miller, "Potash from Wood Ashes," 199; see further at that location (Miller, "Potash from Wood Ashes," 199 n. 25) for a description of "Important Nineteenth-century potassium compounds for industry, pharmacy, etc."

23. Miller, "Potash from Wood Ashes," 197–98. Further, footnote 22 at that location states that "kelp and barilla, made from ashes of vegetation grown in or near salt water, had resulting high sodium-alkali concentrations, i.e., soda. Those commodities faced the earliest competition from the new synthetic alkali . . . [whereas] Pot ashes, which were all made by burning inland vegetation, were predominantly potassium-base salts."

24. T. C. Barker and others, "The Origins of the Synthetic Alkali Industry in Britain," *Economica* 23 (May 1956): 166.

25. Miller, "Potash from Wood Ashes," 194 n. 10.

26. Brady, "Relative Prices," 167.

27. Kreps, "American Potash Industry," 646–47.

28. Kreps, "American Potash Industry," 630.

29. Kirtland was in Geauga County until 1840, when Lake County was created; Kirtland is now in Lake County.

30. Anne B. Prusha, *A History of Kirtland, Ohio* (Mentor, Ohio: Lakeland Community College Press, 1982), 4–16, 32.

31. Whitney's wife, Elizabeth Ann, later reported, "Shortly after entering my twenty-first year I became acquainted with a young man from Vermont, Newell K. Whitney, who, like myself, had left home and relatives and was determined to carve out a fortune for himself." Edward W. Tullidge, *Women of Mormondom* (New York: Tullidge and Crandall, 1877), 34.

32. Deed Records, 1818–22, Geauga County, Ohio, 8:427–28, microfilm, Family History Library, The Church of Jesus Christ of Latter-day Saints, Salt Lake City. The deed states that "Newell K. Whitney" paid twenty-six dollars for his sixty-five hundredths of an acre and that he received "the premises as a good indefeasible estate in fee simple." The deed was recorded in Geauga County Records on October 18, 1822. A copy of the deed is available from the author upon request.

33. Deed Records, 1818–22, Geauga County, Ohio, 8:429. The deed states that "Newell K. Whitney" paid Peter French ten dollars for "the privilege of conveying said water on a direct line to any part of the lot of ground . . . for the period of nine hundred

and ninety nine years.” This deed was also recorded in Geauga County Records on October 18, 1822. A copy of the deed is available from the author upon request.

34. Orson Hyde, “History of Brigham Young,” *Millennial Star* 26 (November 1864): 743.

35. Edward Hazen, *The Panorama of Professions and Trades; or, Every Man’s Book* (Philadelphia: Uriah Hunt, 1839), 20.

36. Brady notes that “the prices of wood ash were, apparently, between ten and fifteen cents per bushel throughout the first half of the century.” Brady, “Relative Prices,” 167.

37. Data taken from advertisements in the *Painesville Telegraph*, 1825, 1828–35.

38. A reverberatory oven was used to bake the alkalis, resulting in the more refined form of pearlash.

39. Additional data regarding the appearance of the ashery will no doubt be revealed upon completion of the archaeological investigations undertaken by the Museum of Church History and Art.

40. Hazen, *Panorama of Professions and Trades*, 20.

41. Jean Rivard, *défricheur* [Jean Rivard, settler], 1877, 83, as cited in Dominique-Marie Doyon, “La Fabrication de la potasse, au Canada et spécialement à Saint-Francois de Beauce,” *Les Archives de folklore* (Quebec: Presses de l’Université Laval, 1949), 27–41; translated into English by the translation department of The Church of Jesus Christ of Latter-day Saints, Salt Lake City; copy in research files of the Museum of Church History and Art, Salt Lake City. For a similar description this process, see Hazen, *Panorama of Professions and Trades*, 19–20.

42. Hendrik Booraem V, *The Road to Respectability: James A. Garfield and His World, 1844–52* (Lewisburg, Penn.: Bucknell University Press, 1988), 16.

43. Doyon, “La Fabrication de la potasse,” 34.

44. William A. Craigie and James R. Hulbert, eds., *A Dictionary of American English*, 4 vols. (Chicago: University of Chicago Press, 1938), 1:85, s.v. “Ash-man.”

45. Hadden Scrapbook, 27, microfilm, Family History Library. (I thank Mark Staker for providing this reference.)

A comparative look at the price of ashes during the Latter-day Saint occupation of Kirtland is found in a ledger from Turin, New York, that spans from 1825 to 1841. It records wood ashes being purchased for \$.06 to \$.12 a bushel. Johnson, *Over the Counter*, 13.

