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WATER CONTROL AND CEREAL MANAGEMENT ON THE BRONZE AGE IBERIAN PENINSULA: LA MOTILLA DEL AZUER

Summary. *Archaeological research conducted in the La Mancha region (central area of the Iberian Peninsula) has made it possible to identify* motillas*. This specific type of archaeological site consists of a central fortification surrounded by an inhabited area. They appear in high densities throughout the plains of this area, distributed at regular intervals and located in places where the phreatic level is closest to the surface and the water has low salinity. The strong relationship between sites and water has subsequently been supported by fieldwork, especially in the Motilla del Azuer settlement, where a complex well that was cut into the natural terrace to reach the phreatic level has been documented. Research has also demonstrated that the large-scale storage of cereals was another significant function. The quantity and capacity of the different storage systems documented in two large enclosures suggest that these sites were engaged in the control and management of cereals.*

INTRODUCTION

Fieldwork over the past 30 years at the settlement of Motilla del Azuer, together with surveys carried out in the western region of La Mancha, make it possible to demonstrate the strong control exercised by Bronze Age societies over such critical resources as water and cereals (Nájera and Molina 1977; 2004a; 2004b; Molina *et al.* 1979; 2005; Nájera *et al*. 1979; 1981). The particular ecological conditions of the La Mancha environment can be related to the way in which these societies undertook the exploitation of a territory with distinctive features.

The La Mancha region is located in the so-called southern *submeseta* in the central area of the Iberian Peninsula, extending across the current provinces of Albacete, Ciudad Real, Cuenca and Toledo (Fig. 1). This region is a broad tectonic depression formed in Miocene times by the Alpine orogeny. The depression, filled with late Tertiary and early Quaternary lacustrine and continental sediments, constitutes a virtually flat plain bounded by several mountain systems. The climate is characterized by its continental nature with significant thermal oscillations, low rainfall and the lack of permanent watercourses in large areas of the region. Nevertheless, the scarcity of water is mitigated by areas of swamp and both permanent and seasonal lagoons, like the well-known Tablas de Daimiel, and especially by the presence of a

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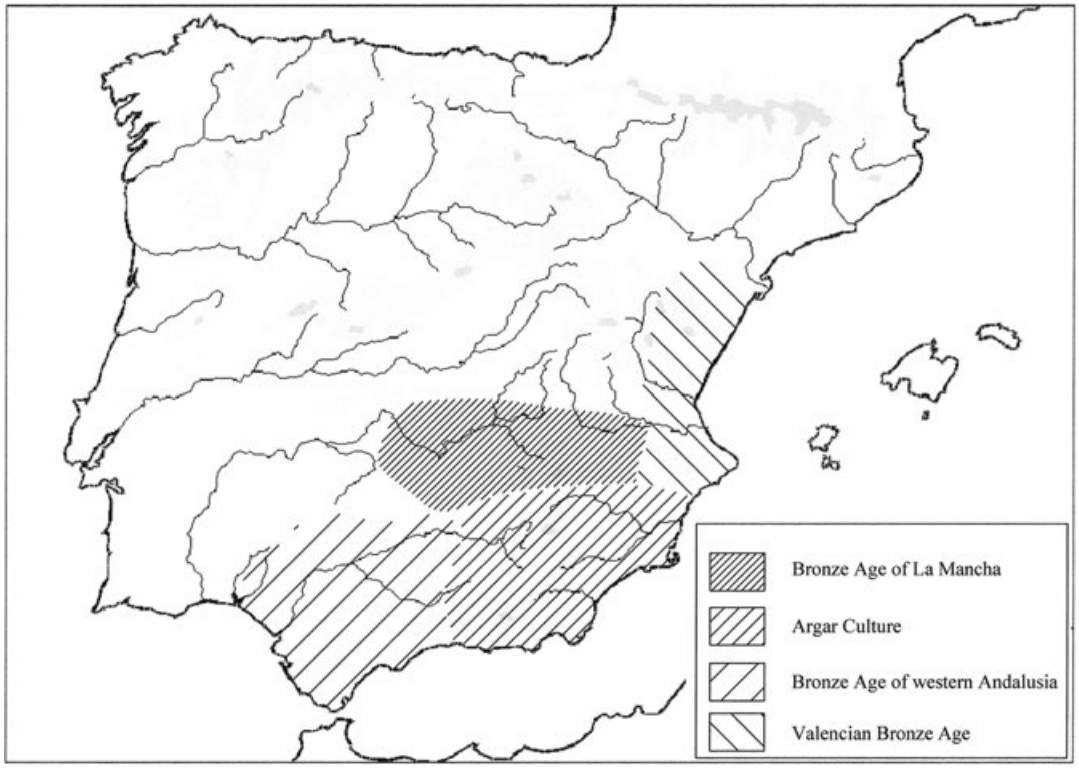

Figure 1
Location of different Bronze Age cultural groups on the Iberian Peninsula.

large aquifer, one of the most significant on the Iberian Peninsula. Traditionally, the communities of La Mancha have used the phreatic levels as the main source of water.

