HISTORY AND CONSTRUCTION OF THE LIME-KILNS AT K STREET AND ROCK CREEK PARKWAY

By

Henry Alfred Essex

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SUMMARY

Travelers on the Rock Creek-Potomac Parkway frequently notice some stone ruins just north of K street and wonder what they are. Their guesses are probably quite varied but seldom correct. These gray stone structures are the last visible remains of what was once a flourishing lime business which existed in the vicinity.

These kilns marked the start of a pioneer industry in the Washington area, the manufacture of cement. Prior to the erection of these kilns the lime was either hauled from other cities at great expense or burned on the construction job.

The first lime kilns that were built in this area were built about 1830. Others sprang up across the nearby canal and farther south in the district around what is now the intersection of New York and Virginia Avenues.

The earliest kilns in the tract between K street, L street, Twenty-seventh street and Rock Creek were run by the Samuel Smoot family from about 1830 to 1855. This site was then acquired by William H. Godey whose family controlled the business until 1897. Under the Godeys the business was expanded and improved. In fact, today these kilns are generally known as Godey's Lime Kilns. In 1897 the establishment became the property of John McL. Dobson who continued in business until 1907. The land was taken over by the United States Government about 1920 for the extension of Rock Creek Park.

SUMMARY

The lime from these lime-kilns was made by heating calcium carbonate or limestone until all of the carbon dioxide was driven off, leaving only calcium oxide or unslaked lime. The limestone was brought down the Chesapeake and Ohio Canal from quarries in Maryland between Seneca and Harper's Ferry.

Godey's Lime-Kilns have no historical significance, and only mark the remains of an industry which died a natural death because of the supercession of the use of lime by the superior Portland Cement and gypsum plaster.

HISTORY OF GODEY'S LIME-KILNS

EARLY HISTORY

Today our use of lime is chiefly limited to the fertilizing of our gardens and the lining of tennis courts. However, this was not the case a hundred years ago. At that time lime was a very useful product. It found wide use as a disinfectant, whitewash, plaster, and cement. In agriculture, lime was and is used to sweeten the soil, that is, render it less acid. Whenever a consumer desired some lime, he generally burned and slaked it himself. This practice did not give uniform or high quality lime; therefore to improve the quality of this important product an industry sprang up.

Shortly before 1830 a Mr. Samuel Smoot built some lime-kilns just north of K street on the west side of Twenty-seventh street. At these kilns the lime was carefully calcined and slaked. The new business apparently prospered because another kiln was built about 1850. In writing about the lime business a contemporary writer says that the stone coming down the Canal made lime half the price of that coming from the East. Evidently at this time Georgetown was considered to be in the Middle West.

THE LIME INDUSTRY AT ITS HEIGHT

Samuel Smoot and his descendants continued to operate the business until 1855, (I believe this to be the date, but I was unable to authenticate it.) when the site was bought by

HISTORY OF GODEY'S LIME-KILNS

William H. Godey. In the Georgetown Directory of 1855 William H. Godey is listed as a painter, but in subsequent directories he is listed as a lime merchant. Mr. Godey conducted the business until his death in 1871. The property was bequeathed to his wife, Mary Godey and at her death went to her son, Edward L. Godey. It was under Edward Godey that the business reached its height. In 1884 Edward Godey is listed as having applied for a building permit for the erection of a lime-kiln.

In 1884 an advertisement was published which spoke of Mr. Edward Godey as being one of the enterprising business men of Georgetown. Concerning his product it states, "The capacity of the works is two thousand barrels weekly and surpasses all others in quality of whiteness, yielding, and working cool. The Government and all leading merchants will use no other, being burned in improved kilns and by wood."

At this time (1884) the premises included five hundred feet on L street and five hundred feet on the east side of Twenty-seventh street. The Washington Lime Kilns as this establishment was then called, also manufactured cement, plaster, and hair for the plaster. Twenty-five men were employed at this plant to operate five "patent" kilns. There may have been five kilns in 1884, but one of these seems to have been completely obliterated by changes in the vicinity.