46. Johnson, *Over the Counter*, 13.

47. Christopher G. Crary, *Pioneer and Personal Reminiscences* (Marshalltown, Iowa: Marshall Printing, 1893), 49. (I thank Mark Staker for providing this reference.) Crary does not give a date for this occurrence, but if read in context it appears to have taken place during the early 1830s.

48. Eric Sloane, *The Seasons of America Past* (New York: Wilfred Funk, 1958), 105–6.

49. A few accounts describe ash hoppers being made from strips of elm bark. Harry Miller, “Canada’s Historic First Iron Castings,” Information Circular IC 209 (Ottawa: Department of Energy, Mines and Resources, Mines Branch, December 1968), 70 n. 12. It is assumed that the use of elm bark was the exception and that hoppers constructed from boards were more commonly used.

50. Johnson, *Over the Counter*, 13.

51. George Francis Dow, *Every Day Life in the Massachusetts Bay Colony* (New York: Benjamin Blom, 1967), 97.

52. Miller, “Potash from Wood Ashes,” 187; Sloane, *Seasons of America Past*, 106.

53. Some accounts relate that boiling water was used in the leaching process. It seems that this was merely a matter of personal preference. See Hazen, *Panorama of Professions and Trades*, 20.

54. Agnes Adele Kinsbury, as quoted in Johnson, *Over the Counter*, 62.

55. Doyon, "La Fabrication de la potasse," 40.

56. Doyon, "La Fabrication de la potasse," 37.

57. M. Parker, *The Arcana of Arts and Sciences, or Farmers' and Merchants' Manual* (Washington, Penn.: J. Grayson, 1824); reference obtained from the research files of Dean Zimmerman.

58. Deed Records, 1851–55, Lake County, Ohio, vol. J, 422, microfilm, Family History Library.

59. Deed Records, 1851–55, Lake County, Ohio, vol. J, 422.

60. Craigie and Hulbert, *Dictionary of American English*, 3:1859, s.v. "Pump log."

61. Miller, "Potash from Wood Ashes," 189.

62. Miller, "Potash from Wood Ashes," 191, fig. 3. "Flared lip" kettles were also used, but apparently more so in Canada than in the United States. Miller, "Potash from Wood Ashes," nn. 77 and 78.

63. Alan Taylor, *William Cooper's Town: Power and Persuasion on the Frontier of the Early American Republic* (New York: Alfred A. Knopf, 1995), 134.

64. An announcement for a "Sheriff Sale" in the *Painesville Telegraph* on August 16, 1833, mentions an ashery in Thompson, Ohio that had "two POTASH KETTLES, standing in an arch." Apparently, a larger ashery complex could have as many kettles as they saw fit. Unfortunately, it is unknown how many kettles Newel K. Whitney had at the Kirtland Flats ashery.

65. Miller, "Canada's Historic First Iron Castings," 18–19; Doyon, "La Fabrication de la potasse," 39.

66. Letter of Joseph Locke, March 19, 1771, to Oliver Wendel, Wendel Family Papers, Massachusetts Historical Society, quoted in Roberts, "American Potash Manufacture," 392.

67. Hazen, *Panorama of Professions and Trades*, 20.

68. *Painesville Telegraph*, April 4, 1828; December 12, 1828; July 28, 1829; November 17, 1829; May 11, 1830; June 7, 1832; October 24, 1834; July 31, 1835; and September 4, 1835.

69. *Painesville Telegraph*, April 4, 1828, 4.

70. Doyon, "La Fabrication de la potasse," 39.

71. Doyon, "La Fabrication de la potasse," 39; Miller, "Canada's Historic First Iron Castings," 19.

72. When molten iron is poured into a mold of some kind, the poorest quality metal, being lighter than the rest, rises to the top of the mold. Before the 1830s, American foundries could offer only vessels cast in the "bottom-up" posture. This meant that the poorest quality iron ended up being in the bottom of the kettles, or the highest part of the mold. The result was metallurgically weak kettles that often broke during the cooking phase of potash manufacture. It was not until after the 1830s that molds using the "bottom-down" posture began to be used in North America. A kettle cast in this fashion had the weakest metal in its flared lip and the soundest metal at its base, making it a more stress-resistant vessel overall. Miller, "Potash from Wood Ashes," 200–202.

