A Study of the Iron Smelting Technology at Magharat el-Wardih / Ajloun

By

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This study deals with the reconstruction of the iron production techniques at the archaeological site of Magharat el-Wardih during the Ayyubid-Mamluk period (1169-1517 AD).

Another aim of this study is to explore the iron smelting techniques at two selected sites have evidences of Ayyubid-Mamluk settlement. These are Ajloun Castle and Kirbet el-Bediyh. The reason for selecting these sites is to determine the nature and extent of the metal activity that took place at these sites during the Ayyubid-Mamluk period, in an attempt to link these activities with the ores that were extracted from Magharat el-Wardih.

The excavations at these particular sites revealed significant and variant amounts of metal smelting residue such as slags, remains of furnaces/hearths and tools, that indicate of iron production activity.

To achieve the aims of this study a collection of various samples of ore and slag from Magharat el-Wardih, Ajloun Castle and Kirbet el-Bediyh were analyzed using several techniques to extract the maximum amount of information that are preserved in these remains, and to identify whether these slags were a production of smelting or smithing process.

Twenty-three samples were analyzed using Atomic Absorption Spectroscopy, Metallographic examination and X-ray diffraction analyses. In addition, archaeological evidence from excavation and survey records has been combined with the analytical study to shed light of the real iron working activities that took place at the above mentioned sites.

These combined proved that smelting activity took place at Magharat el-Wardih to produce iron blooms and these blooms might be transport to
the nearby sites like Ajloun Castle and Kirbet el-Bediyh to complete the smithing process to produce iron and manufacturing it into the desired shapes. This proved by the analyses of slag.

The analytical study of the slag and ore samples shows that Magharat el-Wardih was the only source of the ore that was used for iron smithing operations at Ajloun Castle and Kirbet el-Bediyh, lime and dolomite were used together as a fluxing agent, furnaces with low efficiency were used and smelting operation temperature was rather high.

The predominance of the Ayyubid-Mamluk pottery at Magharat el-Wardih indicates that the mine was largely utilized during the Ayyubid-Mamluk period, also the spread of large amount of slag over Ajloun district point to large size and number of working. Therefore, this period witnessed large scale smelting and smithing of iron.