These kilns were ideally located at the junction of the Chesapeake and Ohio Canal, Rock Creek, and the Potomac

HISTORY OF GODEY'S LIME-KILNS

River. Rock Creek at that time was navigable to fairly large boats. Ready access was possible to the limestone deposits in Maryland near Harper's Ferry and shipment of lime to market was made easy by the convenient waterways. The limestone for these kilns came from the limestone region in Maryland which runs parallel to the mountain ranges and through the center of Frederick County. In this region there are numerous lime-kilns still to be seen.

In 1884 the lime industry was booming sufficiently to support the establishment of other kilns on the west side of the C. & O. Canal by Cammack and Decker on what is now the site of the Smoot Sand and Gravel Corporation.

DECLINE OF THE LIME INDUSTRY

The Godey family continued in the lime business until 1897. In that year the establishment was taken over by John McL. Dobson. Operations continued at the plant until 1907.

About the turn of the century Portland Cement came into common use. This caused the large scale production of lime for cement to be unprofitable.

In 1907 and 1908 the sheds and warehouses of the lime works situated on L street and Twenty-seventh street were demolished to make way for the erection of the Sterling Laundry. When the land along Rock Creek was bought by the Government in

HISTORY OF GODEY'S LIME-KILNS

1920 for the establishment of a park, the lime-kilns were included. At this time the wooden superstructure of the lime-kilns was removed.

PRESENT SIGNIFICANCE OF THE KILNS

From this sketch it must be seen that these kilns have no national historical significance. The National Capital Parks Service says that the lime-kiln's chief reason for existence is that they make a good retaining wall for the embankment on the west side of Twenty-seventh street. To prevent passers-by from being deceived by the look of venerable age, the Parks Service has erected a sign telling briefly what they are.