All these ecological characteristics of the La Mancha environment can be associated with a particular settlement pattern that differs considerably from those documented in other Bronze Age societies on the Iberian Peninsula (2200–1450 cal BC). During the Bronze Age, different cultural groups shared many settlement pattern features. The well-known societies located in peripheral areas, like the Argar Culture in the south-east of the Iberian Peninsula, can be characterized by the occupation of steep slopes and hilltops that in many cases were fortified by complex systems. Strategic position and the control of the surrounding areas were the key factors in the settlement patterns. In contrast, the Bronze Age societies of La Mancha developed a territorial organization based on the occupation of the plain. A structured pattern of sites known as *motillas* was found throughout the low-lying areas of La Mancha. This type of settlement can be distinguished by artificial mounds measuring between 4 and 10 m in height, formed by the destruction of a complex fortification with concentric stone walls. In addition to the *motillas*, which are the most characteristic type of settlement of these societies, two further categories of site have been identified: hilltop settlements in the mountains that border the plain, and small agricultural settlements. As will be shown below, all these types of site were linked in a complex system marked by a high population density.

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Of the different types of site identified in the Bronze Age of La Mancha, the *motillas,* owing to their special features, are the settlements on which the attention of scholars and local antiquaries has long been focused. From the end of the nineteenth century, these sites were believed to be funerary barrows containing cremations (Hervás 1899; Sánchez Jiménez 1948; Schüle and Pellicer 1965), a belief maintained until the 1970s by a lack of archaeological research. This changed dramatically in 1973 thanks to a research project undertaken by the University of Granada in the western region of La Mancha. Three separate *motillas* began to be systematically excavated: El Azuer (Daimiel), Las Cañas (Daimiel) and Los Palacios (Almagro) (Nájera and Molina 1977; Molina *et al*. 1979; 1983; Nájera *et al*. 1979; 1981). At the same time, a survey programme was developed in order to understand the territorial context of the Bronze Age societies and the evolution of the population throughout late prehistory (Nájera 1984; Molina and Nájera 1978; Nájera *et al*. in press).

In 1977, another research team from the Autonomous University of Madrid began work in the La Mancha region with the excavation of the Bronze Age hilltop site at La Encantada (Granátula de Calatrava) (Nieto and Sánchez Meseguer 1980; Nieto *et al*. 1983; Sánchez Meseguer 1994). Several years later, in 1984, they also undertook other fieldwork, including a settlement on the plain called Motilla de Retamar (Argamasilla de Alba) (Colmenarejo *et al*. 1987; Galan and Sánchez Meseguer 1994). In contrast to the western area of La Mancha, archaeological research in the eastern region began in the 1980s with considerable intensity. Scholars belonging to such institutions as the Ministry of Culture and the Complutense University of Madrid undertook a research programme involving extensive surveys and the excavations of Morra del Quintanar (Munera) (Martín 1983; 1984) and Motilla del Acequión (Albacete) (Fernández-Miranda *et al*. 1990; 1993). At the same time, the University of Alicante began intensive surveys in the Almasa corridor and important excavations at Cerro del Cuchillo (Almansa, Albacete) (Hernández and Simón 1994; Hernández *et al.* 1994).

SETTLEMENT PATTERNS: *MOTILLAS*, HILLTOPS AND SMALL AGRICULTURAL SITES

The archaeological research carried out by the University of Granada in the basin of the Guadiana River began in 1973 with extensive surveys. This initial approach to settlement patterns was completed by an intensive survey carried out during 1984. A surface of about 150 km^2 located in the northern area of Ciudad Real was surveyed, including both the plain areas situated along the axis of the Guadiana River/the Tablas of Daimiel and the mountainous zones lying in the southern spurs of the Montes de Toledo (Fig. 2). Plain areas were sampled by transects following the terraces of the Guadiana River, whereas in the mountains the survey followed the natural units of the valleys. As a result, 160 sites were located dating from the Copper Age to the Roman period; 72 belong to late prehistory: seven to the Copper Age, 50 to the Bronze Age and 15 to the Late Bronze Age. All this information made it possible to establish the general development of the population in this area from the Copper Age to the Roman period (Nájera *et al*. in press).

The great stability of the Bronze Age population (Nájera and Molina 2004b), with long-term settlements and significant demographic growth, is remarkable. The dramatic increase in the number of sites contrasts with the scarcity of population during other prehistoric periods. According to the results achieved in the intensive survey area, Bronze Age sites made up 70 per cent of the total until Roman times, with approximately one settlement every 3 km^2. The number of sites increased by a factor of more than seven from the earlier Copper Age, which implies a

