



Applied Research Center Student Newsletter

May 25, 2006

Colonial Williamsburg Blacksmithing Traditions

Colonial Williamsburg blacksmiths (Ken Schwartz, Steve Mankowski, Sheldon Browder, Chris Furr, and Mark Sperry) are dedicated to preserving 200 years of blacksmithing traditions reviving the old methods and techniques of obtaining wrought iron and steel from local ore. Modern analytical methods can be of great help when it comes to analyzing the past, and the ARC personnel have made it their mission to help the blacksmiths with this task. Although blacksmithing appears quite rough, it requires some delicacy. For example, the difference between steel and iron, on the chemical level, is the amount of carbon; however, for blacksmiths it is the difference of techniques used to make the final product. Restoring the original techniques of blacksmithing, without a doubt, carries a significant historical value preserving the past and learning valuable lessons for the future.

Starting Materials



A Bloomery Furnace is a type of "clay oven" used specifically for iron making. The Bloomery Furnace is assembled from local clay, by hand, and is used 2-3 times before it is disposed of. Regular charcoal is used to fuel the furnace. The ore used for metal production consists of 1/2 local ore (a.k.a. Limonite) from Falling Creek (Richmond area) and 1/2 commercially purchased ore (a.k.a. Hematite).

Procedure



As expected, a lot of work is put into iron production. The process started with preheating the bloomery furnace at 7:00 a.m. and did not end until 5 p.m. that night. When the ARC crew arrived at approximately 2:00 p.m., the blacksmiths were in the middle of the process: keeping the fire burning and adding more ore and charcoal. Sixty pounds of ore have to be used to obtain 30 pounds of iron; however, the actual yield is usually smaller due to other variables.

Preparation

Metal production is a time-consuming process. Preparation started at 7:00 a.m. with preheating the Bloomery Furnace and charging it with a charcoal/ore combination. Approximately one pound of ore is used for every two



pounds of charcoal. The charcoal and the ore are added every nine minutes to reach and maintain the desired temperature. The bellows are used to create a strong air current and to keep the fire burning.

Final Product



The final product is a combination of iron and slag (a mixture of compounds not suitable for blacksmithing). Iron is then separated from the slag and used.



At the time of this field trip, the furnace was already used twice, and therefore, had

to be broken down. Subsequent analysis showed that the obtained compound was actually closer to high-carbon steel, than to wrought iron.



Credits:



Steve Delisle
Shop volunteer



Sheldon Browder



Mark Sperry



Walter Prszybysz
Shop volunteer



Steve Mankowski

Colonial Williamsburg Blacksmiths at Work



Dr. Berquist from the Department of Geology, College of William and Mary, helps out the blacksmiths by taking a turn working with the bellows. Dr. Berquist explained to the local crew how the ore is formed and added a valuable perspective on the geological aspect of the project.



Pictured with Steve Mankowski (swinging the sledge hammer) is Ken Schwarz, Master of the Shop.