CONSTRUCTION OF THE KILNS

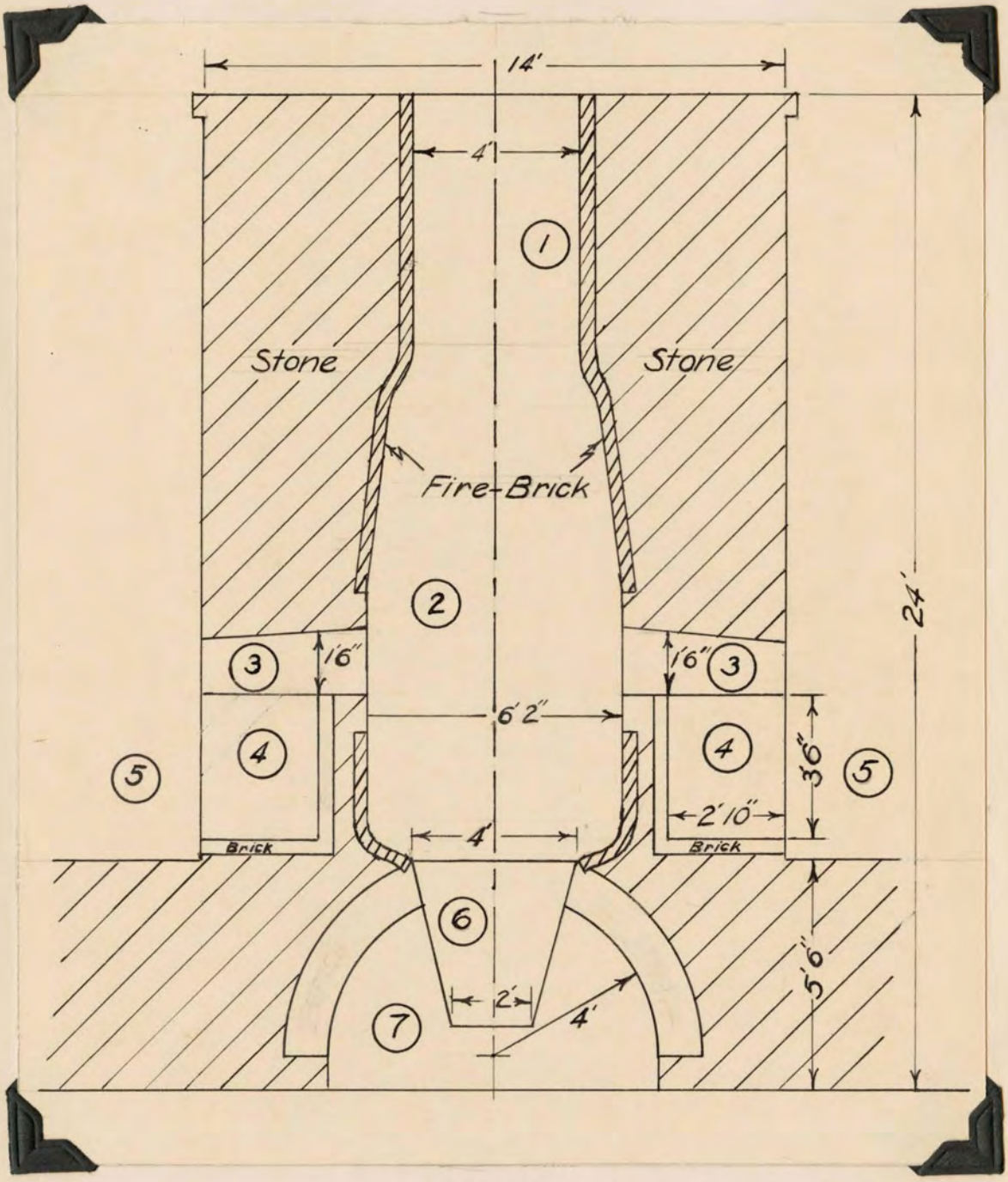

Figure 1.

KEY

(1) Barrel of Kiln
(2) Body of Kiln
(3) Fire Arches
(4) Fire-boxes
(5) Firing Platforms
(6) Cooling Kettle
(7) Draw Pit

CONSTRUCTION OF THE KILNS

DESIGN

Godey's lime-kilns are vertical, separate feed kilns of typical American design. They are rather roughly built of stone into the side of a hill. The exact origin of this type of construction is unknown, but similar kilns may be seen all over the country. They are found chiefly in rural areas where farmers operate them a few days each year to get fertilizer for their fields. The reason for the kilns being built in the side of a hill is that this makes the top of the kiln accessible for the dumping of limestone into the body of the kiln and also provided for the removal of the calcined lime at the bottom.

MATERIALS

Godey's kilns are built of natural gneiss rock which is found in abundance along the Potomac River a mile or two above the kilns. The stone is laid as uncoursed rubble. The interiors of the kilns with the exception of the fire arches are lined with West Branch fire-brick. The fire arches themselves are made of stone faced with fire-clay. The fire boxes were lined with clay brick and had iron grates and fire doors. The arches over the fire-boxes and over the draw pit are also made of clay brick. At the bottom of the body of the kiln there is an externally braced heavy sheet steel cooling kettle. This is nothing more than the inverted frustrum of a cone.

DIMENSIONS

These kilns do not conform rigidly to any particular

CONSTRUCTION OF THE KILNS

set of dimensions. Each one seems to differ in size from the others by a foot or two. Possibly this is due to the mason's difficulty in fitting his stones. A typical set of dimensions appears on Figure I. The kilns are approximately square on the outside and average about twenty-four feet in height. The firing platform is now almost level with the ground. When the kilns were built, the firing platform was about five and a half feet above the ground. This change is due to the filling which was done when this area became part of the Parkway. Formerly the draw pit arch and the firing platform were covered by wooden sheds. These were the superstructure referred to as having been torn down in 1920.

PROCESS OF MANUFACTURE

CHEMICAL PROCESS

Unslaked lime, calcium oxide, is made by a simple chemical process. When limestone or calcium carbonate is heated, carbon dioxide is driven off leaving calcium oxide. This may be written chemically as:

$$CaCO_3 + \text{heat} \rightleftarrows CO_2 + CaO.$$

Calcium oxide is an unstable chemical compound in air since it soon combines with the carbon dioxide of the air to reform calcium carbonate which is useless for cementing. To circumvent this the calcium oxide is slaked, that is, a measured quantity of water is added to form calcium hydroxide, a much more stable compound. The chemical equation for this is:

$$CaO + H_2O \rightleftarrows \text{heat} + Ca(OH)_2.$$

When lime is used as cement, it derives its strength as a binder from the fact that it changes to calcium carbonate, a hard insoluble compound, when exposed to the carbon dioxide in the air. To harden and form a strong bond lime mortar must be exposed to air. Lime mortar cannot be used underwater or any place not in contact with the air. Lime does not make satisfactory concrete because of the above property and because of excessive shrinkage causing the formation of large cracks. To prevent this shrinkage even in mortars a large proportion of sand must be used.