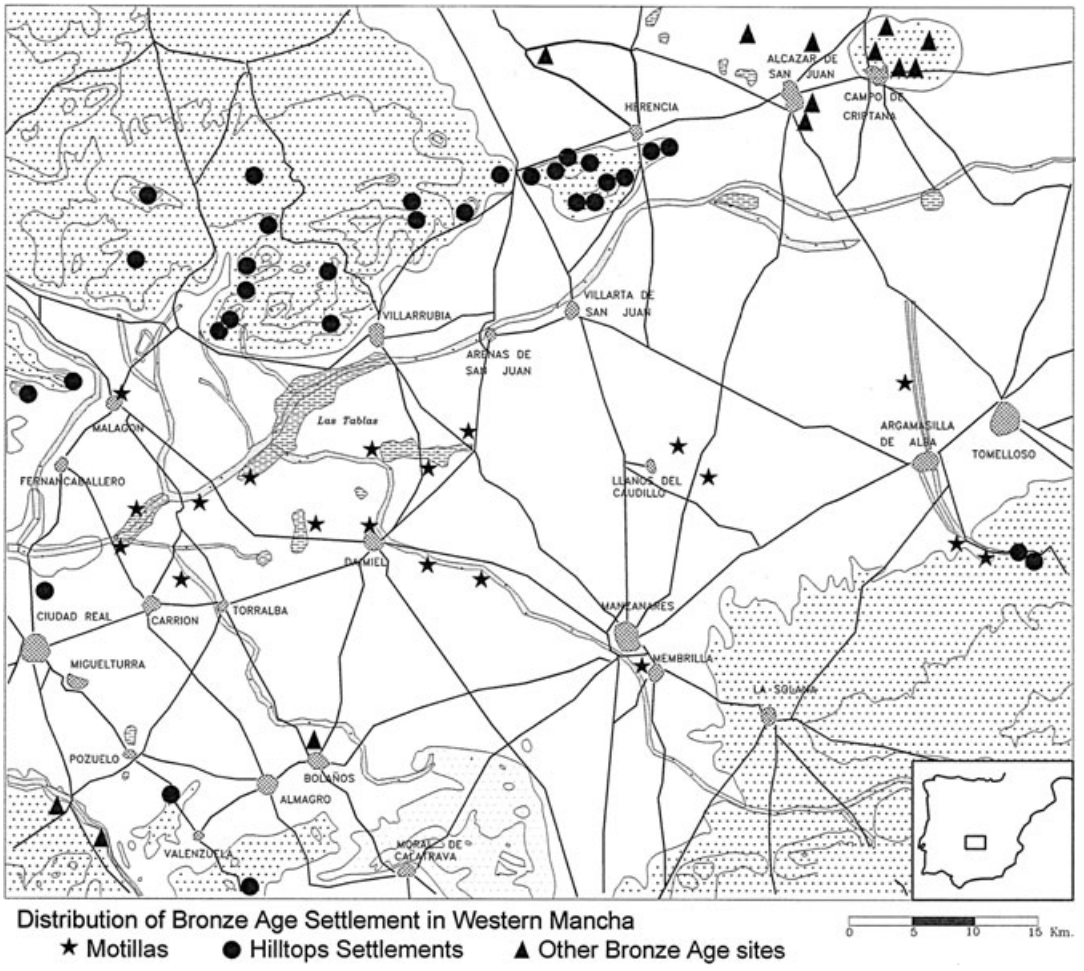

Figure 2
Distribution of the different types of Bronze Age site in the western area of the La Mancha region.

significant shift in settlement patterns. The main features of the La Mancha Bronze Age are high-density population, demographic growth and long-term sites.

As mentioned above, three different categories of site can be identified: *motillas*, hilltop settlements, and small agricultural settlements. Owing to the great regularity of distribution throughout the plain of La Mancha, the *motillas* are probably the most important type of settlement. They are found at regular intervals along the watercourses, 4 to 5 km apart. They may, furthermore, be located next to swamps and areas that, at the present time, are lagoons (Fig. 2). These sites are always located at those points where the phreatic level is closest to the surface. A study of the differences in the water-bearing levels of this region between 1973 and 1983 has shown the close relationship between the distribution of *motillas* and the proximity of the phreatic level. This is illustrated by a 1980 map of water-bearing distribution that shows how the *motillas* were located in those places where the water could be reached more easily (Fig. 3).

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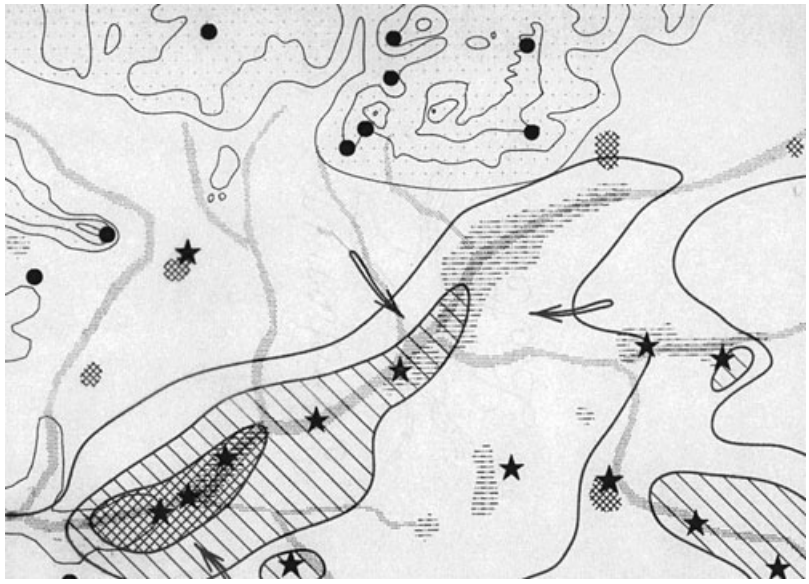

Figure 3
Map of water-bearing distribution in 1980. The *motillas* are located at points where the phreatic level is closest to the surface.

