Abstract

This paper presents a study of the set of metallurgy-related materials and copper and bronze objects found in La Litera region (Huesca Prov.), dating from the period between the Chalcolithic and the Early Iron Age (ca. 2700-550 BC). These materials were discovered in surface prospections or as chance finds, or were irregularly recovered in other ways.

Consequently, these are objects lacking stratigraphic context, which makes their dating difficult. Even so, most of them were not found in isolation but rather with stone or ceramic materials providing in some cases an indication of their age. This study puts special emphasis on the description and typological characterisation of the pieces and on the archaeological materials found in the respective sites. Likewise, in order to establish the chronocultural aspects of the various metallurgical elements and of the manufactured objects of copper and bronze, relations are drawn with typologically similar items that have been documented in nearby regional contexts in both the Iberian Peninsula and other more distant areas north of the Pyrenees.

The elements under study here were found in a total of fourteen sites, most of which are located in the central and southern areas of La Litera region. At least twenty-one objects have been recovered, including nine casting moulds, ten copper and bronze pieces (one of which has been lost), and a couple of items whose typology cannot be identified due to their deteriorated condition. Remains of metallurgical production have also been found.

It should be pointed out that no copper ore whatsoever is to be found in La Litera region. Although traces of copper ore are found in the neighbouring regions of Aragon and Catalonia, there is no evidence of its exploitation there during prehistory and the mining of copper in this period has only been verified in the Montsant mountain area (Tarragona Prov.). The nearest traces of tin to be found are in some very isolated areas far from La Litera.

According to the currently available data, bronze metallurgy was fully established from the first half of the second millennium BC in the Ebro valley and the lower courses of the Segre and Cinca rivers. The metallurgical craftsmen had a very high level of technological knowledge and highly developed skills in bronze metallurgy, showing a mastery of the various phases of the production process. In the period which, as previously mentioned, began in the first half of the second millennium and extended to almost its end, the documentation on hand indicates that the local metalworkers produced a very small range of objects, including

flat axes, riveted tanged daggers, arrowheads, punches, simple bracelets, needles and ornamental elements. In their probably outdoor workplaces, the metallurgical craftsmen of the small farming and herding communities to which they belonged, had what may be considered a small output of a limited variety of products. Metallurgy did not have the same importance as other productive activities in this period. The metalworkers probably devoted only part of their time to the production of their own tools and of objects for other uses and the consumption of their own communities, while any surplus would be traded in the nearby area. Most of their time would be devoted to the production of their own food. In short, they would be part-time specialists.

The objects produced by these craftsmen were mainly made by recasting worn out copper and bronze objects or ingots obtained by commerce or exchange. The fact that no signs of copper ore reduction activity have been documented in any settlement in these areas suggests the hypothesis that the tasks involved were carried out in the places where the ore was mined.

As from the end of the second millennium, at the start of the Late Bronze Age II, bronze metallurgy underwent a notable development in these areas and a greater expansion than in the preceding periods. A major increase in production and a diversification of the typology of bronze objects took place. Some of the objects found in the settlements came from or were influenced by areas north of the Pyrenees and above all locations in the south and east of today's France, arriving along the Pyrenean routes and the valleys of the Segre river and its tributaries. The documented casting moulds indicate that objects were copied and that items characteristic of those distant areas were produced locally, providing a good indication of the fact that relations between the two sides of the Pyrenees were quite common.

During this period, metalworkers may have already enjoyed a certain recognition in their communities and held a different status from the rest of their members, although one cannot speak of social differentiations. It is quite possible that they were part-time metallurgical specialists who also engaged in farming and herding activities, carrying out their metalwork at times when such activities were less intense.

Bronze metallurgy reached its peak between the end of the Bronze Age and the beginning of the Early Iron Age in the Ebro valley, the north-eastern part of the Iberian Peninsula, and Western Europe in general. This peak was also reached in the settlements along the lower course of the Segre and Cinca rivers, showing a great typological diversity of objects and a very notable degree of technological development among metalworkers. We do not know, however, whether or not these people devoted themselves full-time to metallurgical production or whether they made objects only for internal consumption and short-range commerce or produced surpluses for trade on a broader scale.

It was also at the end of the Bronze Age and the beginning of the Iron Age when the Monderes bronze hoard was formed and concealed. This is a set of worn out or no longer useful materials which were intended for recasting and which were most likely carried by a travelling merchant or an itinerant metalworker, just as has been verified in other similar hoards in the north-east of the Iberian Peninsula.

All the casting moulds documented in the sites of La Litera, dating from the beginning to the end of the Bronze Age,

are made of local sandstone, except the valve for terminal-winged axes of Sosa II, which is made of black crystalline gypsum (a type of stone that is also of local origin). Almost all the moulds documented in the Ebro valley and the north-eastern part of the Iberian Peninsula are likewise made of sandstone, except for a few ceramic items. Sandstone was used to make casting moulds for several reasons and above all because it was the most abundant type of stone. It is also a soft stone that is easy to work, allowing mould shapes to be formed in a very clean and precise way. Additionally, sandstone has a great thermal shock resistance to the high temperatures of incandescent metal and, as a result of its makeup, it has a relatively long cooling time.