PROCESS OF MANUFACTURE

MODE OF OPERATION

These kilns are known as vertical separate feed kilns because the fuel and the limestone are not mixed during the process and the limestone comes only in contact with the heated gases. The kilns were charged with limestone from the top. Limestone was dumped in until the cooling kettle and the body of the kiln were filled on the initial charging. The fires in the fire-boxes were then kindled. When the limestone above the fire arches was sufficiently calcined the limestone below the fire arches was drawn off leaving only lime in the kiln. The kiln was then recharged with limestone. When the new stone was burned, the contents of the cooling kettle and the lower part of the body of the kiln were drawn off. However, on the second drawing lime is the drawn off product. In this way the process is continuous and will go on as long as fire is kept in the fire boxes and limestone is added.

The progress of the process was determined by noting th reduction of volume of the limestone. Limestone will shrink twenty to twenty-five per cent when calcined to lime. Lime as it comes from the kiln is a lumpy solid. Any powder present indicates that air slaking (the deleterious formation of calcium carbonate) has started. Lime must be pulverized to fairly small sizes before water slaking.

PROCESS OF MANUFACTURE

Godey's lime kilns were wood burning kilns. Wood is considered by some lime experts to be the ideal lime burning fuel. Since lime forms from limestone at 750°-900° Centigrade, very hot fires are not necessary. In fact, where too much heat is applied to the lime incipient fusion will occur. This is especially true if there are any impurities present in the limestone. In modern lime-kilns using gas as a fuel, the carbon dioxide which comes from the limestone is frequently run back and mixed with the air for the fuel to cool the flame of the gas burner.

Vertical separate feed kilns are the type generally used today in the manufacture of lime. However, they are much more efficient than kilns like Godey's lime-kilns. Godey's kilns were very inefficient because they were built of stone and a great deal of the fuel heat was wasted in raising the stone walls to a high temperature. The limestone only received a fraction of the wood's heat. A modern kiln is made of steel and has a fire-brick lining and therefore requires less heat for heating the kiln walls.

While vertical mixed feed kilns are not the most efficient type, they produce a whiter, and when under expert supervision, a more uniform lime than any other type of lime furnace.

CONCLUSION

The lime from these lime-kilns has played an important part in the building which has occurred in Washington. They were built when the city was very young. It is unfortunate that they could not keep pace with the changing times, but while they produced a fine commodity for their day modern needs have outstripped the capabilities of their product. The lime industry is dead in Washington with these crumbling piles of stone to mark its place. Other tangible evidence of its existence may be seen after digging in the vicinity of the kilns. So much lime was scattered about by the lime workers that the National Capital Parks Service was forced to dig down more than ten feet to get clear of the lime in order to plant trees in the park that has replaced and old industrial area.

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Figure 2. Godey's Lime-Kilns