The regularity of the *motillas* can be analysed not only by studying their distribution along the Guadiana River and its tributaries, but also by taking into account their sizes. There are normally slight differences in size, ranging from 0.25 to 1 ha. This consistent pattern is only broken in those *motillas* lying on the border of the distribution area. One example of this is Motilla de Los Palacios, which reaches 2 ha in size, more than twice the typical dimensions. The location of these sites shows the limit of maximum expansion for this type of settlement in the La Mancha region. This pattern indicates the important role played by the largest *motillas* in boundary control.

The strong link between the distribution of *motilla* sites and watercourses, lagoons and swamps on the plain of La Mancha can be accepted as a fundamental characteristic of this settlement pattern. The only exception is documented on the Cigüela River, an important tributary of the Guadiana River, where there is an unexpected lack of *motillas*. The analysis of differences in water salinity explains this gap in the distribution of *motillas*. Salinity exceedance analysis of the water in the region establishes that up to the 2000 μs/cm curve the water is suitable for consumption, whereas from 4000 μs/cm it loses this property. *Motillas* always appear to be associated with low salinity water in contrast to areas such as the Cigüela River where the high salinity levels explain the absence of this type of site.

In summary, *motillas* are a type of settlement located throughout the plain of La Mancha, characterized by their high density, distribution at regular intervals, and location in places in which the phreatic level is closest to the surface and the water has low salinity. All these characteristics imply careful planning of settlements, in which water was the fundamental criterion for determining the relationship between these sites and the landscape.

The sites of the second category are located on the hilltops of the mountains that border the plain and on the small spurs that cross it (Fig. 2). The landscape of these areas consists mostly of oak and pine woodland, with occasional thicker concentrations of forest and abundant grass in the lowest part of the valleys. These hilltop sites enjoy a natural defensive position enhanced by complex fortification systems that enable a wide territorial control of the inner mountain valleys and the adjacent plain. The intervisibility analyses carried out confirm the high visual relationship between the hilltops and the *motilla* settlements. The strategic placement of hilltop sites involved an important visual control over the *motillas* that would also have been supported by the documented low intervisibility between them. The settlement pattern of the hilltop sites shares the strategic concept present in other peninsular Bronze Age cultures, which contrasts with the original system developed on the plain of La Mancha.

Among the various groups of hilltop sites that can be identified, the settlements on the mountain of Villarrubia and on the southern spurs of Montes de Toledo are notable. Differences in size and location characterize the settlements of this group. Several sites are well situated for controlling access from the plain to the interior of the valleys. At times, this control is even emphasized by a defensive tower located on a dominant point next to the site. Inside the valleys, one or more larger settlements, normally linked to areas with the greatest economic potential, have been documented. The differences in the location and size of the hilltop sites imply that several settlements controlled and centralized the exploitation of large territories. This is the case with sites such as La Encantada (Granátula de Calatrava), at present the only hilltop settlement that has been systematically excavated.

The third type of site in the territorial organization is represented by small settlements found in a wide variety of topographic locations. They normally occupied prominent places on the plain of La Mancha. Particularly noticeable are the traditionally named *fondos de cabaña* sites (García Huerta and Morales 2004; Moreno-Arrones and Prada 2004), located in low-lying areas and characterized by unfortified occupation. Their position in zones with high agricultural productivity could suggest that these settlements were related to an important specialization in farming, especially of cereals.

LA MOTILLA DEL AZUER: A FORTIFIED SETTLEMENT IN LOW-LYING AREAS

From the beginning of the fieldwork in 1973, the *motillas* appeared as a type of site with a significant presence in the region and with a regular distribution throughout the watercourses and swamp areas. In some settlements such as Motilla del Azuer or Motilla de Los Romeros, clandestine excavations made a preliminary characterization of these sites possible. The holes left by these activities revealed massive stone walls and deposits belonging to different phases of occupation, as well as evidence of fire and destruction. All these elements made it possible to suppose that these sites were formed by a central fortification, which, after its destruction, formed a conical mound of rubble surrounded by small inhabited areas (Nájera and Molina 1977).

To test these hypotheses, a programme of excavations was undertaken in 1974 at two sites that seemed most suitable. Motilla de Los Palacios seemed an appropriate site for vertical excavation in a deeply stratified long-term settlement. The second site, Motilla del Azuer, was the perfect place to study spatial organization owing to the lack of occupation after the Bronze Age. The systematic excavations carried out, especially at Motilla del Azuer, from 1974 to the present

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have become an essential reference point in the analysis of La Mancha's Bronze Age. Thanks to knowledge gathered in the different programmes of fieldwork, it has been possible to characterize this type of site accurately.

The site of Motilla del Azuer is located a few kilometres from the town of Daimiel (Ciudad Real), on the left bank of the Azuer River (Fig. 2). The first research phase took place between 1974 and 1986 with eight archaeological seasons and one restoration project. As a result, Motilla del Azuer was identified as a mound fortification measuring about 40 m in diameter with a central tower, two walled enclosures and a large patio located in the eastern area. A settlement area was documented surrounding the fortification. The necropolis, following a common pattern in most Bronze Age peninsular cultures, was situated inside the inhabited area (Nájera *et al*. 1977; 1979; 1981; Molina *et al*. 1979).

