Interpretation of artefacts from Thomas Jefferson's nailery at Monticello, Virginia

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ABSTRACT: Laboratory analyses of nails, nail rod, and hoop iron from Thomas Jefferson's nailery at Monticello, Virginia, yield information about the methods used and the products made at American rolling and slitting mills in the early years of the 19th century. The iron, made by fining pig, is nearly free of phosphorus. It is relatively soft and ductile, having a tensile strength of 290 MN/m$^2$ and a reduction of area of 62%. Critical grain growth found in the hoop iron indicates that the metal was at a temperature of about 840°C during its last rolling pass. Rolling conditions produced an unusual pinch-and-swell structure in the slag inclusions. Bending at the edges of the nail rods indicates that the clearance between the slitter discs was about 20% of the nail rod thickness. Ferrite veining in the rod suggests that the iron passed through the slitters at a temperature between 600 and 700°C.

Introduction

Thomas Jefferson's surviving account books, notebooks, and correspondence record many aspects of the nail-making enterprise carried on at his Monticello estate from 1794 to 1825. Archaeological excavations have uncovered evidence of the layout of the nailery buildings along with abundant artefacts that include the nail rod and hoop iron used in making hand-wrought and machine-cut nails. The artefacts, records, and site evidence make the Monticello nailery a valuable source of information on iron and nail making techniques in early republic times.

Jefferson's wide-ranging interests coupled with his frequent and prolonged absences from home led to indebtedness arising from poor management by the overseers he employed at his Virginia estates. In December 1793 Jefferson returned to what he intended to be permanent residence in Virginia as a farmer and manager. Faced with a precarious financial position, he searched for ways to increase his income through better use of his assets, which included a large number of slaves that he had inherited. Monticello, then on the fringe of frontier settlement in Virginia, was well placed...