The Dam at Laurel Forge Pond (Laurel Lake) in Pine Grove Furnace State Park

compiled by Andre Weltman, August 2013 **rev 2016**

Laurel Forge was built in 1830 by ironmaster Peter Ege (1776-1847), two miles east of his iron furnace at Pine Grove. The purpose of a "finery forge" was to convert *pig iron* from the furnace into *wrought iron*. Wrought iron could be rolled, pressed or welded into useful shapes, whereas brittle pig iron would shatter. A blacksmith only used wrought iron, usually in the form of "merchant bars." The process involved heating the pig iron then hitting it repeatedly with a very large hammer – essentially a length of tree trunk attached to a hinge at one end, with a stone and iron head weighing 500 pounds or more at the other end. By the time forge operations ceased around 1896, Laurel had two forge hammers, one of which was said to be the 2nd largest in all of Pennsylvania.

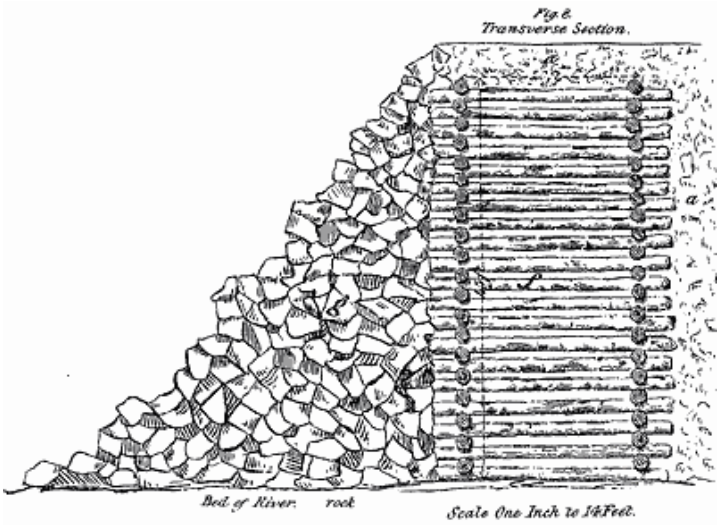
In operation, forge hammers pounded the hot metal about once a second – an extremely loud process. To rapidly lift and drop these massive hammers, water ran down a wooden flume (trough) to turn water wheels attached to wooden shafts with a cog mechanism. This was the central reason a large dam was built across Mountain Creek. In addition, water power ran bellows to push air into the fires that heated the iron.

All the forge buildings are gone; they were located in the vicinity of the gravel parking lot adjoining the modern dam, along Pine Grove Road east of the beach. In the early 20th century, a series of massive forest fires – most notably in 1900 and 1915 – destroyed what remained of the old forge and nearby workers' houses.

From approximately the 1880s into the 1920s, ice was commercially harvested from the forge "pond." (The last ice was harvested at Laurel in the 1930s to supply the mansion at Kings Gap.) However, this was not the original purpose of the dam. Nor was it intended for our modern uses such as boating and swimming and fishing. It is hard to look at beautiful Laurel Lake today and envision the purely industrial function of the area more than a century ago.

The first dam at Laurel Forge was located 60 feet upstream from the dam you can see today. It was a "rock filled timber crib with upstream earth blanket." The 1830 dam was rebuilt after failing in 1847, 1889, and 1919… each time using the same materials. During various repairs in the early 20th century, a concrete spillway was poured on top of the timber crib structure, and concrete and stone wings were installed, but the core was still made of wood and stone like Peter Ege's dam a century earlier.

From *Wikipedia*: "Timber dams were widely used in the early part of the industrial revolution and in frontier areas due to ease and speed of construction. Rarely built in modern times because of relatively short lifespan and limited height to which they can be built, timber dams must be kept constantly wet in order to maintain their water retention properties and limit deterioration by rot, similar to a barrel. The locations where timber dams are most economical to build are those where timber is plentiful, cement is costly or difficult to transport, and either a low head diversion dam is required or longevity is not an issue."



Left: a profile view of a typical Timber Crib Dam showing large stones piled on the upstream side. Illustration from *"Rideau Dams"*, by Lieutenant W. Denison, in "Papers on Subjects Connected with the Duties of the Corps of Royal Engineers", London, 1838.

State government took full control of the dam from the ice company in 1922 (the Commonwealth of Pennsylvania had purchased the former iron company lands in 1912-1913, but some portions remained in private hands or under commercial lease for variable periods afterwards).

It wasn't until 1967 that the Commonwealth began construction of a totally new concrete structure 60 feet downstream from the old timber crib dam.

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Top: Laurel Forge circa 1880. This is now a gravel parking lot. The dam is not visible to left rear. The main forge building with multiple chimneys is in the middle.

Bottom: Laurel Forge dam after it failed in June 1889. Horizontal logs in the "timber crib" are visible to left. The dam is missing in the middle. Note forge waterwheels.

Laurel Forge Dam Failures

October 1847: No details are available. As with later dam failures, the damage was repaired. That year must have been an exciting one for ironmaster William Miles Watts (1809-1883). In addition to the dam failure, in **February** a fire destroyed the furnace casting house "and associated machinery." In **June** in Carlisle, he married Anna Reed – his first marriage, as he was a "bachelor" when he took ownership of Pine Grove Furnace in 1845 from his brother Frederick Watts (1801-1889).

June 1889: The dam burst after storms that led to many floods & dam failures, most famously in Johnstown PA. The forge and a house were swept away; bridges and a paper mill dam in Mt. Holly were destroyed.

July 1919: After heavy rains, one side of the dam failed around 8 P.M. on July 22nd. At that time it was maintained by the United Ice & Coal Company, under lease from the state government. According to the *Gettysburg Times*, "It was necessary for the campers and bungalow inhabitants [cabin owners] to flee for the hills for their lives and the prompt action of the persons who happened to be near the dam saved them from drowning." The water destroyed railroad tracks ½ mile downstream, and swept away a Laurel Lake cabin plus a dozen campers' tents, as well as all the belongings of 20 Girl Scouts from Elizabethtown. The newspaper also reported that water rushing down Mountain Creek burst a dam at Mount Holly Springs and "the upper end of Mount Holly was covered with water… great damage has been done to the town."

Although the dam was repaired after the 1919 event, it remained in very poor condition. DEP memos in 1922 noted that timber facing on the downstream side was "visibly deteriorating." Stop-gap efforts were made, for example by pouring an 8 inch concrete spillway "cap" atop the timber crib, but by 1924 cabin owners and regional Chambers of Commerce were calling loudly for more substantial action. Side stone walls were built, and rocks and clay added. However, most repairs were done only in response to emergencies. For example, emergency repairs were needed in September 1949 when the old 25-foot-high dam "developed a serious leak." This pattern continued until more than $500,000 was finally made available for a completely new dam, built in 1967-68 of concrete. The new structure has had to be patched from time to time, but without doubt it is vastly more solid than its predecessor.

Footnote: in **1961** a new dam was considered "whose waters would encompass both Fuller Lake and Laurel Lake" – flooding the eastern half of the park. A DEP memo said it "would be very expensive because of the road relocation necessary and the numerous buildings which would have to be moved or razed." Some cabins along the edge of Laurel Lake were removed, but then Secretary of Forests and Waters Maurice Goddard issued a press release on November 13, 1961 announcing "abandonment of plans for expansion… This announcement will no doubt be well received by the many families who occupy cottages constructed on State-owned land in the Park area, as any further development… would necessitate the cancellation of some of those leases."