Following a pause of several years, fieldwork was taken up again in 2000 and is still in progress. Gradual deterioration of the massive stone structures necessitated recommencement of the archaeological work with a high-priority goal: the consolidation and restoration of the impressive archaeological remains in order to open the site to the public. As part of this second phase, eight excavation seasons (Nájera and Molina 2004b; 2004c) and two restoration projects (Nájera *et al.* 2004; Martín *et al*. 2004) have been undertaken to date. The new fieldwork has focused on three main areas of the site:

a) Large areas of the settlement and necropolis, little explored during the first research phase, were excavated to allow an accurate characterization of these spaces.
b) Walled enclosures were systematically excavated, with many storage structures recorded.
c) Special emphasis was placed on studying the patio. Inside this large open area, an impressive well was documented that cut through the natural terrace to the phreatic level.

The fortification

The internal structure of the fortification shows a degree of complexity due to the long-term use of the site (2200–1400 cal BC) and many changes in the spatial use. Different phases of building and rebuilding of the walls, changes that entail the division of internal spaces, and corridors or doors that were open or closed tell us about the complex history of the defensive constructions (Fig. 4).[1] All these changes produced frequent increases in the fortification's vertical structures. The conical mound formed by the fortification is predominantly the result of these recurrent processes, which involved many superimposed construction phases spanning centuries of occupation (Fig. 5).

In spite of the spatial complexity reached, the main structural elements were maintained throughout the entire period of occupation at the settlement. The fortification was organized from the beginning with separate, clearly defined spaces: a central tower with points of access located in narrow corridors, a large patio placed in the eastern area of the fortification that contained an impressive well more than 20 m deep, and two concentric enclosures separated by walls. The circular outer wall enclosed the fortified area (Fig. 6).

1 Photographs by M.A. Blanco and the Department of Prehistory and Archaeology, University of Granada.

Figure 4
Internal space of the fortification showing the structural complexity reached.

Figure 5
Aerial view of La Motilla del Azuer from the north-eastern corner.

The eastern patio and the hydraulic structures

The tower is the central element of the fortification; all the other defensive structures were organized around it. Quadrangular in shape, the tower is constructed of rubblework with walls measuring over 11 m high. The walls show various reconstruction phases, indicating that they were built and rebuilt many times throughout the occupation of the site. Access to the tower was provided by ramps and doors located in narrow corridors that also enabled communication with other areas of the fortification. These corridors also have impressive walls, measuring over 7 m in height including several refurbishments. Access to the eastern side of the tower was indicated by the remains of a door, partially destroyed by previous clandestine excavations.

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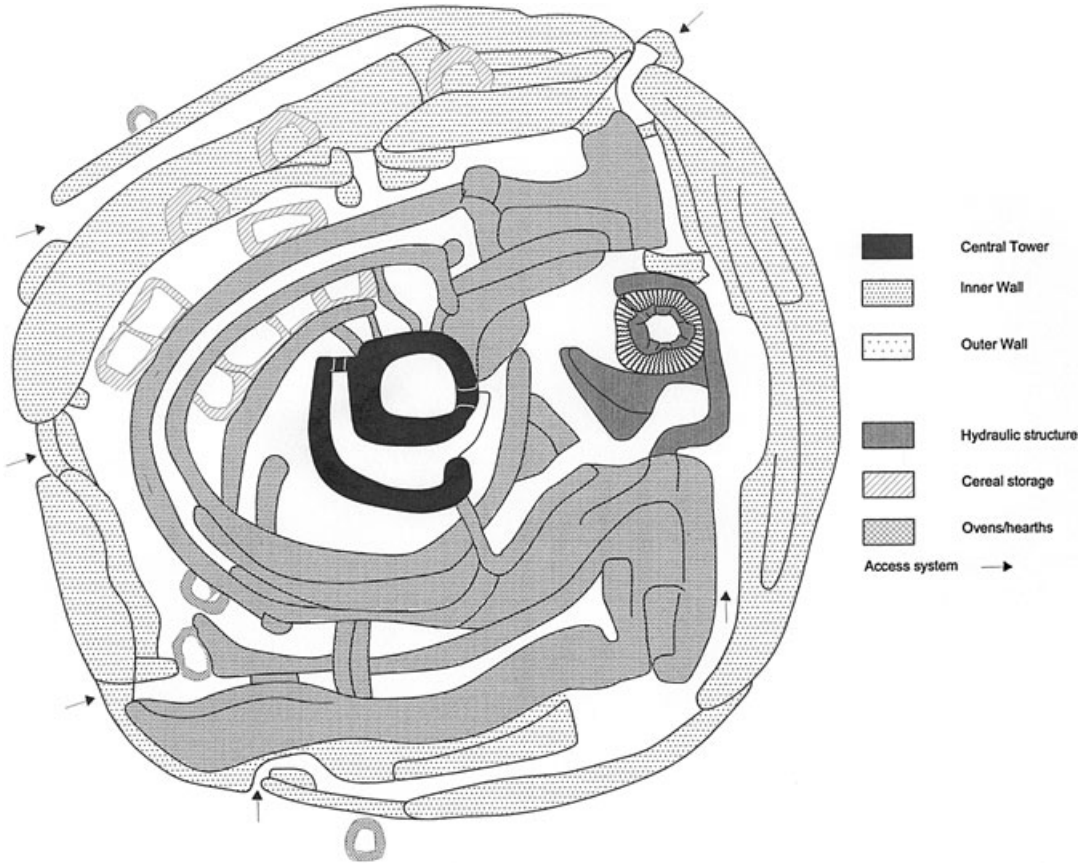

Figure 6
Schematic plan of the fortification with the different identified areas.

