

Iron Working

During prehistory and the Medieval period iron production and working was dominated by the fact that temperatures achieved in hearths and furnaces could only soften iron rather than melt it.

Iron ores are commonly found across Scotland. One of the most prolific sources is 'bog iron' found in wetland areas. Iron is smelted by heating iron oxide (iron ore) with carbon (charcoal) in a furnace. The furnace needs to allow a high temperature to be reached but also allow the flow of air to be controlled. Reducing the amount of air bellowed into the furnace causes the burning charcoal to form carbon monoxide. This then leaches oxygen from the iron ore to form carbon dioxide, leaving the iron in a large mass called a 'bloom' mixed with various impurities from the ore stone. Once recovered, these impurities are squeezed out of the iron bloom by heating and hammering it.

As the iron cannot be melted it cannot be cast, and must be 'smithed' or hammered into the shape of the tool or object to be made. Although this is a laborious process, the resulting object is strong and resilient, though heavy, making it excellent for bladed objects such as knives, axes and saws. It is also an excellent material for fixings such as nails and rivets which can be used to quickly construct large wooden structures such as buildings and boats. This made it a valuable resource, so much so that Roman soldiers leaving Inchtuthil fort buried one tonne of nails upon leaving the fort, in order to prevent them falling into native hands.



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Photograph and Xray of corroded iron socketed adze from High Pasture Cave, Skye



Reconstruction drawing of medieval blacksmith

© Pat Haynes

As iron became more heavily relied upon for tools and fixings, the local blacksmith became an invaluable asset to the local community. Historic maps usually note the location of smiths, which were abundant across the Highlands. As the demand for charcoal required for smithing and smelting increased, large areas of forest were cleared and smoldered to fuel the furnaces.

Iron reacts with oxygen and water, causing heavy corrosion. This means that many iron artefacts are poorly preserved and can be difficult to identify, as the surface is usually distorted and flakey with rust. However, an X-ray can be used to see beneath the corrosion and show the shape of the object beneath.

See also:

Box 3 object sheet: Iron Nails

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