

Perspectives

More on Wooden Smelting Furnaces

Conservation Analytical Laboratory
Museum Support Center
Smithsonian Institution
Washington, D.C. 20560
June 29, 1987

Dear Editor:

J. E. Rehder's note on "The Use of Wooden Smelting Furnaces" (*Journal of Field Archaeology* 14 [1987]: 121–122) reminded me of the very interesting account of the use of wooden furnaces in North America published by Frederick Overman (1852: 656–657):

If a Western backwoodsman wants shot or bullets, he will kindle a fire in a hollow tree or an old stump of a tree, place some galena on the charred wood and melt it down. After cooling, he finds the metal at the bottom of the hollow. Formerly lead was smelted in log-furnaces, in Missouri—a rude kind of square furnace, constructed of logs or stones. Fig. 333 [FIG. 1] shows such a furnace. The front wall of such a furnace

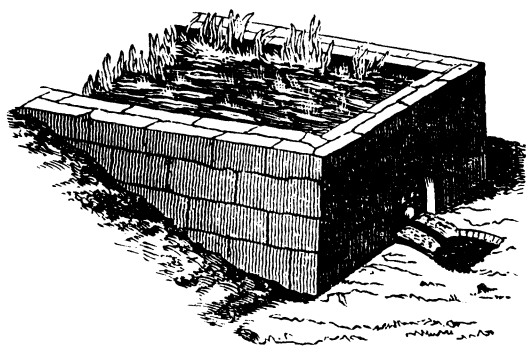


Figure 1. Log furnace in Missouri, for smelting lead (from Overman 1852: fig. 333).

is about 8 feet wide, and 7 high. The hearth in the bottom of the interior is about 2 feet wide, 8 feet long, and 10 or 12 inches high, forming ledges or boshes with the side-walls 1 foot in width. The arch in front, which admits air into the furnace, is about 2 feet high and wide, and is temporarily shut by stones, clay, or brick. A basin in front of the furnace receives the fused metal, from which it is ladled into the pig-moulds. The operation in this furnace was simple; a layer of heavy logs was placed horizontally in the bottom; then billets of split wood were set upright, and these covered with galena; the top of the ore was covered by small wood. A fire kindled in the front arch will char the lower parts of wood first; and by the time the heat is conveyed to the ore sufficient for melting,

the hot charcoal below will expel sulphur and precipitate the metal, which flows out as it is formed. One heat requires 24 hours; after which the furnace is cooled and the ashes removed; then it is charged anew. About 50 per cent. of metal is thus obtained from the ore. The ashes which remain contain much metal, and are subjected to a second smelting in the ash-furnace. Both these kind of furnaces are now obsolete . . .

Neither of these methods employed a blast, as did Rehder's thought-provoking experiment. The log furnaces described by Overman should be distinguished from the timber-clad blast furnaces typical of Scandinavia that, though constructed with logs, were lined with refractory materials.

Yours truly,
Martha Goodway

Martha Goodway is a metallurgist at the Conservation Analytical Laboratory, Smithsonian Institution.

Overman, Frederick

1852 *A Treatise on Metallurgy; Comprising Mining and General and Particular Metallurgical Operations, with a Description of Charcoal, Coke, and Anthracite Furnaces, Blast Machines, Hot Blast, Forge Hammers, Rolling Mills, Etc., Etc.* New York and London: D. Appleton and Company.

Logs or Stones?

36 Castle Frank Road
Suite 309
Toronto, Ontario M4W 2Z7
August 2, 1987

Dear Editor:

Martha Goodway's addendum to my note on wooden smelting furnaces is welcome. I am familiar with Overman's book, *The Manufacture of Iron*, but I had not seen his *Treatise on Metallurgy*.

The description of the lead-smelting furnace is reasonably clear, and it operates as a natural draft furnace very similar to those used for roasting iron ores. The effective draft in the furnace is created by the height from the center

of the 2-ft-high front opening to the top of the fuel bed, or about 6 ft, and this is adequate to produce a sufficiently high airflow rate to create a temperature adequate to smelt galena (Rehder in press).

The furnace was constructed “of logs or stones,” and if of logs would resemble the furnace I described. The walls would be protected from oxidation (i.e., combustion) by the fact of their distance of several feet laterally from the central air entry. I strongly suspect that the front wall was made of stone since, if of wood or lined with wood, the proportion of air shortcircuiting up the inside of the front wall would consume it.

Yours truly,
J. E. Rehder

Rehder, J. E.
in press “Natural Draft Furnaces,” *Archaeomaterials*.