The eastern side of the tower delineates one of the patio's borders, a large open area, trapezoidal in shape, that almost completely occupies the eastern part of the fortification (Fig. 7). The outer defensive wall encloses the eastern area and various corridors located on its northern and southern sides link the patio to the more internal areas of the fortification. The patio was in use during the entire occupation of the site. The process of maintaining it, along with the development that created superimposed structural phases, produced one of the most complex areas to be excavated. Separate access points to the inner area of the patio were documented. From the outer areas of the fortification, two doors located in the south-east and north-east corners reveal several episodes of reconstruction. In the more recent phase of the south-east gate, its layout changed slightly and traditional rubblework systems were modified using enormous stones, giving it a massive appearance. Access to the north-east door in the most recent phase was through a corridor with steps. Corridors and ramps opening onto the southern and northern sides of the patio connected with the innermost areas of the fortification. A complex stratigraphic sequence defined the development of these access points, with many changes throughout the occupation of the site.

Figure 7
Aerial view of the La Motilla del Azuer site with the central tower and the patio.

Inside the patio, a well was excavated by the inhabitants of the settlement, cutting the natural terrace on which the site is located. The well first cut through the gravel deposits of the terrace and then the limestone bank located just below until it reached the phreatic level. The well was more than 20 m in depth, measuring from the top of the tower. During the Bronze Age the excavated area was funnel-shaped, owing to the great depth achieved, progressively reducing the surface area of the well. The cut made in the geological matrix was protected with rubblework walls resting on the limestone rock banks (Fig. 8). Like other parts of the fortification, this hydraulic structure attained a considerable degree of complexity over time with the construction of successive walls and platforms that in some cases narrowed the well and in others modified the systems of access.

The western fortified enclosures: cereal storages

In the western area, two large enclosures separated by defensive walls have been documented. The first wall leans on the south-east and north-east corners of the central tower, and the second encloses the fortification (Fig. 6). The inner enclosure is located in the western area of the fortification between the intermediate wall and the corridor that provides access to the tower. This area shows several phases of reconstruction that divide the space into multiple-room units, associated with episodes of fierce fires and high levels of destruction giving rise to more than 7 m of deposits.

The data recorded during the excavation of this enclosure make it possible to establish some changes in its functionality over time. Its most important purpose was for the storage of cereals. Different storage systems have been documented in this area: rectangular structures built of stone and mud in the earliest period and containers made of pottery and esparto grass during the more recent phases. As a result of the fires, organic material such as esparto and a considerable amount of carbonized cereals have been preserved.

The second enclosure was located between the intermediate wall and the outer one, occupying a large space surrounding the western half of the fortification. Recent fieldwork

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Figure 8
Hydraulic structure located inside the fortification.

carried out in this area has revealed the importance of storage pits for cereals. Many of these were large pits built of stone masonry, quadrangular or oval in shape, more than 2 m deep and with different reconstruction phases. The inner surfaces of these storage pits were covered with mud plaster and their average capacity exceeded 4 cu m, according to the present state of preservation (Fig. 9).

Furthermore, use of the storage containers in these walled enclosures for cereals is supported not only by the abundance of carbonized grain but also by the large quantity of rodent remains recorded in the archaeological deposits. The systematic flotation of excavated sediments has shown significant quantities of micro-fauna in which rodents predominate. In addition to the cereal storage pits, several ovens characterized by either a circular or an oval shape, stone foundations and mud vaults have been documented. Their function may have been related to cereal roasting and food production. The abundance of ash deposits located inside the enclosures suggests that the ovens must have been in extensive use.

The outer line of wall that encloses the circular fortified area is remarkable for its construction characteristics. The inclination of the walls towards the interior of the fortification raises important questions about the system of construction and its dynamics, which are currently under investigation. Specific methodological and technical procedures were required to excavate this area. In the last phase of this outer wall, the construction systems change dramatically, incorporating the use of huge stones; this contrasts with the previous systems of construction, which employed small- and medium-sized rubblework.

Figure 9
Fortified enclosure with some of the storage pits documented.

Narrow corridors parallel to the outer wall provide access to the fortification from the inhabited area, thus avoiding direct entry to the internal spaces (Fig. 4). Several access points have been documented, in some cases reaching great complexity. Such is the case with the door situated in the south-west corner of the fortification. The access displayed several rubblework structures that narrowed the space considerably, making transit difficult. Next to these structures, large post-holes were present on both sides of the door, and probably represent part of the closing system.