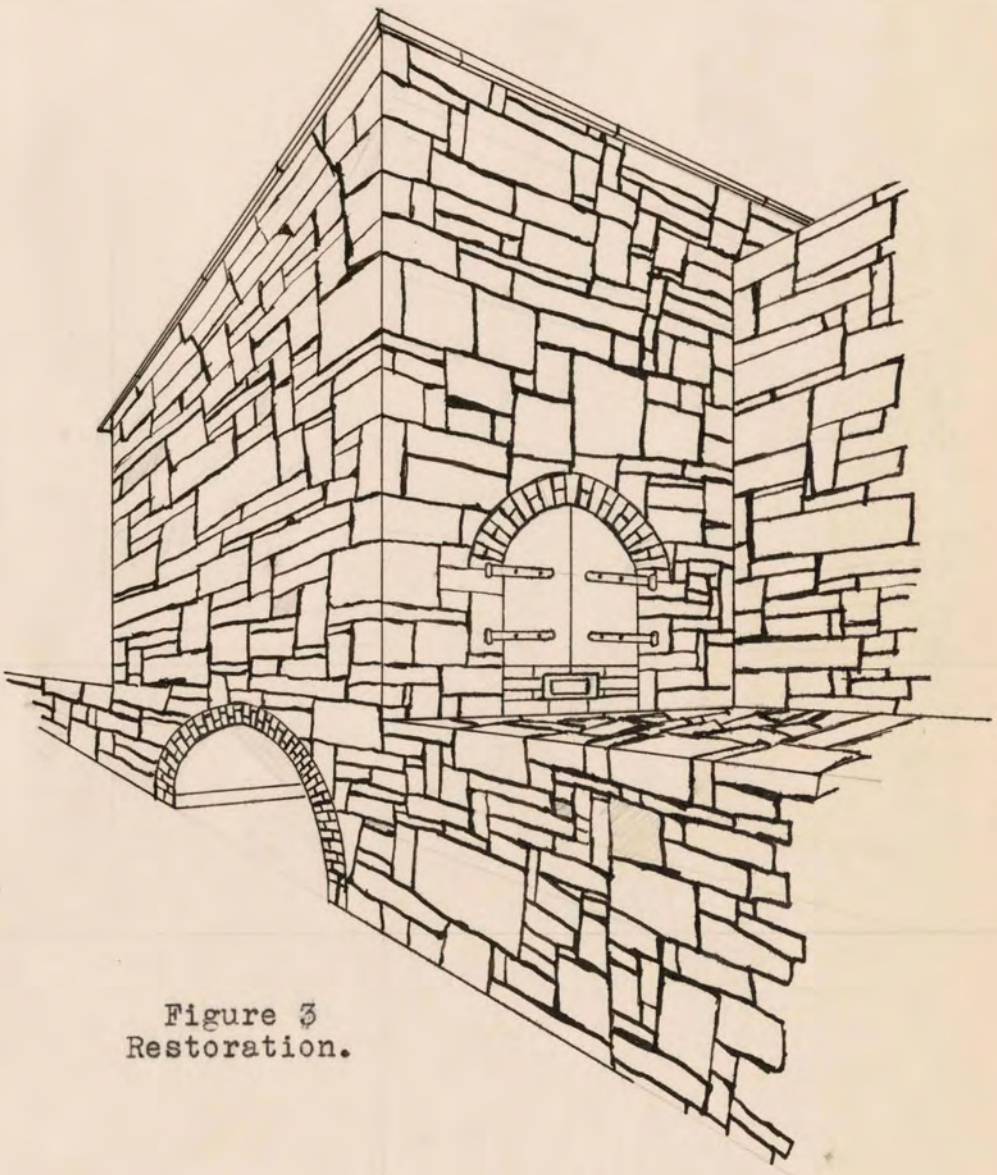

Figure 3
Restoration.