73. Miller argues that the improved technology came after the northeastern United States potash industry had become obsolete, and that Canadian asheries were the only ones to benefit from the enhanced flared-lip kettles. Miller, "Potash from Wood Ashes," 194–96. The evidence he uses to support this statement is weak, being based on

his limited search for existing kettles in the New England region. It seems possible that the demand for such vessels could have been greater in Canada than in the U.S., but to suggest that they did not exist at all is unreasonable. Even a town such as Kirtland would have had access to kettles produced with the new technology, either directly from England where the improved technology was first used, or from a local foundry using the same techniques. However, there is no evidence that indicates the Kirtland Flats ashery ever had such a kettle.

74. The Canadian government regulated the weight of potash barrels, ensuring they weigh approximately five hundred weight (560 pounds). Miller, "Canada's Historic First Iron Castings," 19.

75. Doyon, "La Fabrication de la potasse," 40.

76. That the early Latter-day Saints and their contemporaries were aware of the potential harmful effects of potash and its derivatives is evident in an account of a tar and feathering incident that took place in Jackson County, Missouri, told in Joseph Smith, "History of Joseph Smith," *Times and Seasons* 6 (March 15, 1845): 832. Speaking of Bishop Edward Partridge, a victim of the mob, the author writes: "there [he was] . . . in the midst of his family, with a few friends, endeavoring to scrape off the 'tar,' which, from eating his flesh, seemed to have been prepared with lime, pearl-ash, acid, or some [other] flesh eating commodity."

77. Doyon, "La Fabrication de la potasse," 40.

78. Hazen, *Panorama of Professions and Trades*, 20.

79. Archaeological investigations at the ashery site, when completed, may be able to shed further light on this issue.

80. Miller, "Canada's Historic First Iron Castings," 66 n. 2; Miller, "Potash from Wood Ashes," 198 n. 23.

81. For a similar description of this process, see *Chambers's Encyclopedia: A Dictionary of Universal Knowledge for the People*, rev. ed., 10 vols. (London: W. and R. Chambers, 1878), 7:710, s.v. "potash and pearl-ash."

82. "Glass Factory," *Painesville Telegraph*, February 26, 1825, 3. Painesville, approximately ten miles northeast of Kirtland, was Kirtland's largest neighboring town and closest commercial center.

83. *Painesville Telegraph*, June 30, 1826, 3.

84. "Hollow ware" was the term applied to bowl-shaped dishes made of metal, pottery, or glass in the nineteenth century, including cast-iron cauldrons. Hollow ware ranged in size from the smallest cooking pot to the massive potash kettles.

85. "Course of Trade," *Painesville Telegraph*, July 28, 1826, 3.

86. The Ohio and Erie Canal was historically also referred to as the Grand Canal. John Kilbourne, *The Ohio Gazetteer* (Columbus: John Kilbourn, 1826), 25.

87. "New-York Market," *Painesville Telegraph*, May 5, 1829, 3.

88. *Painesville Telegraph*, April 3, 1835, 3. It is assumed that both "Fairport" and "Richmond" were cities in Ohio. One was likely Fairport Harbor on the shores of Lake Erie; Richmond is probably what today is known as Richmond Heights, which has been subsumed by the city of Cleveland.

89. Robert L. Layton, "Kirtland: A Perspective on Time and Place," *BYU Studies* 11, no. 4 (1971): 434.

90. Leonard J. Arrington, Feramorz Y. Fox, and Dean L. May, *Building the City of God: Community and Cooperation among the Mormons*, 2d ed. (Urbana: University of Illinois Press, 1992), 15. For the exact wording of the revelation in which the program is outlined, see Doctrine and Covenants 42:30–35.

91. Arrington, Fox, and May, *Building the City of God*, 16.

92. Arrington, Fox, and May, *Building the City of God*, 31.
93. The United Firm was later known as the United Order.
94. Arrington, Fox, and May, *Building the City of God*, 31.
95. Deed Records, 1836–37, Geauga County, Ohio, 23:446, microfilm, Family History Library.
96. Deed Records, 1836–37, Geauga County, Ohio, 25:4–5.
97. The author has compiled a possible chronology of what is thought to be the Kirtland Flats ashery property, available upon request. Additional historical research is currently being done by staff at the Museum of Church History and Art.
98. Deed Records, 1851–55, Lake County, Ohio, vol. J, 422.
99. Deed Records, 1864–65, Lake County, Ohio, vol. U, 562; Deed Records, 1865–67, Lake County, Ohio, vol. W, 393, 394, 605; Deed Records, 1868–72, Lake County, Ohio, 1:562, 563; Deed Records, 1867–72, Lake County, Ohio, vol. Z, 201; Deed Records, 1868–72, Lake County, Ohio, 2:493; all microfilm, Family History Library.
100. Deed Records, 1868–72, Lake County, Ohio, 2:493.
101. Deed Records, 1876–79, Lake County, Ohio, 7:532.