The settlement and necropolis

The settlement area surrounding the fortification has a radius of approximately 50 m. During the first phase of the fieldwork from 1974 to 1986, research on the settlement was limited. Vertical excavation was carried out in order to establish the maximum extent of the site and the nature of the archaeological deposits, reaching sedimentation nearly 3 m thick in some areas. In the second phase of research, which began in 2000, excavation of the settlement has been an important goal. Large areas, particularly the south-east and south-west quadrants of the site, were systematically investigated. As a result, the inhabited areas have been carefully distinguished and the number of graves identified has increased considerably.

Although more excavation will be necessary, the inhabited area can be characterized by oval and rectangular dwellings divided by walls into separate rooms. Dwellings were built with

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Figure 10
View of the settlement area.

stone foundations and their mud walls were often associated with timber posts that in some cases appear carbonized. Their roofs were composed of organic material waterproofed with mud and supported by the timber posts (Fig. 10). Inside the dwellings, various domestic activities have been identified, especially storage areas, looms and hearths. In this context, excavation in one room revealed at least ten large storage vessels and several millstones *in situ* in very good condition, preserved by the intense heat of a fire.

Between the dwellings, wide open-air areas with a high concentration of pits, ovens, earth and rubbish dumps relating to storage and production activities were common. Pits, both circular and oval in shape and of various sizes, are especially frequent in the northern and eastern areas of the settlement. They are normally filled with ash and/or waste materials. The hearths and ovens can be differentiated by their diverse typology both in terms of their size and construction. They are normally circular in shape with stone foundations. Probably one of the most common features of these structures is the presence of different layers of plaster recorded on the inner surfaces of the ovens (Fig. 11). In the dump areas, located in the south-west of the settlement, there are several large pits containing animal remains. Of particular note is the high percentage of horse remains, generally hooves, skulls, large bones and jawbones, probably the result of butchery.

As with other Bronze Age cultures of the Iberian Peninsula, the necropolis at El Azuer is located within the settlement area. Burials were normally placed under the floors of dwellings, although in the recent phases, when many changes in the use of space took place, several graves were recorded in the peripheral areas of the fortification. Taking into account the fieldwork undertaken in 2004, 75 burials have been excavated, although 36 were partially destroyed during the prehistoric occupation. The funerary ritual always took the form of individual inhumation in pits, occasionally covered with stonework or slabs. Nevertheless, in some child burials the ritual includes the use of pottery vessels. The bodies always appear in a flexed position (Figs. 12 and 13).

Grave goods are scarce and unrepresentative, although some adults have been found buried with pottery vessels and, in some cases, with daggers or awls made of copper. Also exceptional are the grave goods of a child burial that include very small items made in pottery

Figure 11
Circular oven with different layers of plaster on the inner surface.

Figure 12
Individual inhumation in a flexed position.

and clay, reproducing the typical materials found at the settlement (Nájera *et al*. 2006). Nevertheless, a lack of grave goods is the norm in the majority of the burials, despite differences of age and sex.

Seventy-five individuals, comprised of 49 adults and 26 children, make up the anthropological sample that has been analysed. Among the adults both sexes and different age

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Figure 13
Child inhumation in a pottery vessel.

groups are equally represented. The population of El Azuer corresponds to the old demographic regime with very high child mortality rates and low life expectancy. The average height for men was 1.75 m and for women 1.53 m. Anthropological analyses indicated the pathologies of this population, which were mostly infections caused by nutritional stress and poor health conditions. The high percentage of maxilla dental pathology and diseases such as hypoplasia can also be related to a population with a diet rich in carbohydrates. Other illnesses such as periostitis and osteoarthrosis reflect the existence of infection and degenerative diseases (Jiménez-Brobeil *et al*. 2008).

Ancient landscape and economic structure

The palaeoecological analysis of Motilla del Azuer makes it possible to form a hypothesis concerning the landscape of the territory surrounding the settlement (Nájera and Molina 2004b). A palaeobotanical study has been carried out based on large samples of charcoal belonging to the various archaeological contexts of the fortification and settlement. According to the results, the samples analysed were dominated principally by oak, followed by cork, both species probably used as wood for construction. In spite of the location of the site next to the Azuer River, no riverbank species has been recorded. Even the presence of other species such as pine is very unusual (Rodríguez-Ariza *et al*. 1999).

Palinological analyses were carried out on the geological deposits from the Guadiana River, which resulted in several levels being dated to the Bronze Age. The palaeoecological evidence for this period shows an environment populated with *salix*, *pinus* and *quercus*, as well as with a significant number of plants, over 50 per cent, associated with swamp areas (Menéndez and Florschutz 1968). This analysis contrasts with the studies conducted at the site of Motilla del Azuer where, in addition to species such as oak, pine, oleaceae, willow and alder, a remarkable selection of plants linked to cereal cultivation has been identified (information provided by Dr. R. Yll).