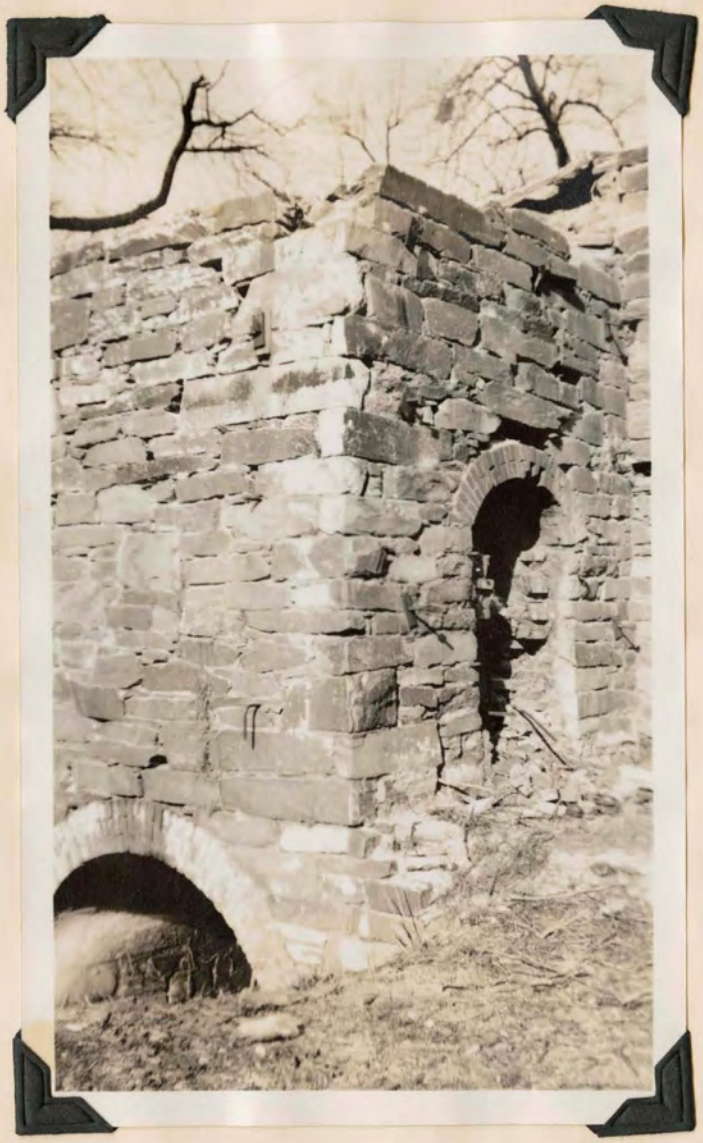

Figure 4. One of the Kilns as It Appears Today
Contrast this with Figure 3.

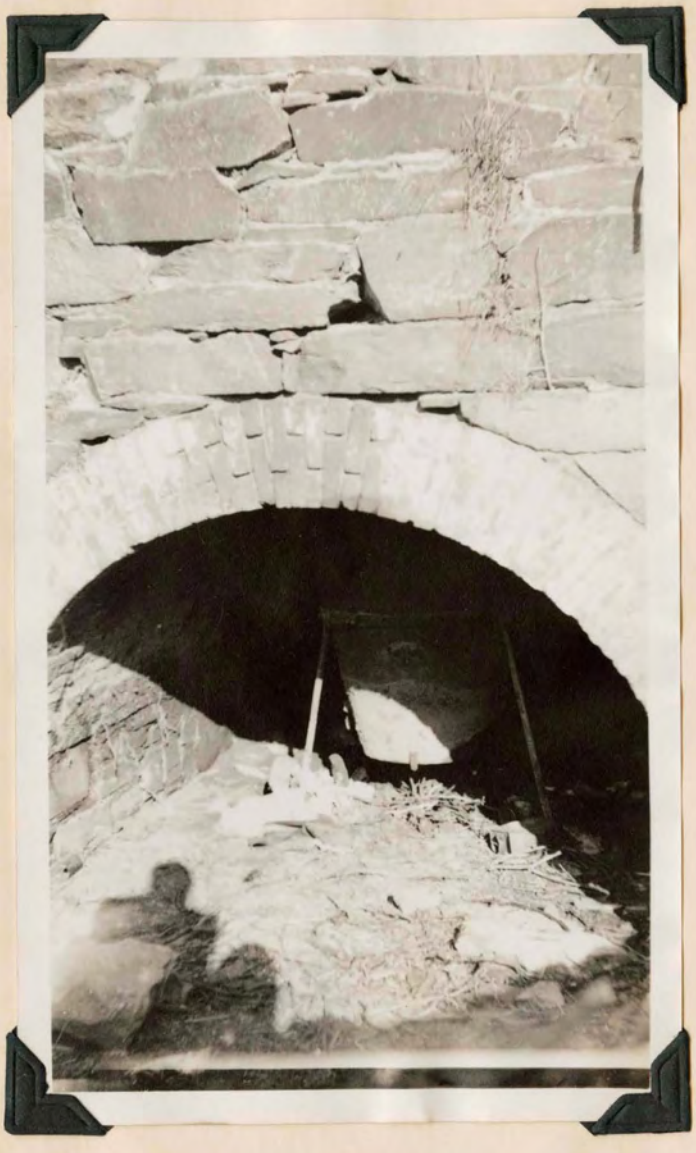

Figure 5. View of Draw Pit Showing Bottom of Cooling Kettle.

Figure 6. Interior View Showing Fire Arch