Palaeoenvironmental conclusions can also be drawn from the results of the faunal analysis of samples recovered from the Motilla del Azuer site (Driesch and Boessneck 1980). Deer and wild boar dominated the wild animal assemblage, followed by carnivorous species such as lynx, Spanish cat, fox and badger, and medium- and small-sized rodents like rabbit, hare, fat dormouse, field mouse and common mole. Birds make up 2.3 per cent of wild animals with 13 different species identified. Species such as bustard, little bustard and crane inhabited open spaces, while stone curlew, goose and duck indicate watercourses or areas of swamp. Birds-of-prey such as hawk, little owl, buzzard and owl are also notable in the sample studied (Driesch and Boessneck 1980).

According to these analyses, the environment of Motilla del Azuer during the Bronze Age can be characterized by a meadow landscape with patches of trees such as oak, cork and gall oak together with shrubland species such as juniper, strawberry tree, rockrose, laburnum and lentiscus. These species would indicate bioclimatic parameters that were slightly wetter and warmer than at present. The lack of gallery forest in the environmental record would suggest the absence of permanent watercourses in the surrounding area.

Indications of subsistence practices are based on detailed studies of faunal and carpological samples (Driesch and Boessneck 1980; Buxó 1990; Araus *et al.* 1997; Nájera and Molina 2004b). Seeds from various cereals, mainly wheat and hulled and naked barley, have been identified. In the sample analysed, these types of cereals clearly predominate, followed by lower percentages of leguminous species such as peas, vetches, beans and lentils. The cereals and legumes were placed in different storage systems in a cleaned state, implying that the primary processing/threshing of the seeds took place outside the fortification. Agricultural production can be characterized by extensive cereal farming with crop rotation.

Livestock was another important subsistence activity in the economic structure of the settlement. From a sample of 11,977 bones, it is clear that sheep and goats formed the highest percentage of the faunal assemblage, with those over two years old in the majority, and with a significant female proportion. Cattle, mainly adult females, occupy second place followed by horses and pigs, which were generally slaughtered before reaching the age of two. Dogs were even systematically consumed, as can be deduced from a documented specific slaughter pattern (Driesch and Boessneck 1980). In addition to being used for their meat, the livestock were an important source of products such as milk and wool. The sex and age pattern of the domesticated species and the presence of cheese-strainers and loom-weights at the settlement support the significance of secondary goods.

DISCUSSION

The territorial organization of the population during the Bronze Age may be related to the ecological conditions of the La Mancha environment. In this process, the *motillas* stand out as a type of site whose distribution throughout the landscape shows a very strong association with those areas where the phreatic level was closer to the surface, and the water could, therefore, be reached with less difficulty. The lack of *motillas* linked to watercourses with high salinity levels, together with their regular distribution pattern, suggests that the planning of this type of site was clearly based on a critical resource: water (Nájera and Molina 2004a).

This approach to settlement patterns has subsequently been supported by excavations, particularly those carried out in Motilla del Azuer. Although the hypothesis of a well located in

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the eastern area of the fortification was considered during the fieldwork undertaken in the 1980s, it was only recently that its presence and considerable structural complexity were documented. The well at El Azuer would have required a sizeable investment of labour for the inhabitants, cutting into the natural terraces until they reached the phreatic level and maintaining the structure during the entire period of occupation. The presence of a large and complex well within a walled fortification indicates that one of the main reasons, if not the most important, for the distribution of the *motillas* across the landscape was the control of water.

The fieldwork undertaken at Motilla del Azuer also suggests that the large-scale storage of cereals was another of the main roles of this type of site in the complex organization of the territory and the exploitation of its resources. The considerable number of storage systems documented in two large enclosures located in the western area of the fortification, along with the large quantities of associated cereal seeds, indicates that the *motilla* was a huge storage centre that substantially exceeded the needs of the inhabitants, whose population was probably modest, if the small size of the settlement area surrounding the fortification is taken into account.

Further support for this specialized role in the control and management of cereals is found in the scarcity of evidence for cereal production and processing. Stone tools such as denticulate sickle blades are poorly represented in the material culture of El Azuer, which may indicate the low participation of the inhabitants in harvesting. The small number of millstones recorded is more likely to be related to subsistence activities at El Azuer rather than to large-scale production. The processing of cereals was carried out in the domestic sphere, which contrasts with the scale and complexity of the different storage systems and the large amount of cereals associated with them. The ovens, also common inside the fortified enclosures, were most likely linked to the processing of cereals – especially roasting – as a way of improving their preservation, although this requires confirmation.

Water control, the storage of large quantities of cereals and the amount of labour involved in the construction and maintenance of the impressive fortifications imply specialization in several activities that far exceeded the requirements of the social group that inhabited this type of settlement. All these features, together with the regularity of the settlement pattern, indicate a strong social hierarchy based on the integration of different types of settlement. In this sense, important social differences can be noted by studying the variation in grave goods between the *motillas* and hilltop sites. The funerary ritual at Motilla del Azuer can be characterized by the virtual lack of grave goods, indicating a homogeneous social structure. Conversely, in the necropolis at hilltop sites such as La Encantada, important social differences can be identified based on strong variations in grave goods. The quantitative and qualitative diversity can be used to establish differential access to wealth and consequently a stratified society. All these elements would support a complex political relationship between hilltop settlements, occupied by the social elites, and sites located on the plain that were inhabited by social groups without significant social differences, and especially linked to the control and management of such critical resources as water and cereals (Nájera and Molina 2004b).

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